

The

International

ADDITION

festival

&

fair

APRIL 1962

2/6

Thirteen years ago we started something...

... Remember 1948 — the year Manchester United won the Cup and My Love the Derby. It was also the year of the Berlin Airlift and the Wembley Olympic Games. To us, however, 1948 has an even deeper significance for this was the year when we first demonstrated the Ferrograph — the year in fact which virtually witnessed the birth of a new industry. For until the coming of the Ferrograph no Tape Recorder had been designed and commercially



manufactured in Britain. Yes, certainly we started something and we are justly proud of our many contributions to the art of Tape Recording. For let it not be forgotten that many of the features incorporated in that first Ferrograph are today to be found on many competitive machines. Did we say "Competitive"? Well perhaps that's not strictly true because with its impeccably high standards of performance and manufacture we venture to think — and users appear to agree with us — that the Ferrograph is in a class by itself.

Series 4A

For conventional Monaural Recording and Playback
Model 4A/N ($3\frac{3}{4}/7\frac{1}{2}$ i.p.s.) **81 GNS**
Model 4A/H ($7\frac{1}{2}/15$ i.p.s.) **86 GNS**

Series 4S

As above but in addition fitted with stereo head to permit playback of pre-recorded stereo tapes through external hi-fi amplifiers and loudspeakers.
Model 4S/N ($3\frac{3}{4}/7\frac{1}{2}$ i.p.s.) **88 GNS**
Model 4S/H ($7\frac{1}{2}/15$ i.p.s.) **93 GNS**

Series 420

For Monaural and Stereo recording and playback, with monitoring, re-recording from one track to the other, introduction of echo effects and many other advanced features. Requires power amplifiers and external loud speakers.
110 GNS

The Incomparable **Ferrograph**

THE FERROGRAPH COMPANY LTD.

84 BLACKFRIARS ROAD, LONDON, S.E.1 Telephone: WATerloo 1981

Record it on...
Gevasonor Magnetic Recording Tape.
Now available in a wider-than-ever
range of types and sizes

GEVASONOR MAGNETIC TAPE

TYPE	SPOOL DIA.	TAPE LENGTH	PRICE PER SPOOL	STOCK NO
TYPE M Standard Play	4"	300'	10/6	M/90
	5"	600'	18/-	M/183
	5 $\frac{3}{4}$ "	820'	23/6	M/250
	7"	1200'	30/-	M/365
	10"	2400'	55/-	M/730
TYPE LR Long Play	3"	225'	7/6	LR/68
	4"	450'	13/6	LR/137
	5"	900'	24/-	LR/275
	5 $\frac{3}{4}$ "	1150'	28/6	LR/350
	7"	1800'	42/-	LR/550
	10"	3600'	80/-	LR/1100

gevasonor

GEVASONOR MAGNETIC TAPE

TYPE LRP Long Play Tensitized Polyester	3"	225'	9/-	LRP/68
	4"	450'	16/-	LRP/137
	5"	900'	28/-	LRP/275
	5 $\frac{3}{4}$ "	1150'	35/-	LRP/350
	7"	1800'	50/-	LRP/550
	10"	3600'	95/-	LRP/1100
TYPE DP Double Play Tensitized Polyester	3"	300'	14/-	DP/90
	4"	600'	25/-	DP/183
	5"	1200'	45/-	DP/365
	5 $\frac{3}{4}$ "	1650'	55/-	DP/500
	7"	2400'	80/-	DP/730

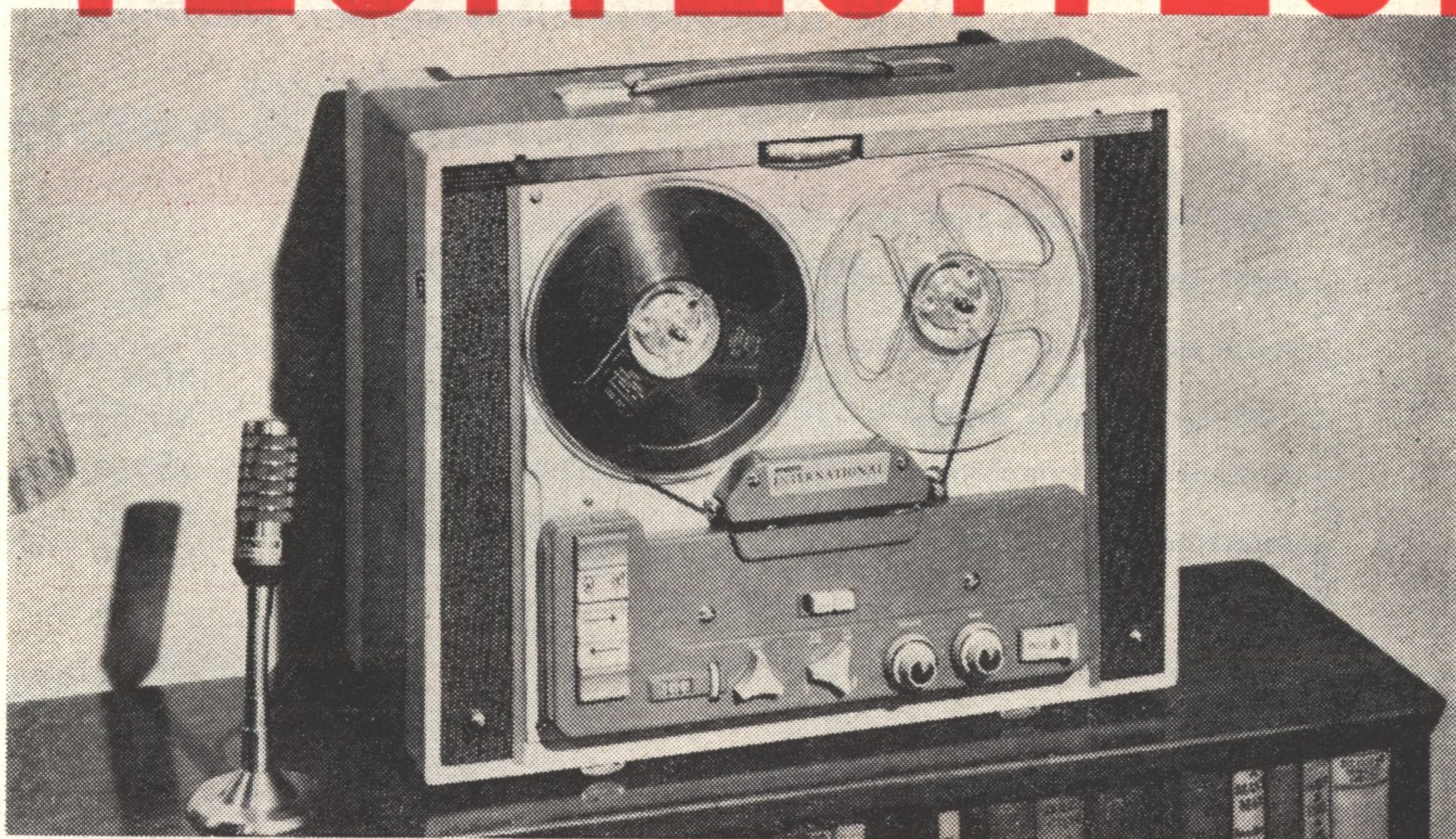
GEVAERT

Obtainable from your radio or photographic dealer

GEVAERT LIMITED · BRENTFORD · MIDDLESEX

See us at Booth 60
Demonstration Room 122

YES!YES!YES!



INTERNATIONAL

Triumphant new WyndSOR recorder

SEE IT ON STAND No. 32

HEAR IT IN ROOM No. 261

To appreciate the vertical-operating "INTERNATIONAL" to the full, you must see it and hear it and study the full-colour brochure. But briefly :

4 tracks — 2 speeds ($7\frac{1}{2}$, $3\frac{3}{4}$), fantastic performance, independent bass and treble controls, 8in. round speaker (13,000 lines gauss) facing rear, recording level meter with horizontal scale, 3 inputs, 3 outputs, output for stereo monitoring through speaker, switched straight through amplifier, red/green warning lights, tape position indicator, storage space for microphone and 6 spools, ribbon microphone with flexible column and stand, centrifugal locking nuts for spools, pause control (temporary or lock-down), mixing of inputs.



75 gns. complete with ribbon microphone and flexible column.
69 gns. without microphone.

WyndSOR RECORDING COMPANY LIMITED

WYNDSOR WORKS, 2 Bellevue Road, Friern Barnet, London, N.11
Telegrams: Wyndreco, London Telephone: ENTERprise 2226/7

ZONATAPE ADDS COLOUR TO YOUR RECORDINGS

Colour spools are another exclusive Zonatape feature—
RED for PVC Standard Tape ★ GREEN for Polyester Extra Play ★ BLUE for Polyester Double Play ★ CLEAR for Diacetate. You will also find the recordings you make on ZONATAPE more colourful. This is because the magnetic coatings used by Zonal were designed originally for use in recording film successes like "Ben Hur" and "Guns of Navarone."

Now, with Zonatape, you, too, can record the whole range of the sound and musical spectrum.

Come and hear for yourself what a big difference a really professional tape—a Zonatape—will make to your recordings.

Demonstration Room 236—Booth 42



ZONAL FILM (MAGNETIC COATINGS) LTD.

Zonal House, Westfields Road,
London, W.3. Acorn 6841.

C 60



New Studio Condenser Microphone

Smooth over entire range (20 . . . 18,000 cps) with field proven omni and cardioid capsule CK 26 and CK 28. Transistor B 60 power pack makes the C 60 independent of AC mains. Miniaturized for use on shoulder strap. C 60 with B 60 power pack or N 60 power supply and all necessary cables only £79.10.0d. and £92.10.0d.

K 58



New Headphone—Microphone Boom Set

Combination of the well known K 50 headphones and the dynamic noise cancelling microphone D 58. Rugged, iron-dust proof, extremely lightweight, no tight coupling to ear necessary. No listening fatigue. Ideal for switchboard operators, intercommunication, language laboratories, broadcast reporters, etc. Available also with transistor amplifier for +6 dbm output: type K 58 T.

POLITECHNA (LONDON) LTD.

LONDON W.1

3 PERCY STREET

Telephone: Langham 6236

Telex: 23894

Cables: Polindust London

See us at the
AUDIO FAIR

Booth **69**

Room **321**

Office **324**

AKG of Vienna has the basic patents on mikes with full-range cardioid response. AKG's cardioids are cardioid down the entire range where you need it most! This is only one of the plus values in an AKG. They are all rugged and smooth in their translation of sound.

From von Karajan to Joe Doakes, AKG is first choice for crisp, full-bodied sound. From £100 to £7, AKG cardioids are the cardioidest mikes you can buy today.



**MICROPHONES
FROM VIENNA**



**WHERE THEY
KNOW THE
TRUE SOUND
OF MUSIC**

WAVERLEY RECORDS

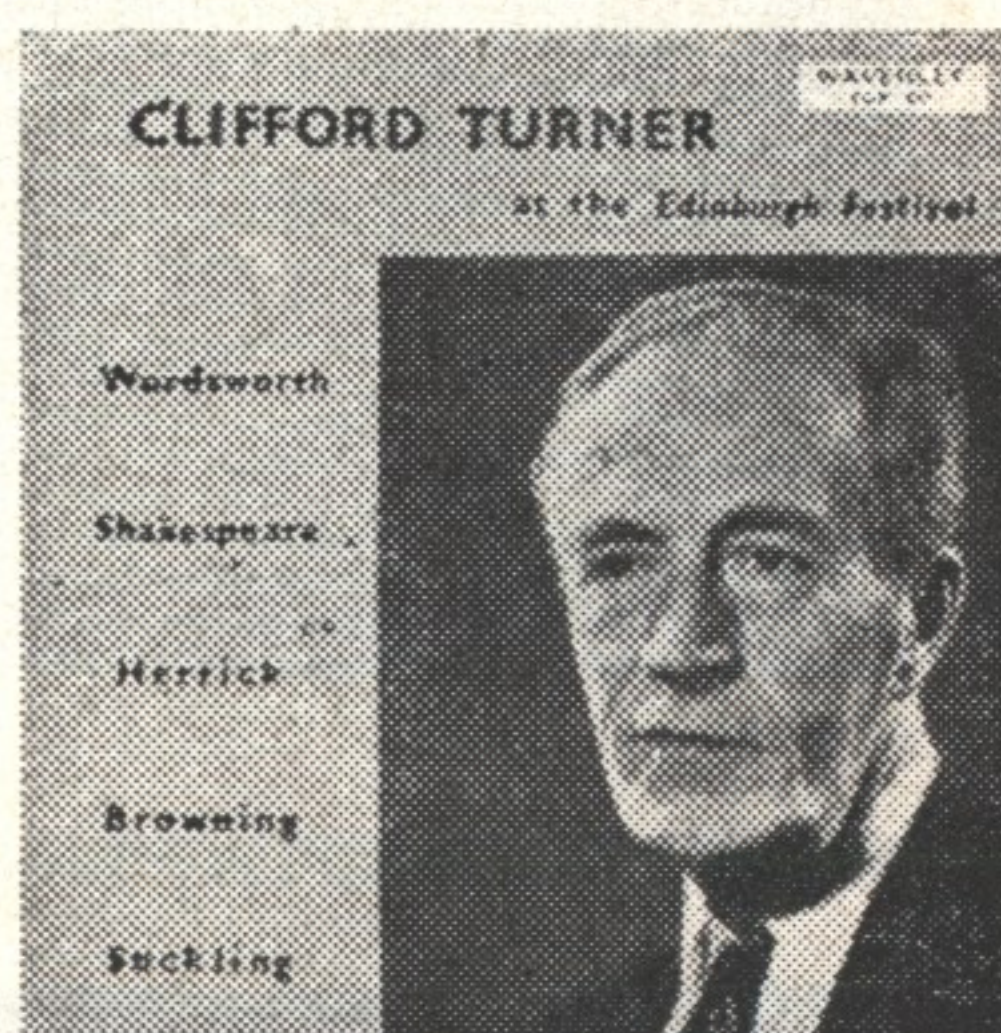


Highlights from our Catalogue

"MARCH OF THE PIPERS"

A stirring disc of Piping and Drumming.
The Edinburgh City Police Pipe Band.
Marches, Strathspeys, Reels, Jigs, Drum Fan-
fare and Highland Schottische.

MONO 12in. LP STEREO
LLP 1007 36/8d. SLLP 1008



CLIFFORD TURNER AT THE EDINBURGH FESTIVAL

A SPEECH RECORD OF GREAT DISTINCTION

Sonnet Nos. 18 & 116 (Shakespeare)
The Solitary Reaper (Wordsworth)
My Last Duchess (R. Browning)
The Constant Lover (Suckling)
MONO only 7in. EP
YLP 051 13/-

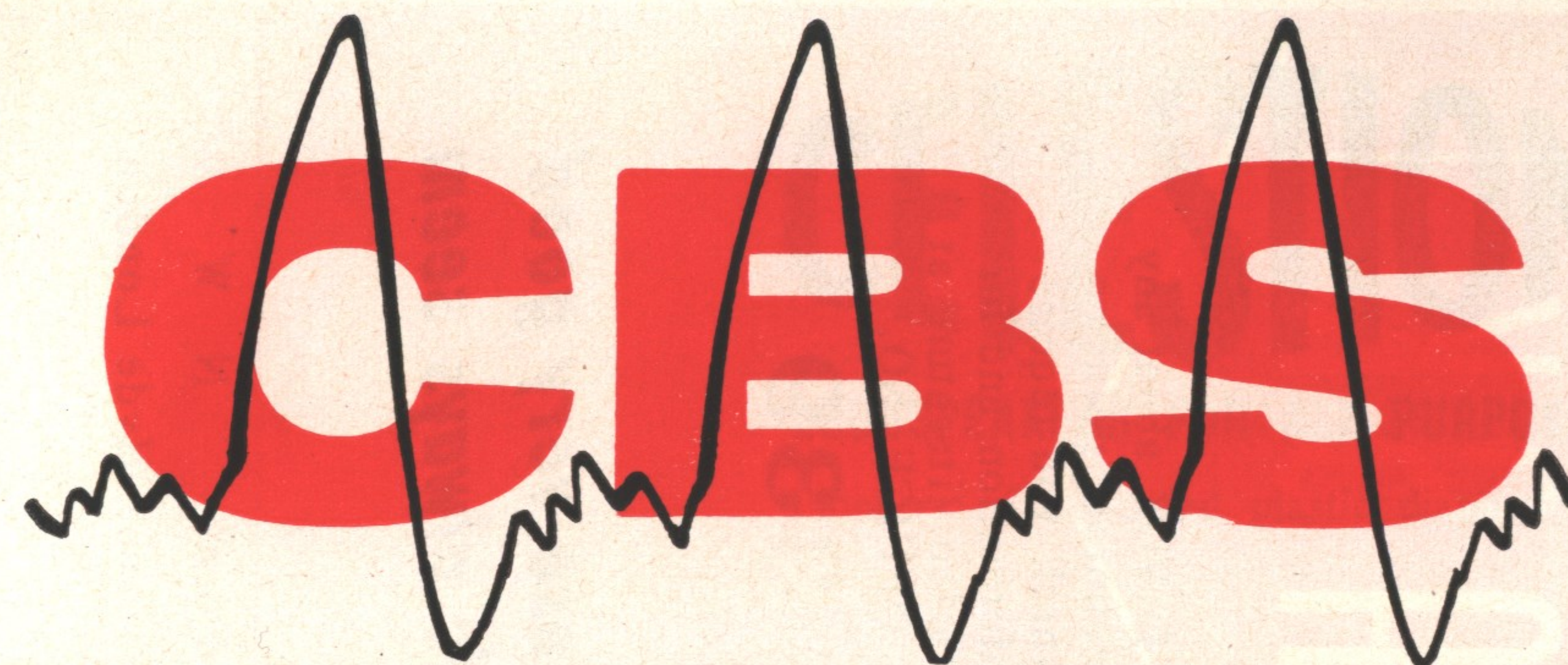
HAYDN QUARTETS

First Stereo Recording!
THE EDINBURGH QUARTET PLAY
Quartet No. 22 in D Minor
Quartet No. 70 in D Major
MONO 12in. LP STEREO
LLP 1005 36/8d. SLLP 1006



WAVERLEY RECORDS

23 EARL GREY STREET
EDINBURGH 3

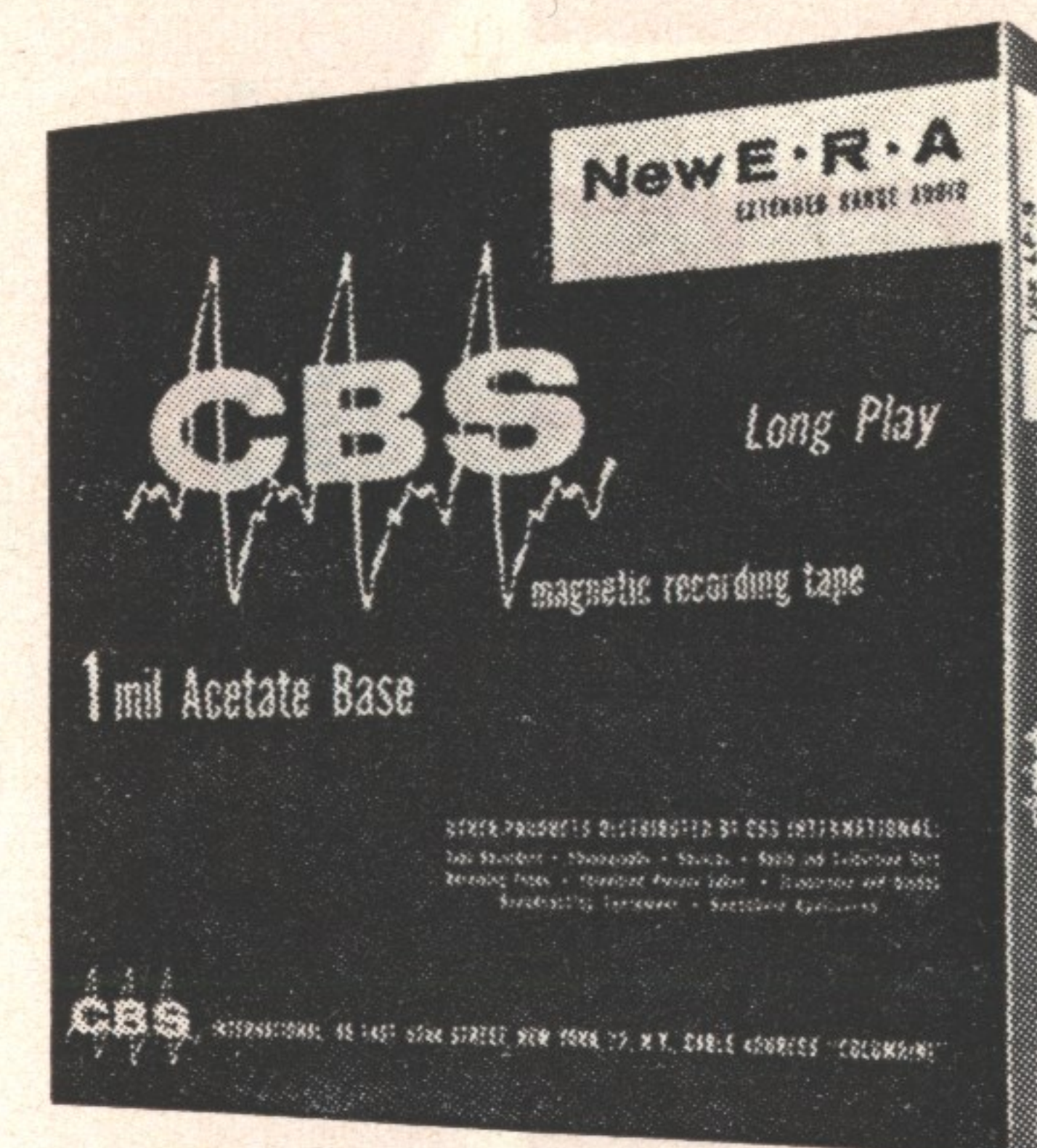


PROFESSIONAL STANDARD TAPES

for better recordings

Specially prepared fine magnetic iron oxide dispersion; precision and uniformity in processing with quality control at all stages—these are some of the features that result in CBS Tapes are giving you extended frequency range, better wearing; better transients and the chance to make magnificent recordings from all sources on quarter track at 3½ ips if required. In all sizes—standard, long play and double play.

Particularly recommended for 4-track and stereophonic uses.



- ★ Better quality at less cost.
- ★ Available in all sizes.
- ★ Ideal for 3½ in.
- ★ Ideal for stereo and 4-track instruments.
- ★ Long wearing.
- ★ Excellent signal to noise ratios.

Specimen Sizes and Prices

STANDARD

900ft. on 5½ in. reel 23/-
1,200ft. on 5½ in. reel (long play) 25/-
1,800ft. on 5½ in. reel (double play) 45/-

MYLAR

900ft. on 5½ in. reel 28/-
1,200ft. on 5½ in. reel (long play) 32/-
1,800ft. on 5½ in. reel (double play) 55/-

● FROM TAPE STOCKISTS EVERYWHERE

CBS INTERNATIONAL

A Division of Columbia Broadcasting System, Inc.

CBS TAPES

12-16 WATLING STREET, LONDON, E.C.4

Phone: CIT 2238

SEE HEAR ASK

VITAVOX loudspeakers, microphones, horns, dividing networks, pressure units and ancillary equipment on BOOTH NO.

25

VITAVOX loudspeakers and loudspeaker systems demonstrated on both mono and stereo in DEMONSTRATION ROOM

337

VITAVOX about any technical point on which you require information and for detailed literature at OFFICE NO.

339

VITAVOX

... the people who make those very good loudspeakers your friends always seem to have

VITAVOX LIMITED
TELEPHONE: COLindale 8671

Westmoreland Road London NW 9
TELEGRAMS: Vitavox Hyde London

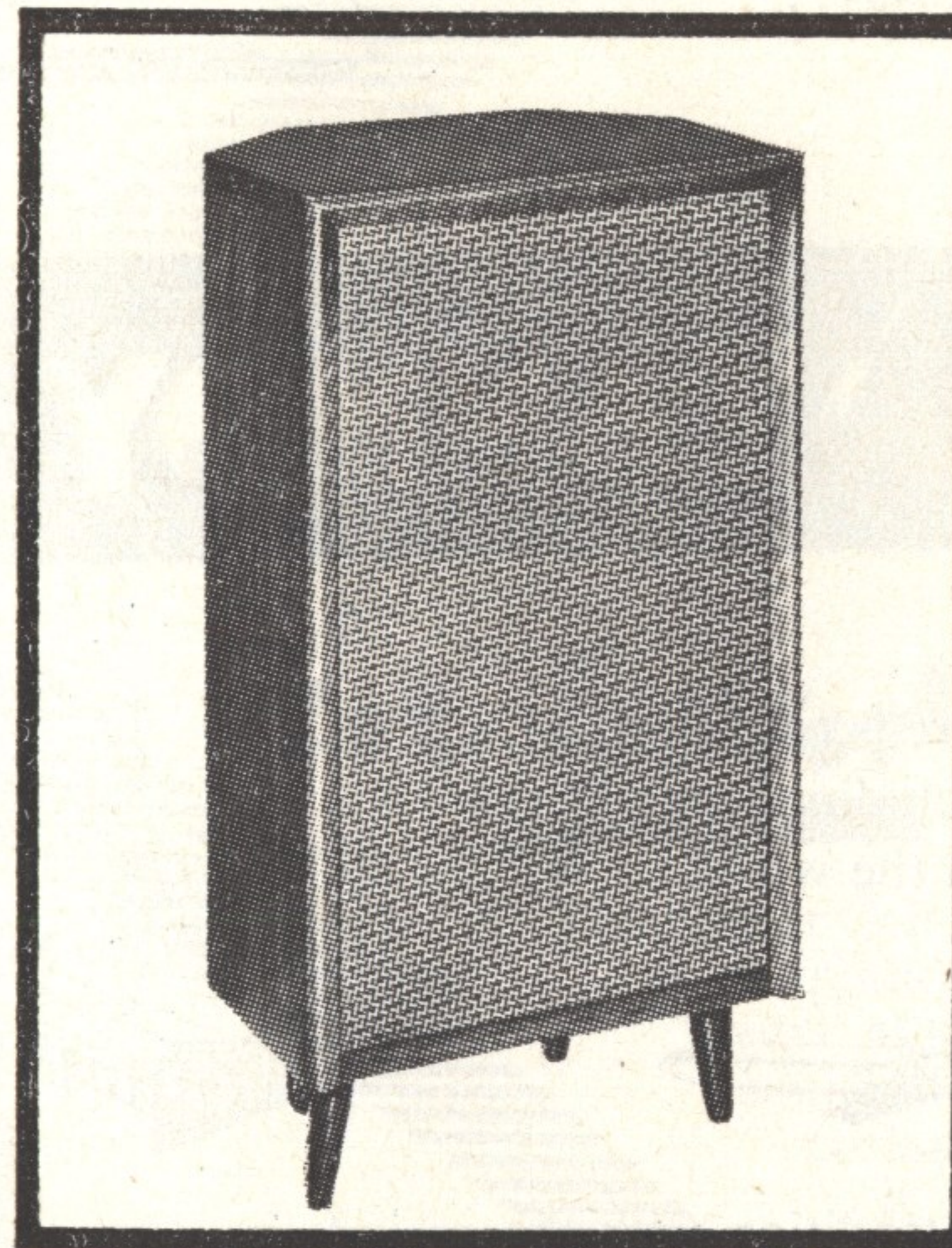
Close to Queensbury Station L.T. Bakerloo Line Stanmore Branch

CELESTION

LOUDSPEAKERS FOR ALL PURPOSES

Pioneers of expanded plastic diaphragms
in Gt. Britain

COLAUDIO II



We invite you to see and hear
the demonstration of this
fabulous loudspeaker.

**STAND No.58
DEM.ROOM No.348**

Rola Celestion Ltd.

Ferry Works, Thames Ditton, Surrey

Phone: Emberbrook 3402/6.

Grams: Voicecoil, Thames Ditton.

TANNOY LIMITED

TANNOY PRODUCTS LTD.

TANNOY RENTALS LTD.

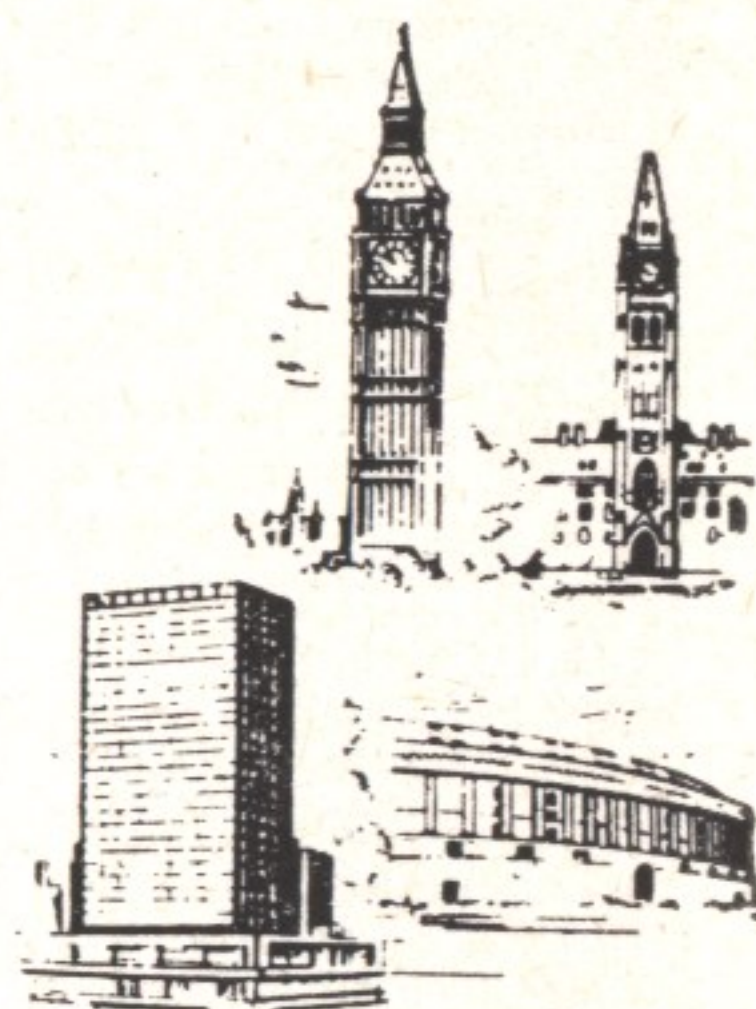
**other
things
they
do**

TANNOY (AMERICA) LTD.

TANNOY (CANADA) LTD.

TANNOY MARINE LTD.

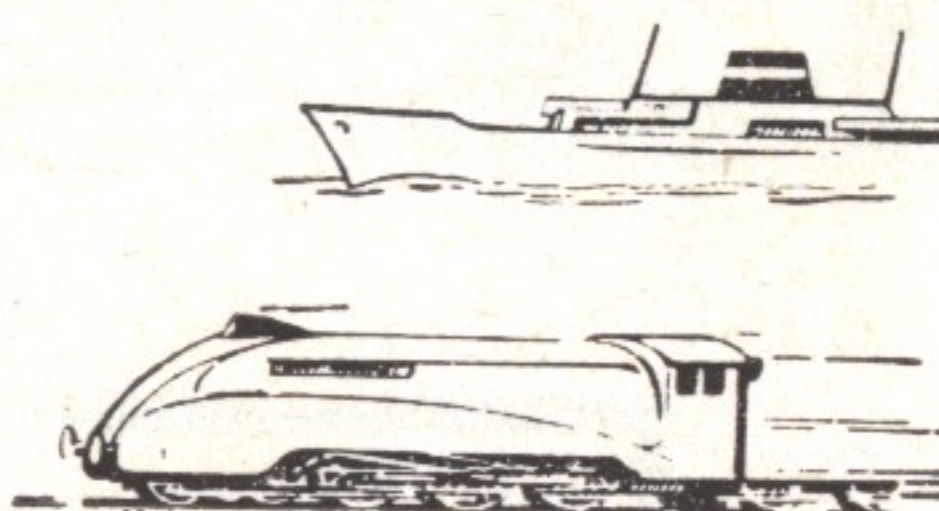
Sound reinforcement and multi-lingual interpretation systems by Tannoy are chosen for the Houses of Parliament London, Ottawa and New Delhi; for U.N.O. Headquarters New York and Geneva...



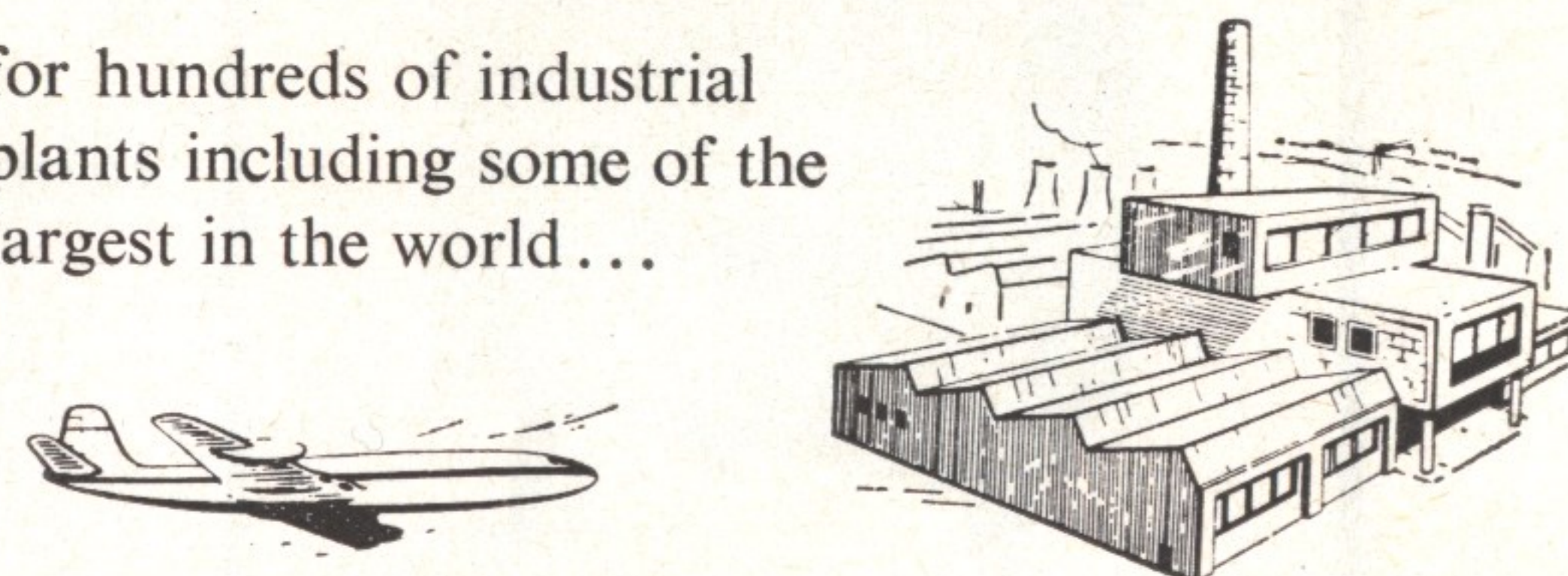
for the conferences of S.H.A.P.E., N.A.T.O., U.N.E.S.C.O.; and those of numerous public bodies and industry...



Sound communications for ships, railways, airlines and airports...

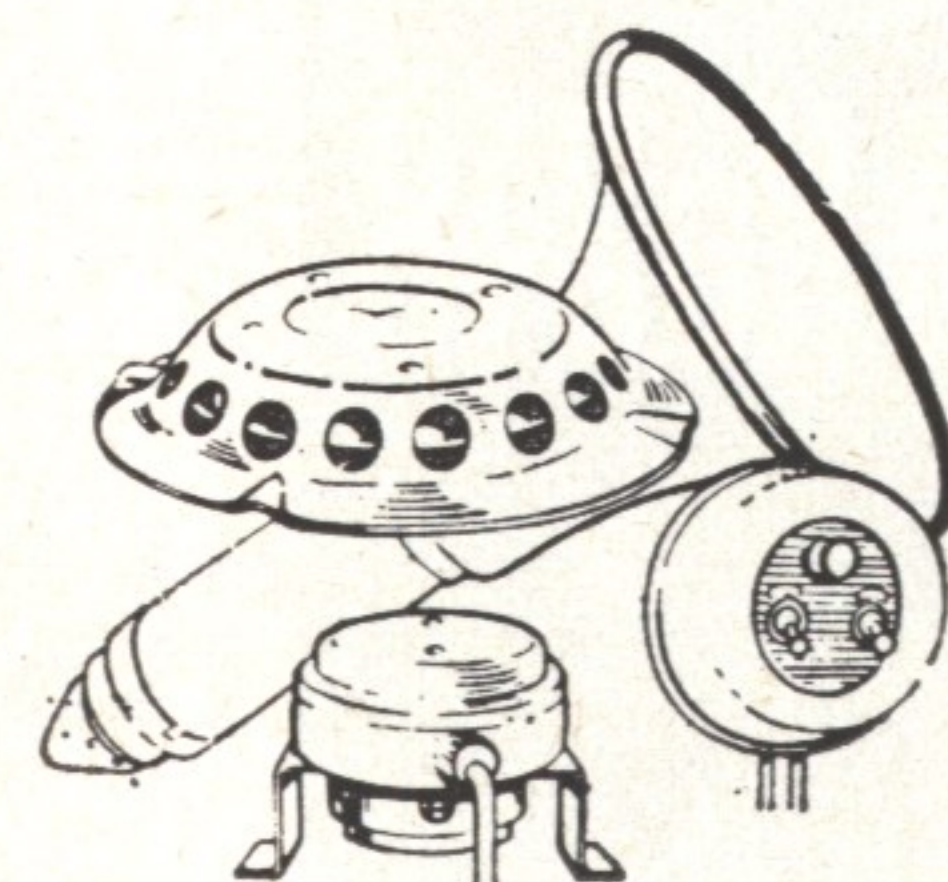


for hundreds of industrial plants including some of the largest in the world...

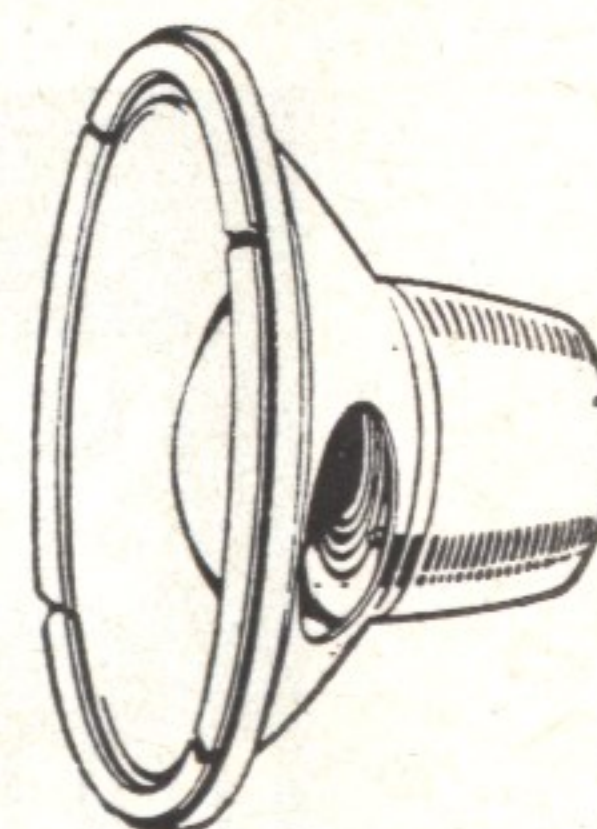


and long tradition with the armed services in war and peace...

In the world of Hi-Fi Tannoy loudspeakers, amplifiers and pick-ups are an acknowledged standard of quality...

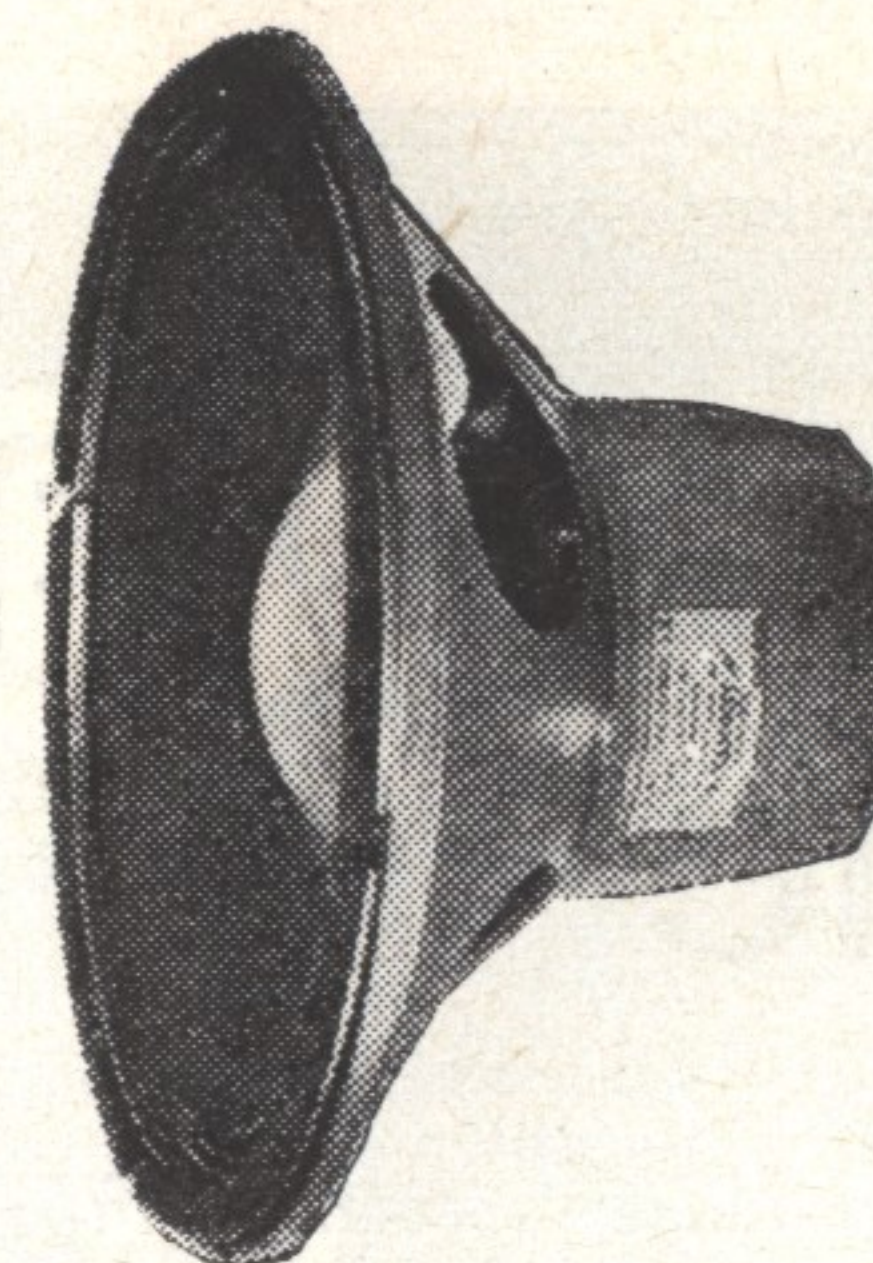


Tannoy Marine Equipment spells safety for mariners with gas detectors, ventilators, and the famous Hey-Loh loud hailer.

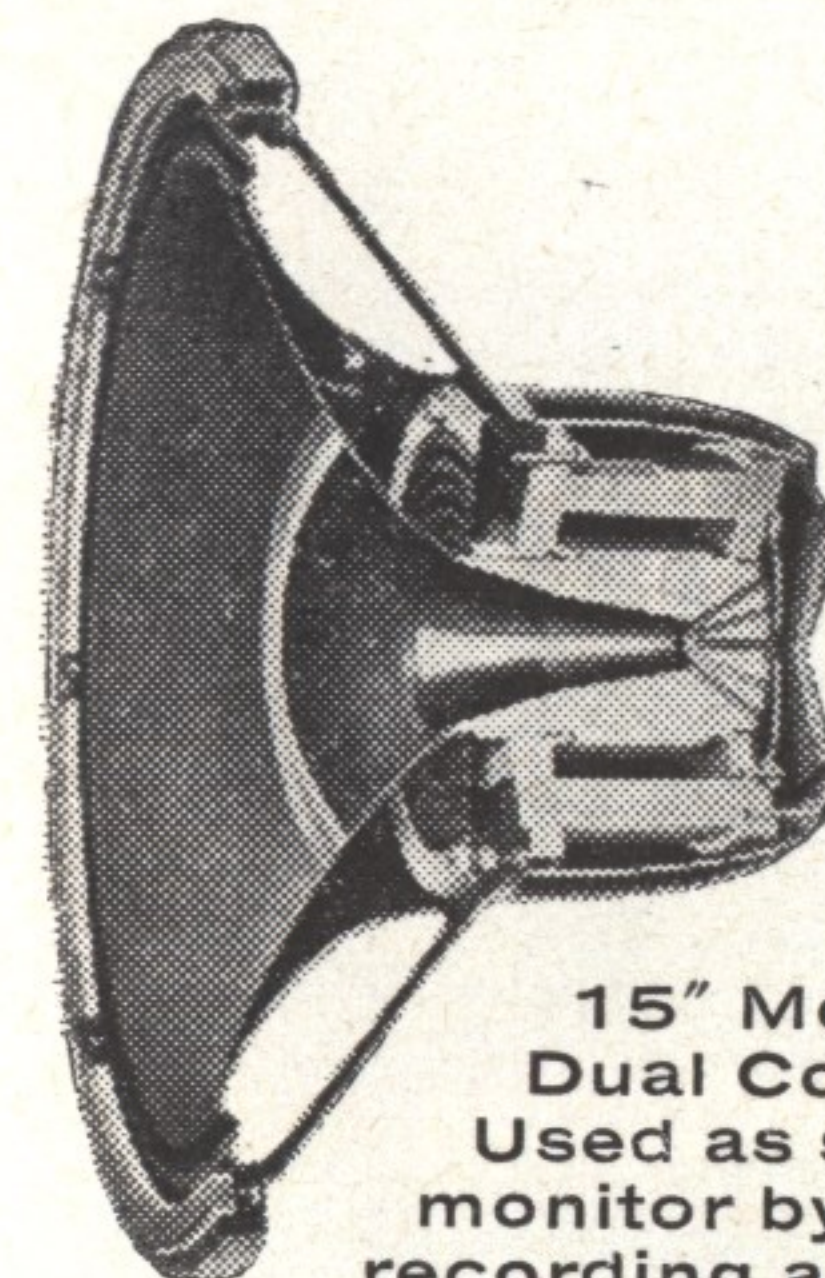


TANNOY PRODUCTS LIMITED

12" Monitor Dual Concentric. For highest quality Home music systems.

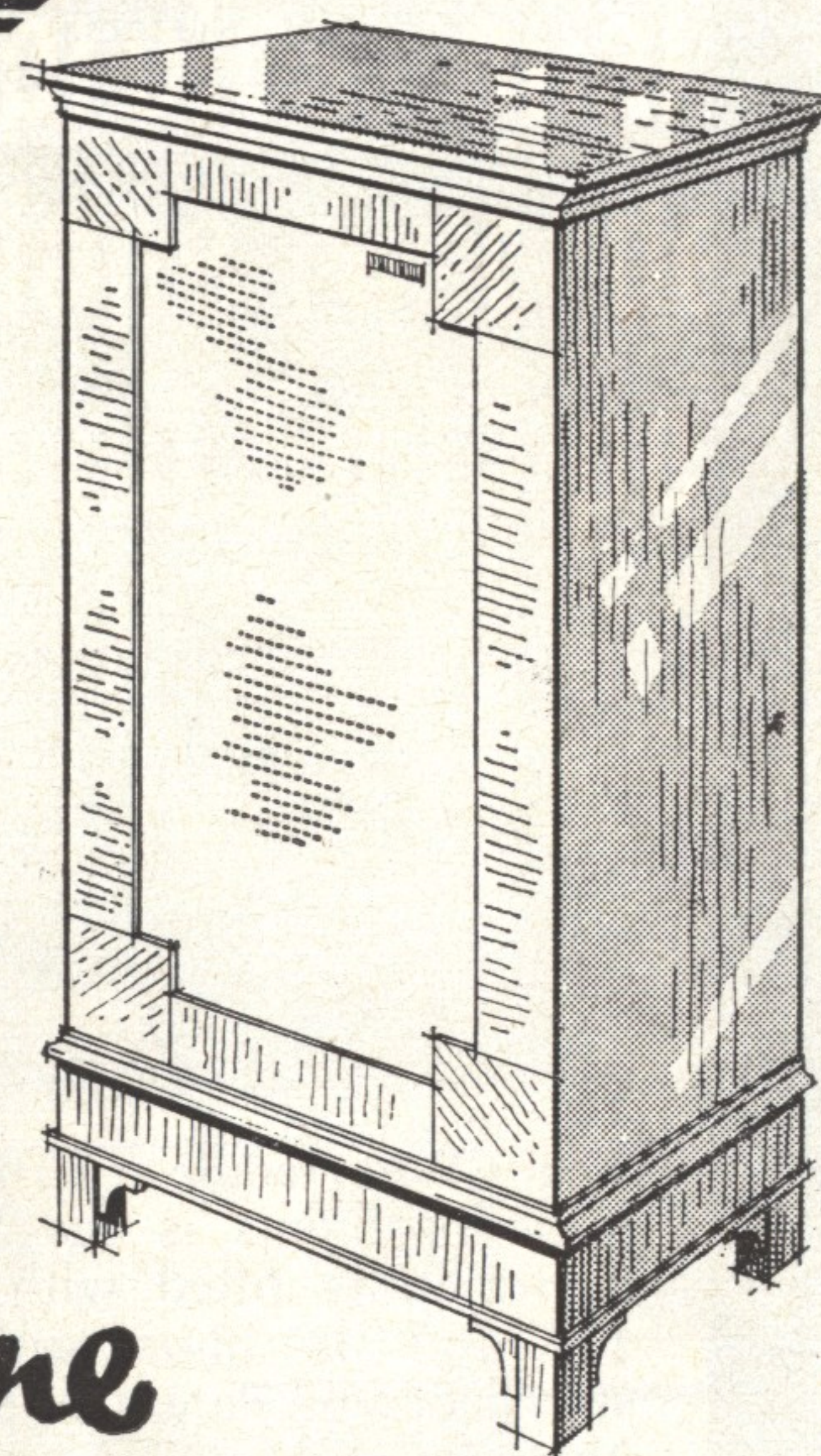


III LZ Monitor Dual Concentric. Ideal where space is restricted.



15" Monitor Dual Concentric. Used as studio monitor by recording and broadcasting companies.

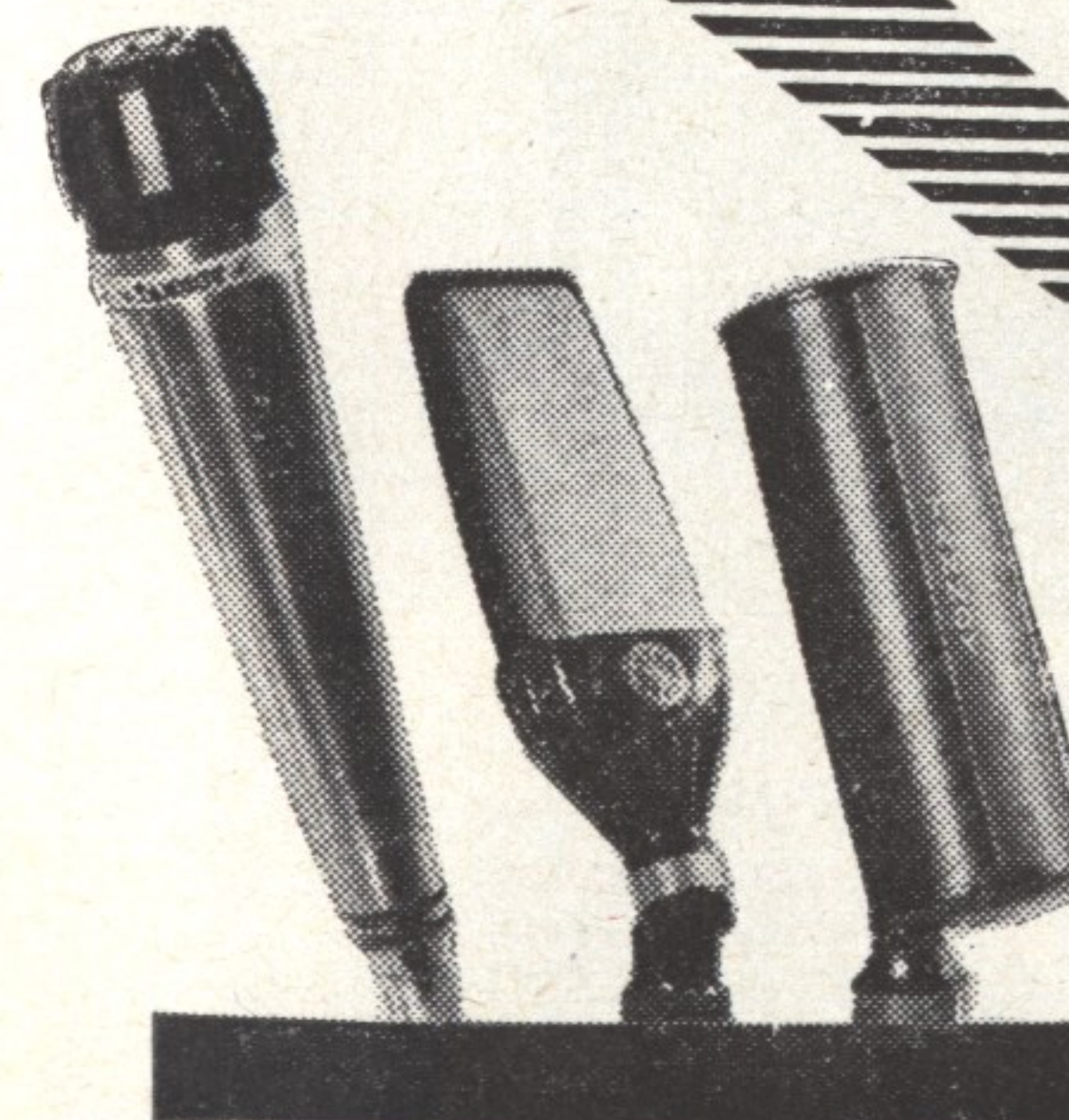
STUDIO STANDARDS *in your home*



The corner G.R.F. enclosure has for several years been regarded as a quality standard by professional users and music lovers alike. The introduction of a *free-standing model* built to the same exacting standards, not only increases its application to mono systems but makes it an ideal companion to the corner version in stereo systems of the highest quality.

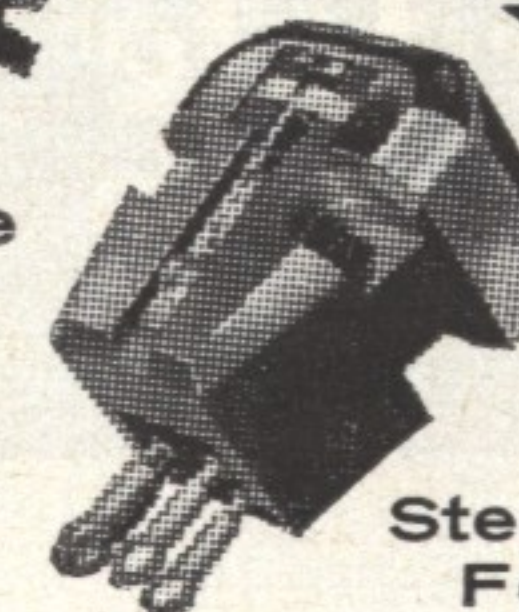


**STAND No. 39
ROOM 204**



LEFT: NEW—Pressure Operated Moving Coil Microphone. 25 cps-14Kcs. Omni-directional. CENTRE: NEW—Velocity Ribbon Microphone. 25 cps-14Kcs. Symmetrical bi-directional characteristic. RIGHT: NEW—Single Element Cardioid Microphone. Front to rear discrimination exceeding 15 dB. 25 cps-14Kcs.

Variluctance Turnover Mono Cartridge. As used by the B.B.C.



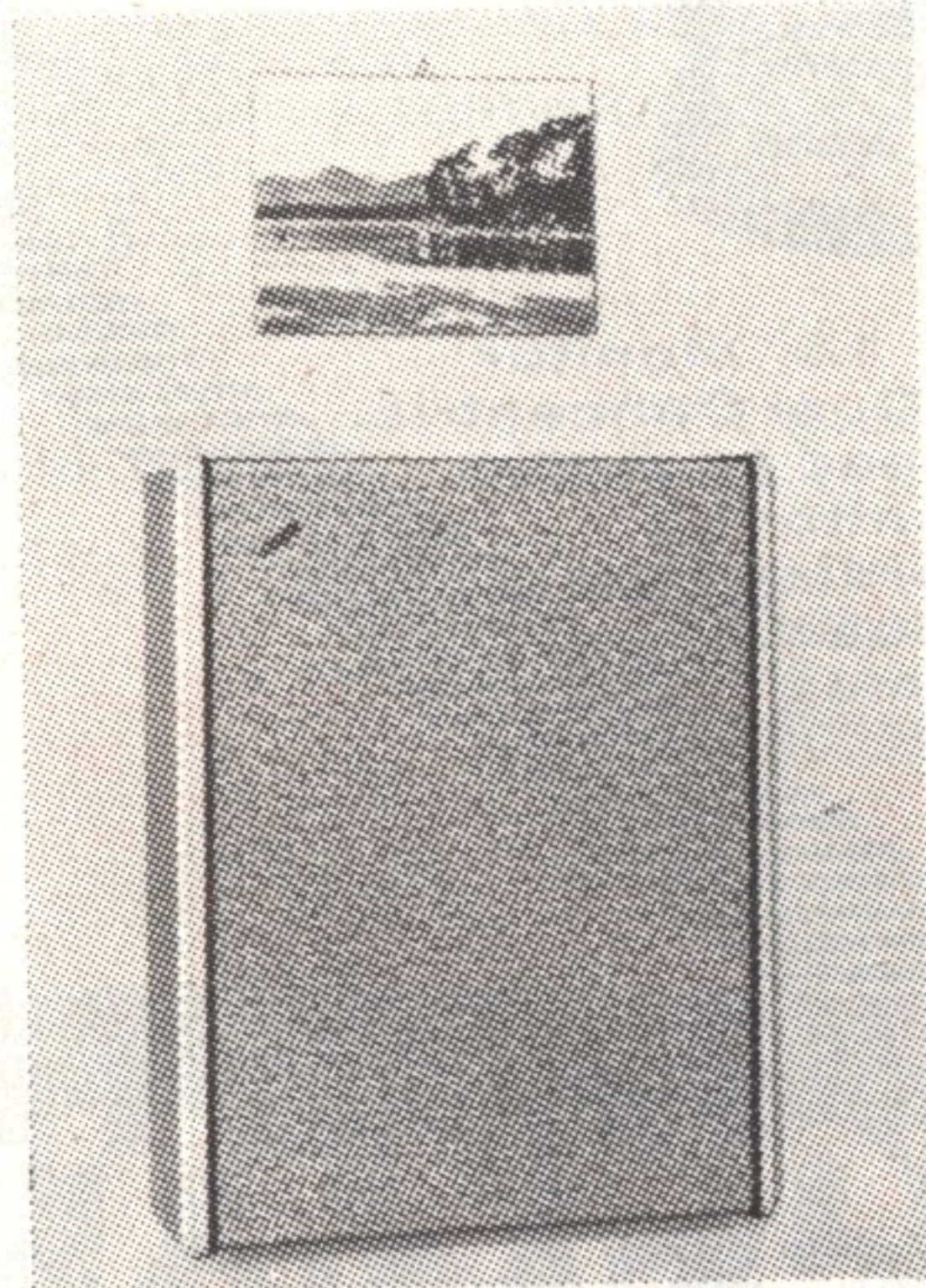
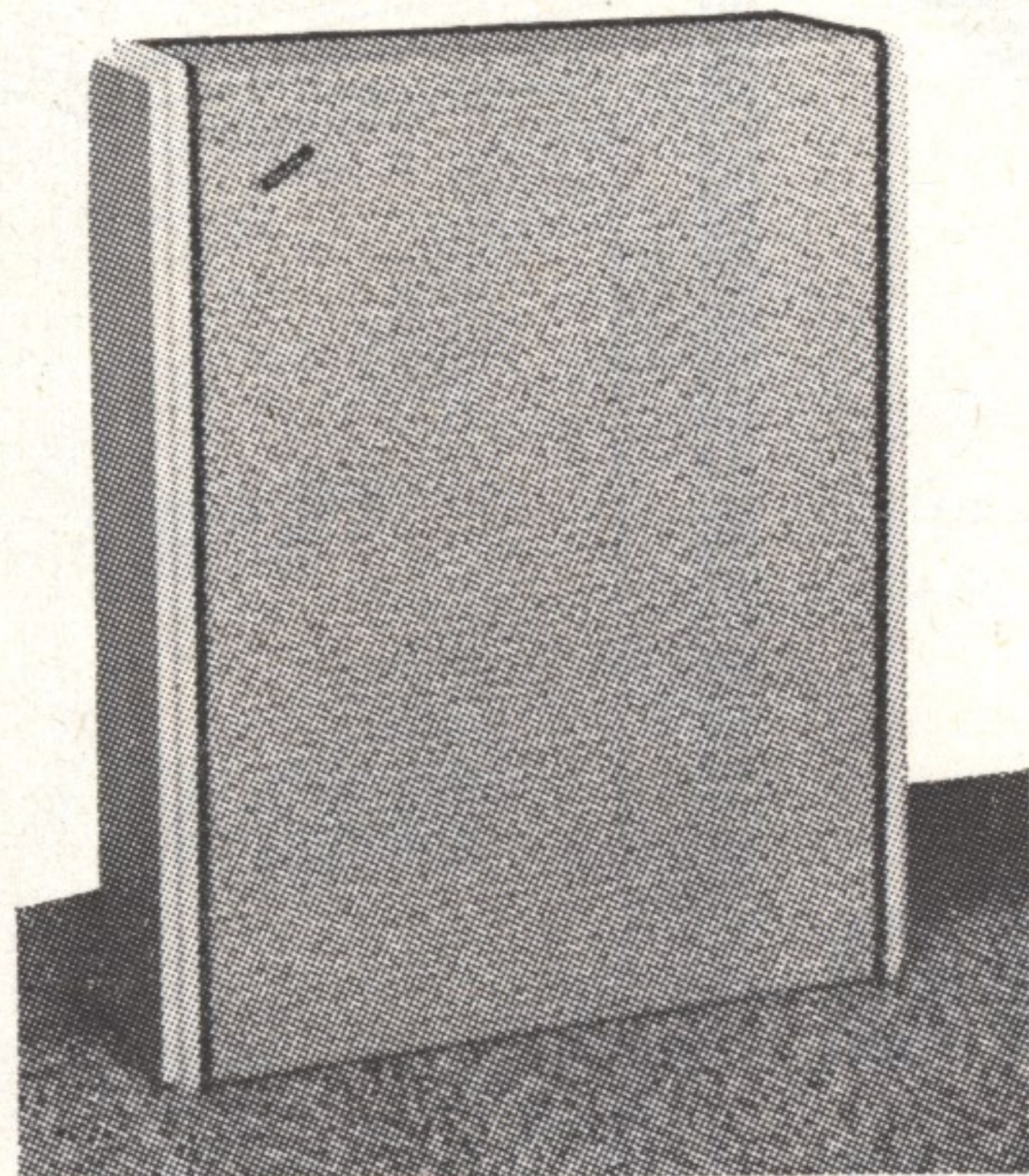
Varitwin Stereo Cartridge. For high quality Home music systems.

One of the
Tannoy Group
of Companies

WEST NORWOOD · LONDON S.E.27 · GIPSY HILL 1131

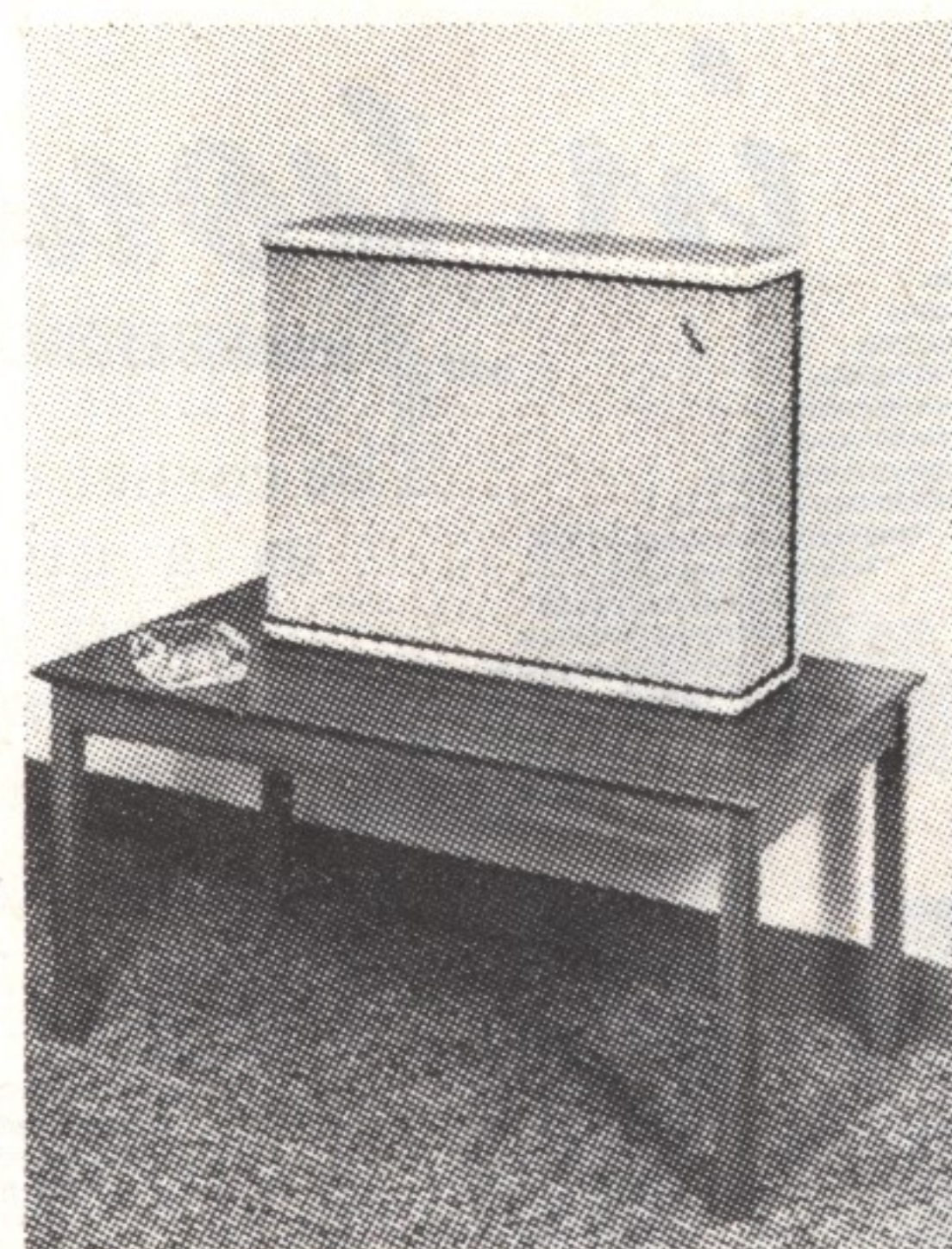
WHARFEDALE INTRODUCE THE slimline 2

There is a growing demand for high quality speakers for stereo, which :
Take up little space. Cost below £25. Go down to 30 cycles like all
good compact systems to-day. Reproduce speech without honking.
Have attractive appearance and appeal to the housewife.



The Wharfedale answer to these problems is the Slimline 2, which is fitted with special 12" and 4" units with polystyrene cones. Patent application No. 46738/61. The attractive cabinet is suitable for wall, floor, or table mounting, as illustrated.

Size : 25" x 20" x 7". Weight : 32 lb. Units : PST 12/RS : PST 4. Range covered : 30 to 15,000 c/s. Power handling : 15 watts RMS or 30 watts peak. Back fitted with glass plates for vertical or horizontal wall mounting. Price £22 10s.



Tropical models available. Descriptive leaflet on request.

Wharfedale
WIRELESS WORKS LTD

**IDLE
BRADFORD
Yorkshire**

Tel.: Idle 1235/6
Telegrams : 'Wharfdel'
Idle, Bradford

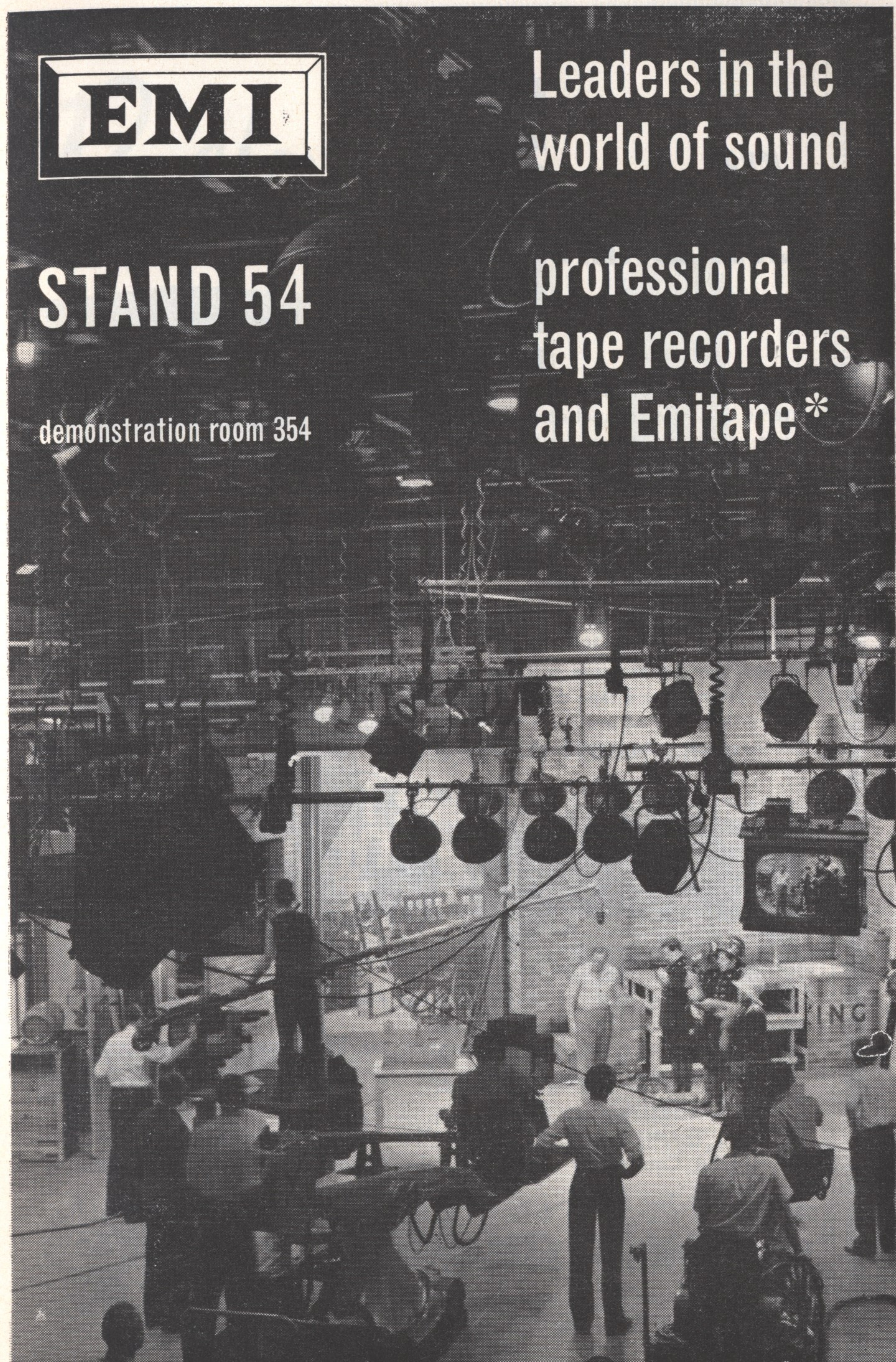
EMI

Leaders in the
world of sound

STAND 54

demonstration room 354

professional
tape recorders
and Emitape*



* Emitape is manufactured by EMI Tape Limited ■ EMI ELECTRONICS LTD. Hayes, Middx. Tel. Hayes 3888

Chapman

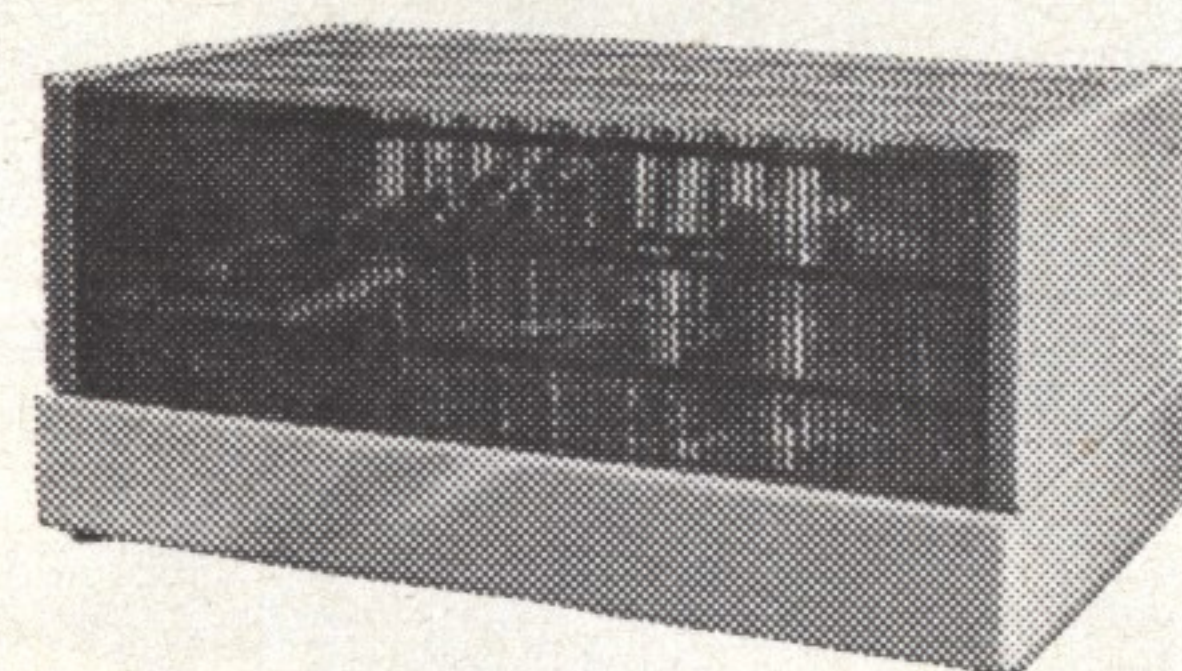
lead with quality and elegance

The 305 is a comprehensive stereo or single channel control unit, providing every facility for high quality radio, gram, and tape reproduction.

It is supplied ready for connection to the 305 Stereo Main amplifier which will give 8 watts per channel on stereo and 16 watts in parallel. The sensitivity of the 305 is high enough to accept the signal from a tape head direct. This means that a tape deck can be used for reproduction of pre-recorded tapes without the need of a separate tape pre-amplifier.



model **305** Stereo Control Unit
Stereo Main Amplifier



model **FM 95 AM/FM TUNER**

The ideal tuner for incorporation into a domestic high fidelity system, and also an economical answer for the requirements of the high fidelity enthusiast.

First class drift-free Frequency Modulation reception and the more powerful Continental stations on the Medium and Long wave-bands..

See them on Stand 17 or write for full specifications.

CHAPMAN ULTRASONICS LTD.

Sales Division: 24, Upper Brook Street, Mayfair, London, W.1.

Telephone: HYDe Park 2291



Reslo

for high quality
sound reproduction

PENCIL RIBBON MICROPHONE

Type PRL 30/50 ohms
Type PRM 250 and 600 ohms
Type PRH 30/50 ohms and Hi-Z

Nominal Frequency Response :

± 3 dB 70 c/s to 12 Kc/s

Output Level :

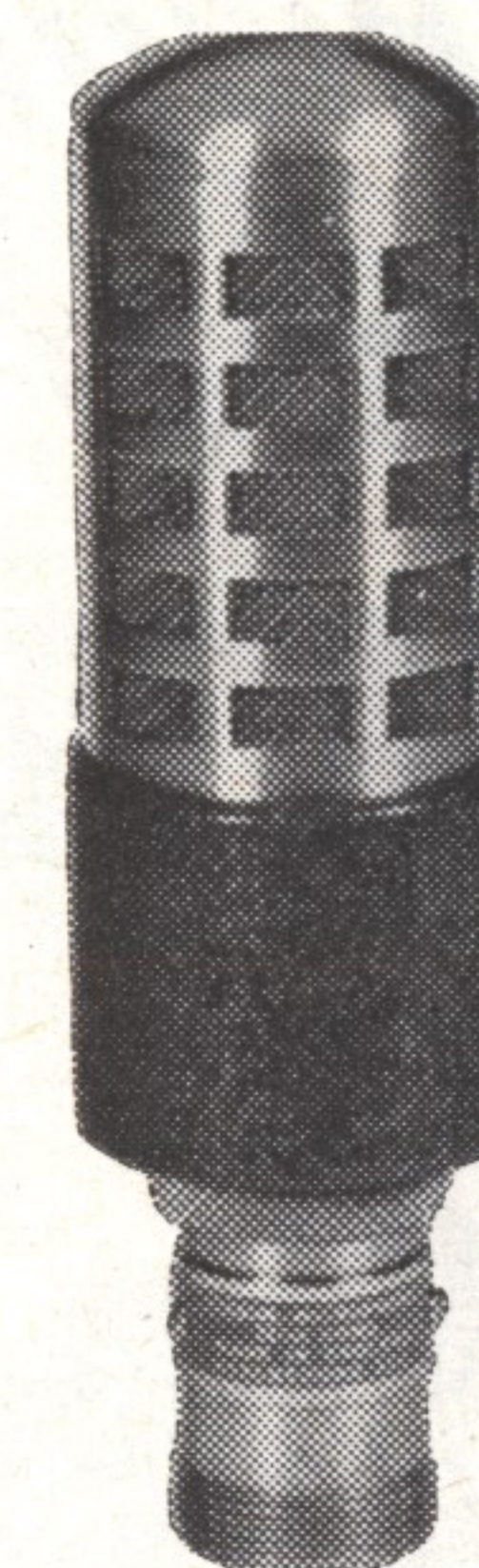
60 dB below 1V/dyne/cm² at 40 K ohms

Finish : Microphone Case and connector satin chrome, base casting silver grey Hammertone enamel.

Dimensions : Max. Diameter base 1 $\frac{3}{8}$ in. reducing to 1 $\frac{1}{4}$ in. on shell.

Overall length of body—3 $\frac{1}{4}$ in. without socket.

Weight : 9 oz.



NEW!

STEREO
MICROPHONE
MOUNT

STEREO RECORDING WITH BALANCED RIBBON MICROPHONES

RESLO now introduce a specially designed dual mounting bar for two microphones type RB/T. Knurled locking screws are provided at the ends which fix each microphone in the optimum stereo position. Ten yards of twin screened cable is supplied for each microphone. Pairs of microphones can be specially matched at a nominal charge.

See them on Stand 18 or write for full specifications



RESLOSOUND LIMITED

Sales Division: 24, Upper Brook Street, Mayfair, London, W.1.

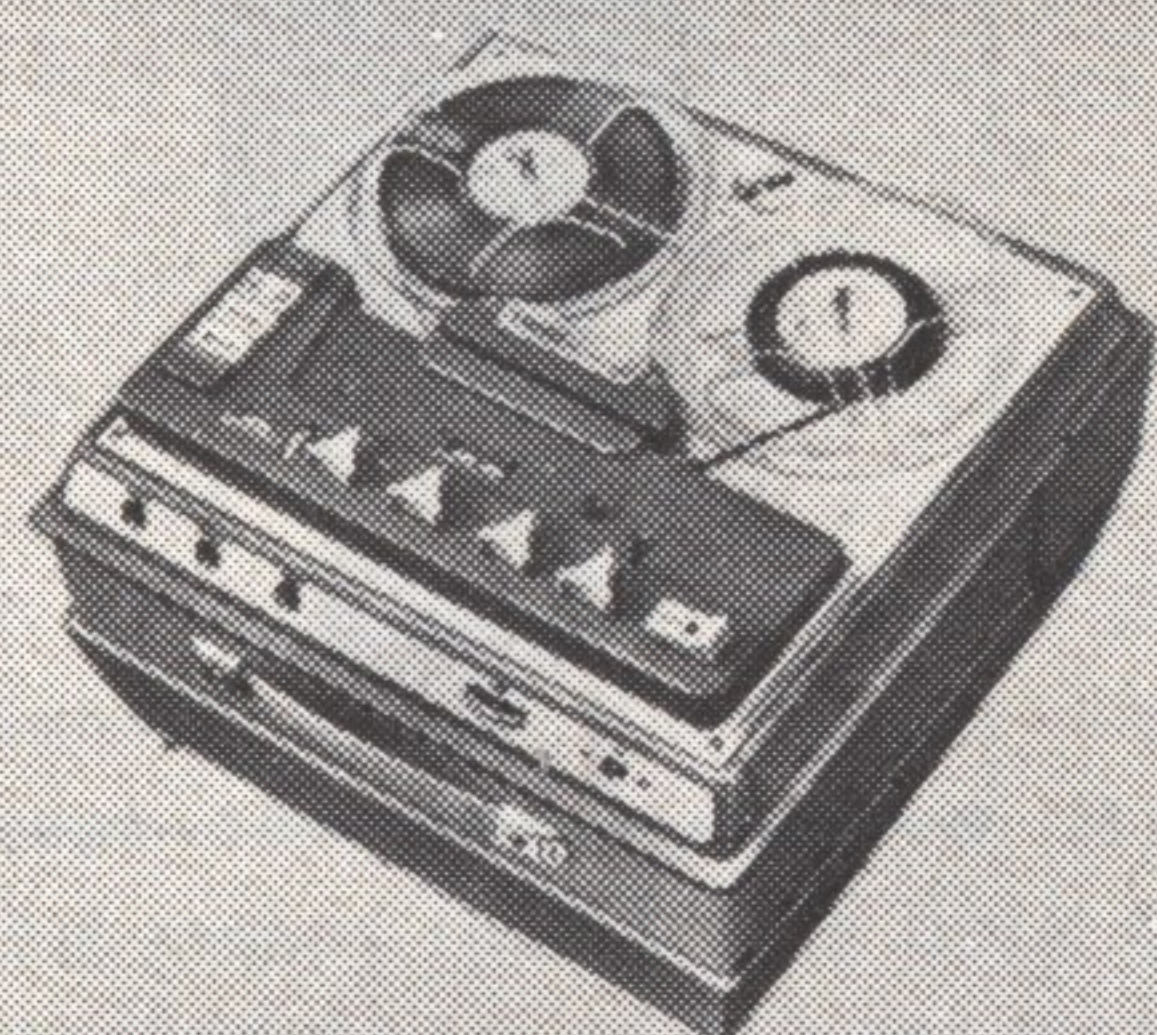
Telephone: HYDe Park 2291

TRUVOX 80

SERIES

*Technically Luxurious
range of*

TWO TAPE RECORDERS



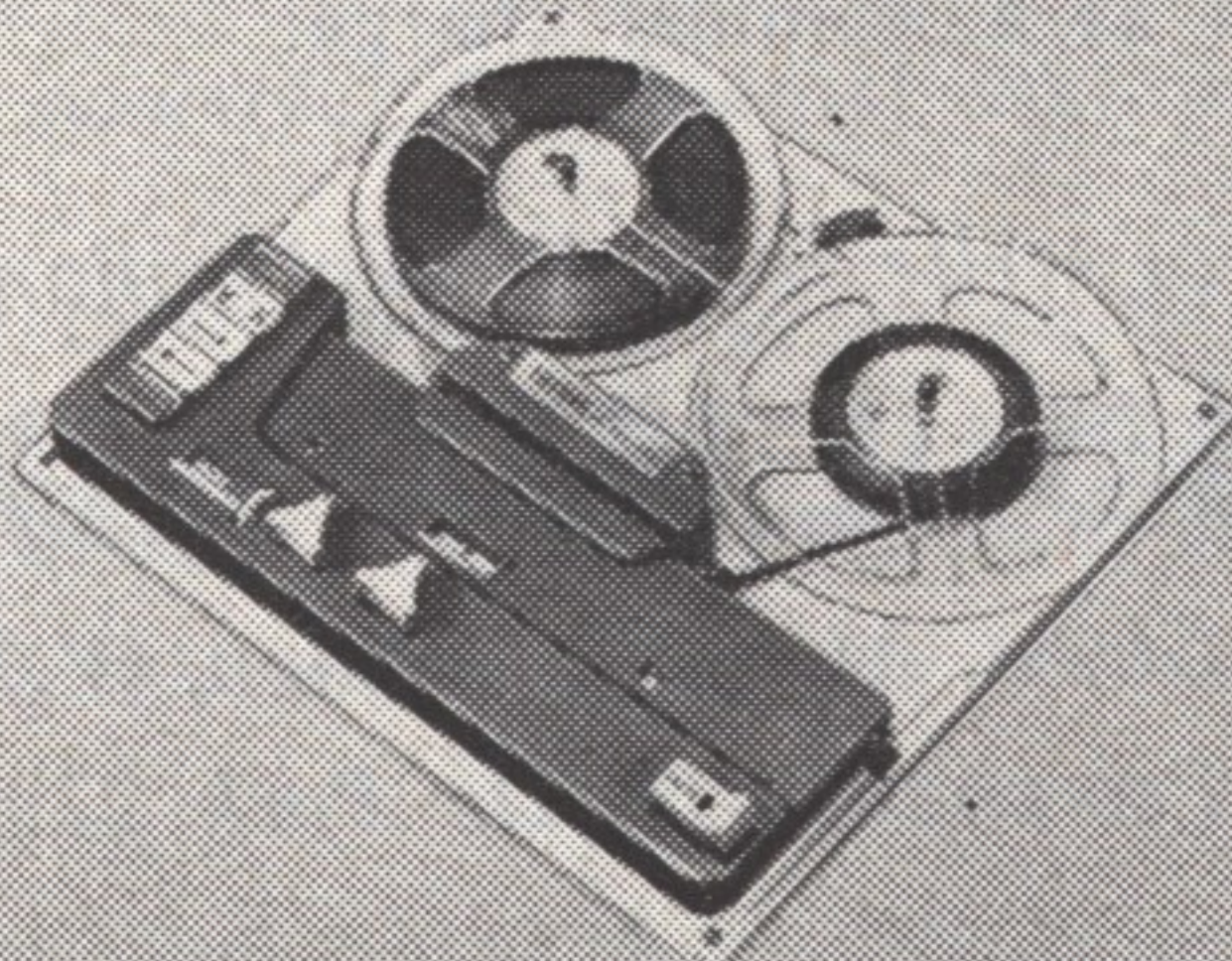
Model R 82
Twin Track
Model R 84
4-Track

SIX HI-FI TAPE UNITS



Model PD 82
Standard 2-Track
Model PD 83
Professional 2-Track
Model PD 84
Standard 4-Track
Model PD 85
Professional 4-Track
Model PD 86
(Illustrated)
Stereo 1/2-Track
Model PD 87
Stereo 1/2-Track

FOUR TAPE DECKS



Model D 82
2 Heads,
Twin Track
Model D 84
2 Heads,
Four Track
Model D 86
3 Heads,
Four Track
Model D 87
3 Heads,
Twin Track

Full technical details from:
TRUVOX LTD., NEASDEN LANE, LONDON,
N.W.10.

DEMONSTRATION ROOM

336

STAND No.

44

SENSITIVITY & RESPONSE

The best circuit must depend for faithful reproduction on the sensitivity and response of the microphone. The BBC recognize this fact and use STC microphones —the most efficient in the world.



There is an STC microphone for every purpose.

Type 4106

A full range of stands, accessories and cables is also available.

STC MICROPHONES—the first step to high quality reproduction.

Type	Response in Cycles	Suitability	Price
4021 Moving Coil	30-15 000	Speech or music	£24. 0.0
4035 Moving Coil	40-10 000	General purpose and out-of-doors	£23. 0.0
4037 Moving Coil	30-15 000	Speech or music	£24. 0.0
4038 Ribbon	30-15 000	Speech or music	£43.10.0
4105 Cardioid (moving coil)	60-10 000	General purpose	£22.10.0
4106 Cardioid (moving coil)	30-15 000	Speech or music	£49.10.0

Generally microphones have an impedance of 30 ohms.

Visit us on Stand 50



Standard Telephones and Cables Limited
PUBLIC ADDRESS DEPARTMENT: ESTERBROOKE STREET · LONDON S.W.1

Garrard

STILL THE FINEST CHOICE

in Demonstration
Room 248

1. AUTOSLIM - DE - LUXE.—A high performance unit fitted with heavy turntable and Transcription Pickup Arm.

2. MODEL TPA.12. — Transcription Pickup Arm fitted with MPM.4 plug-in moulding.

3. MODEL 4HF. — High quality single Record Player with TPA 12 Pickup Arm.

4. LABORATORY SERIES AUTO TURNTABLE TYPE A. —Transcription Record Player with provision for automatic use.

5. MODEL 301.—Famous Transcription Motor used by Broadcasting Stations throughout the world.

6. MAGAZINE T A P E DECK.—Magazine loading makes recording and playback simple.



Here's the **NEW** range of TELEFUNKEN *tape recorders*



NEW

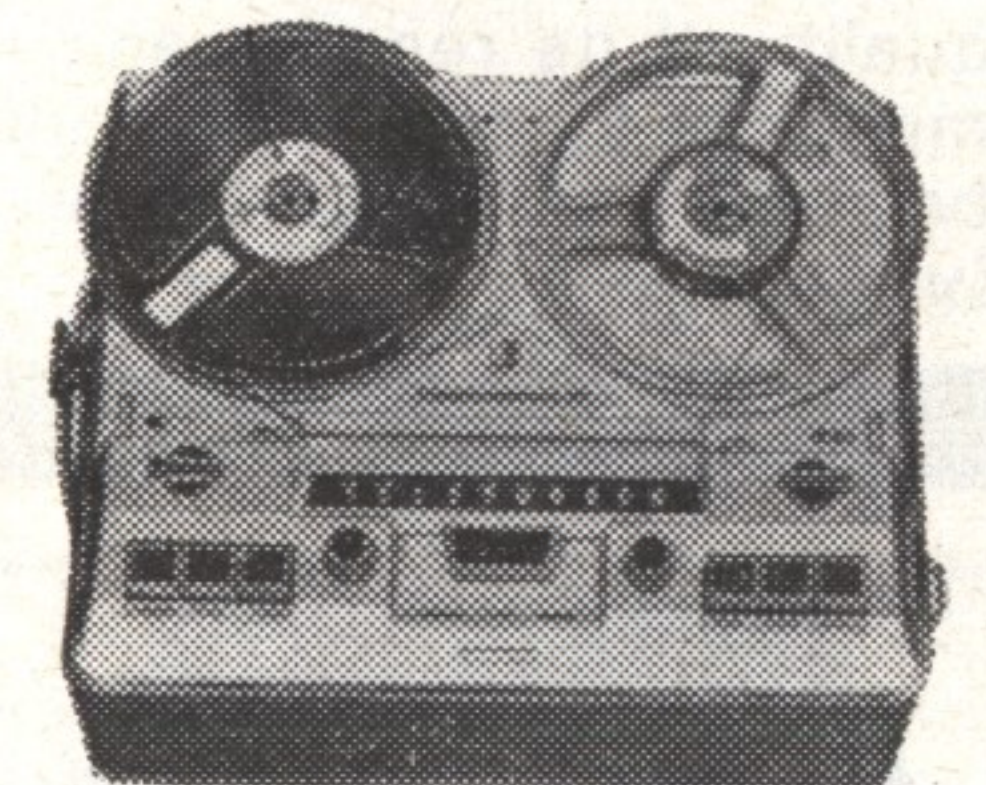
MAGNETOPHON 95

Entirely new design in the Telefunken range with attractively styled case. Twin Track. Fully Portable. Three speeds: $7\frac{1}{2}$ ", $3\frac{3}{4}$ " and $1\frac{1}{8}$ ". Maximum Spool size 7". Frequency response: 30-18,000 c.p.s. at $7\frac{1}{2}$ i.p.s.; 30-16,000 c.p.s. at $3\frac{3}{4}$ i.p.s.; 30-9,000 c.p.s. at $1\frac{1}{8}$ i.p.s. Special trick and "straight through" amplifier facilities.
59 Gns (excluding microphone)

NEW

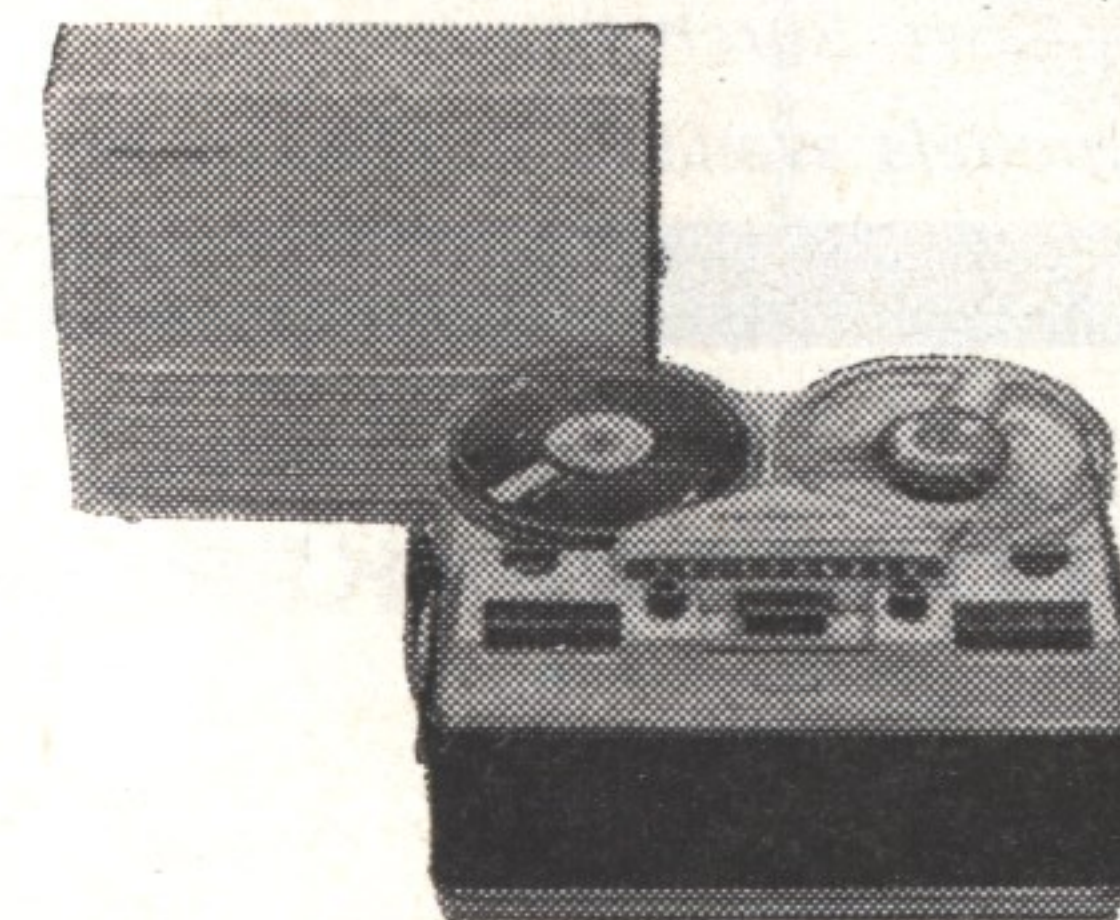
MAGNETOPHON 96

This new FOUR-TRACK recorder has the same basic style and technical specifications as the Magnetophon 95, but offers all the advantages of the desirable four-track technique. Playing time over 16 hours on 7" DP tape. Multiple transcription from one track to another. Facilities for playback of prerecorded stereo tape through additional amplifier or radio.
69 Gns (excluding microphone)



NEW

MAGNETOPHON 97



The stereo tape recorder which provides not only the outstanding facilities of the four-track system with its manifold possibilities for transcribing and trick effects, but also the twin-channel stereo, four-track technique for recording and playback. Speeds, frequency response and spool size same as Magnetophon 95. Extra speaker in the lid for stereo playback.
95 Gns (excluding microphone)



AND OF COURSE

the famous 75K.15 and 85KL

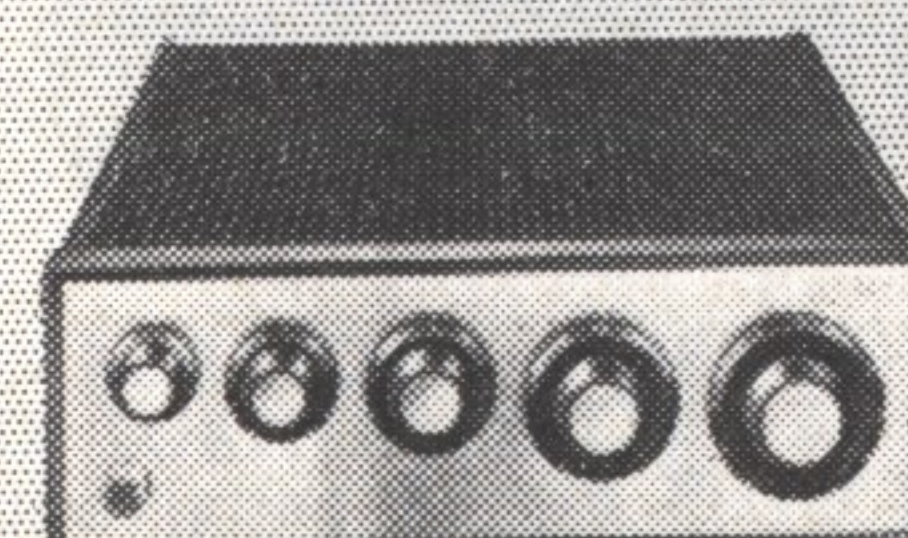





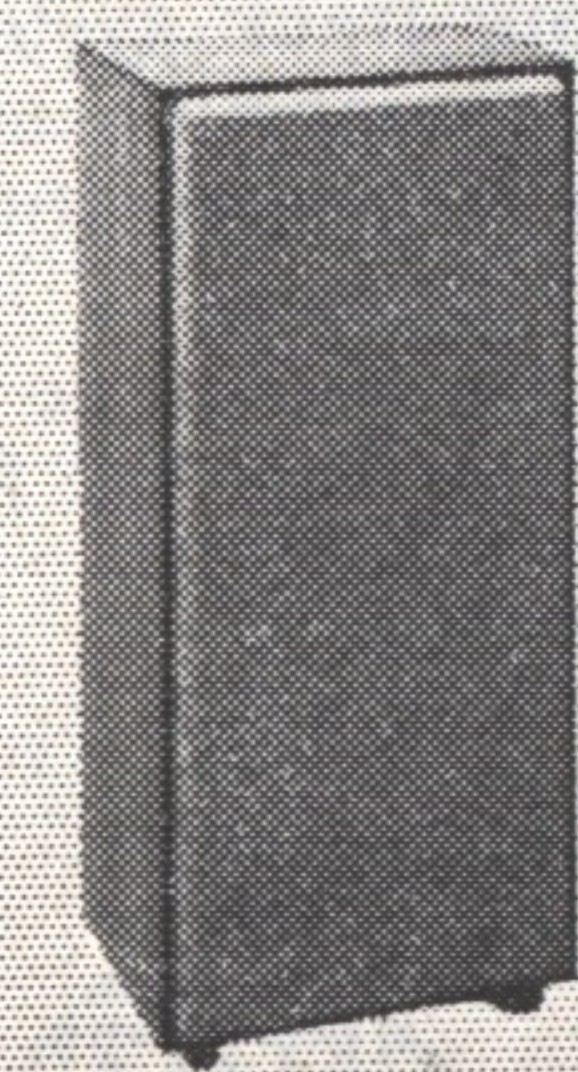
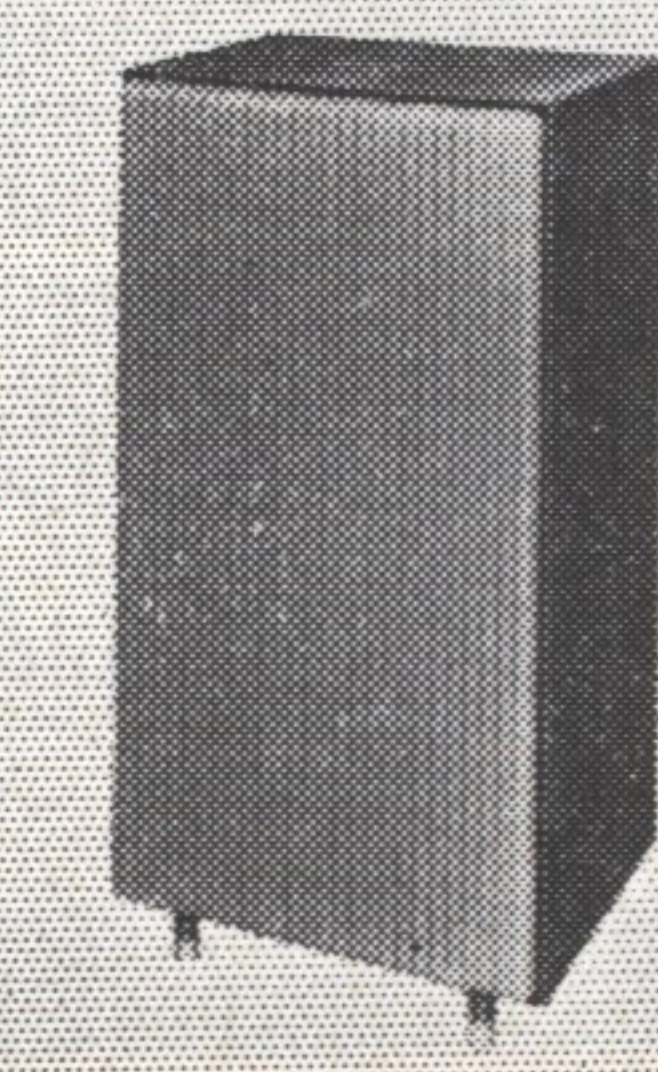
THE GARRARD ENGINEERING & MANUFACTURING CO. LTD. • SWINDON • WILTS.

REMEMBER! ITS STAND 30 FOR THE FINEST RANGE OF PE HI-FI FIDELITY SYSTEMS

 <p>MOZART STEREO ENSEMBLE 195 gns. (tax paid) <i>Plus Govt. Surcharge.</i></p>	<p>PACKAGED FORM</p>  <p>MOZART STEREO LOWBOY 45 gns</p>
---	--

The Pye 'Mozart' ensemble is a complete stereo system. The quality of its records and radio sound reproduction recommends it to the perfectionist, while the elegant design and beautiful finish make the 'Mozart' a magnificent piece of furniture.

 <p>MOZART STEREO AMPLIFIER MODEL HFS 20M 35 gns.</p>	  	<p>UNIT FORM</p> <p>MONO AMPLIFIER MODEL HF 10M 23½ gns.</p> <p>MOZART AM/FM TUNER MODEL HFT 113M 30 gns. <i>Plus Govt. Surcharge</i></p> <p>MOZART FM TUNER MODEL HFT 108M 24 gns. <i>Plus Govt. Surcharge</i></p> <p><i>All models available in chassis form</i></p>
---	---	--

		<p>LOUDSPEAKERS</p> <p>MODEL HF 8BS 18 gns.</p> <p>MODEL HF 15SMT 27 gns.</p>
---	---	--

*Seeking better things
from your recording equipment!*

SEE and TRY

the **Grampian** DP4

A really sensitive dynamic microphone that will give improved performance out of all proportion to its modest cost.

Ideal, too, for broadcasting, public address, call systems, etc.

DP4/L (low impedance) microphone complete with connector and 18 ft. screened lead

£8.0.0

Medium and high impedance models £9.0.0



- ★ STAND NO. 59
- ★ DEMONSTRATION ROOM 252
- ★ TRADE ENQUIRIES ROOM 251

GRAMPIAN REPRODUCERS LIMITED
Hanworth Trading Estate, Feltham, Middx. FELtham 2657

Grampian SOUND EQUIPMENT

H.M.V.

AUDIO EQUIPMENT



Studio Perfection

—brought to your home by the world's top
audio engineers



CLARKE AND SMITH
DEMONSTRATION ROOM 211

BOOTH 7



Sole distributors:

Clarke and Smith Mfg. Co. Ltd., Wallington, Surrey

SEE and HEAR the full range of STENTORIAN products at Booth 33 • Demonstration Room 322

people



F. C. JUDD
Technical Editor
'Amateur Tape
Recording and
Hi-Fi Magazine'

of



PERCY WILSON
Technical Editor
'The Gramophone'

sound



MILES HENSLOW
Editor
'Hi-Fi News'

judgement

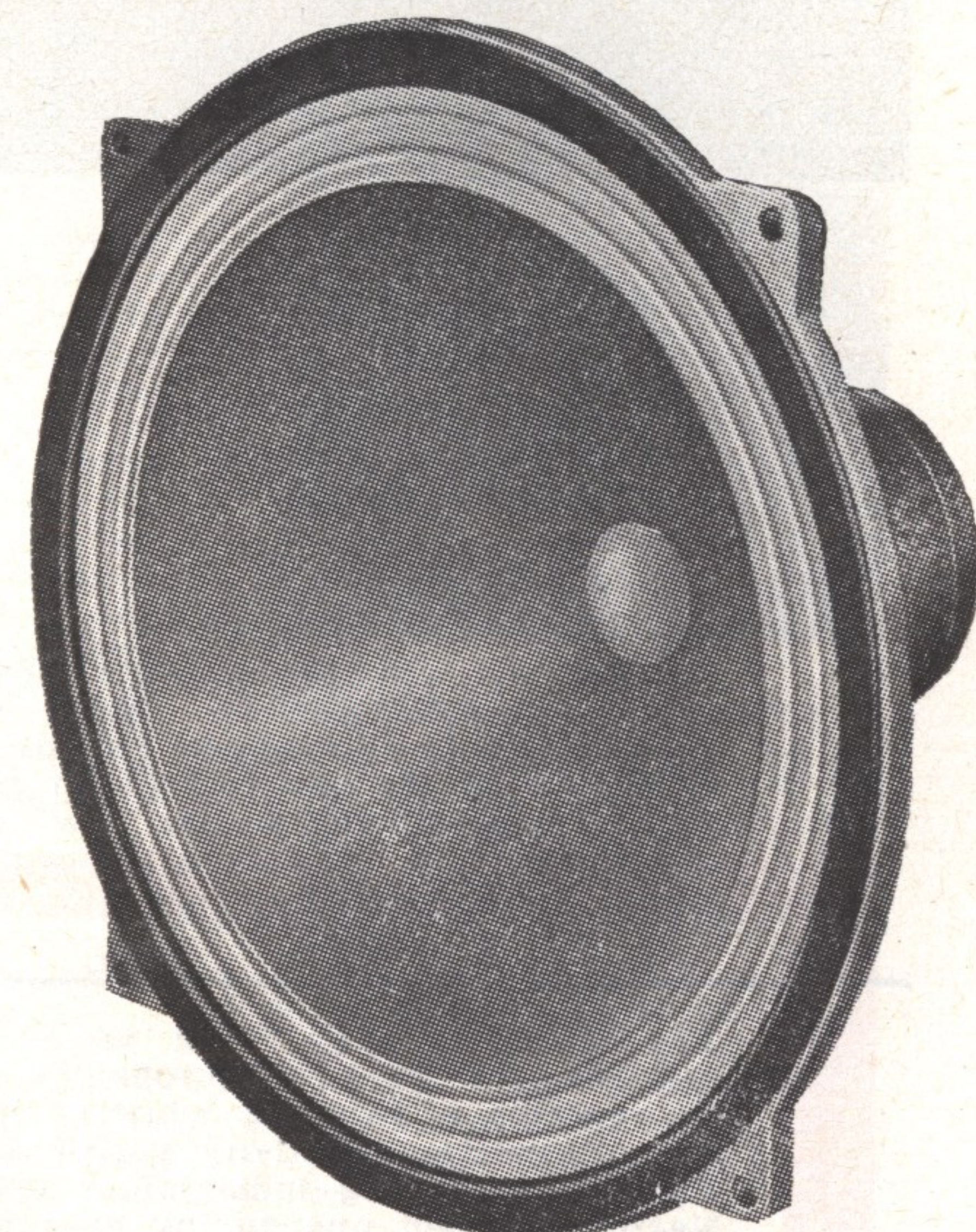


JOHN GILBERT
Technical Editor
'Music Trades
Review'

choose



DONALD ALDOUS
Technical Editor
'Audio and
Record Review'



MODEL H.F. 1016

10" P.M. Unit, 16,000 gauss magnet. Die-cast chassis and universal impedance speech coil providing instantaneous matching at 3, 7.5 and 15 ohms. Handling capacity, 10 watts. Frequency response, 30 c.p.s. to 15,000 c.p.s. Bass resonance, 35 c.p.s.

Price £8.4.0 (inc. P.T.)

Stentorian

The range of Stentorian loudspeakers incorporating the patented cambric cone was developed to provide reproduction that takes full advantage of the television and V.H.F. sound transmission and high fidelity recordings now available.



WHITELEY ELECTRICAL RADIO CO. LTD.

MANSFIELD · NOTTS

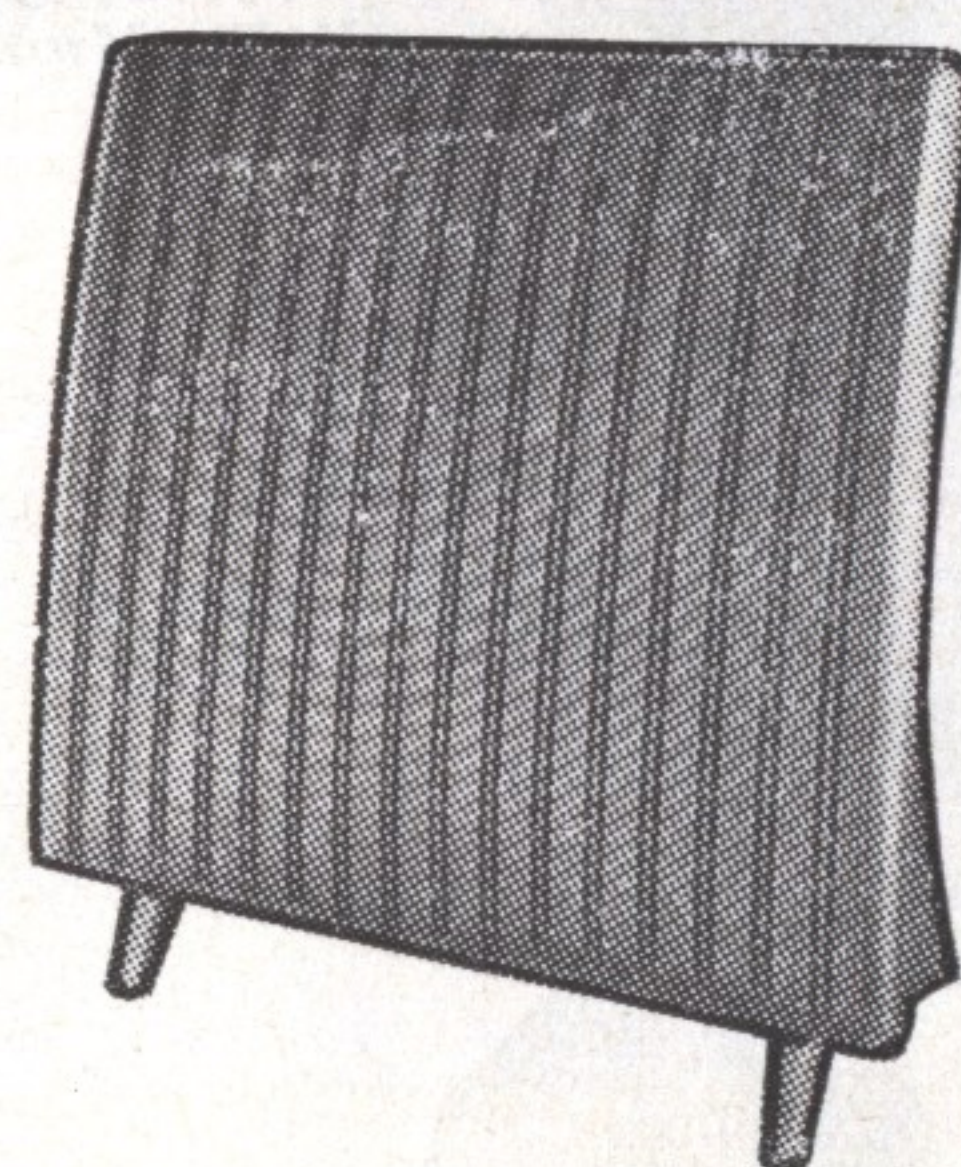
Telephone: MANSFIELD 1762-5

WA7(2c)

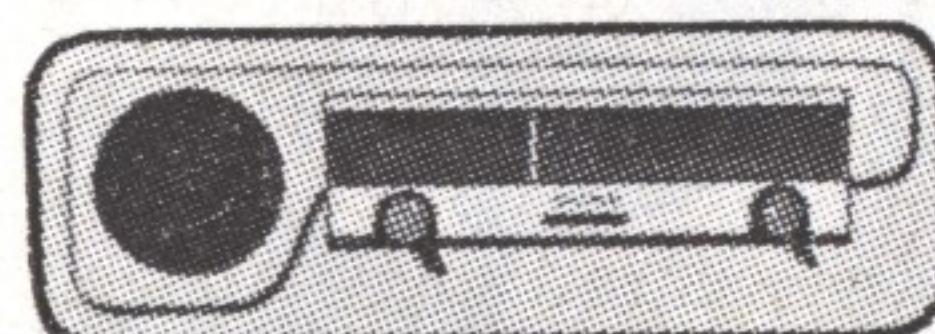
QUAD

for the closest approach to the original sound

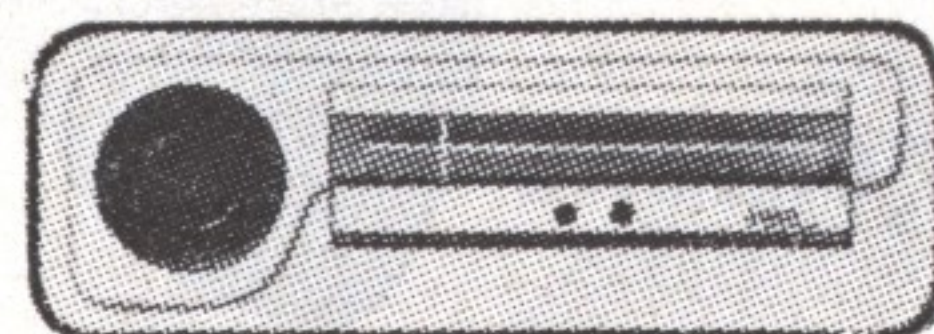
The QUAD was the world's first wide range electrostatic loudspeaker. Much of the recent improvement in gramophone records can be directly attributed to its use for studio monitoring and quality control, while its low distortion and exceptional lack of colouration are equally valued in the home installation.



The QUAD AMII Tuner is available in two versions for use in Europe or Overseas and incorporates a switched whistle filter as well as two alternative selectivity positions. A luminous ribbon type tuning indicator is operative on the Narrow position and tuning does not alter when changing to Wide or Filter positions.



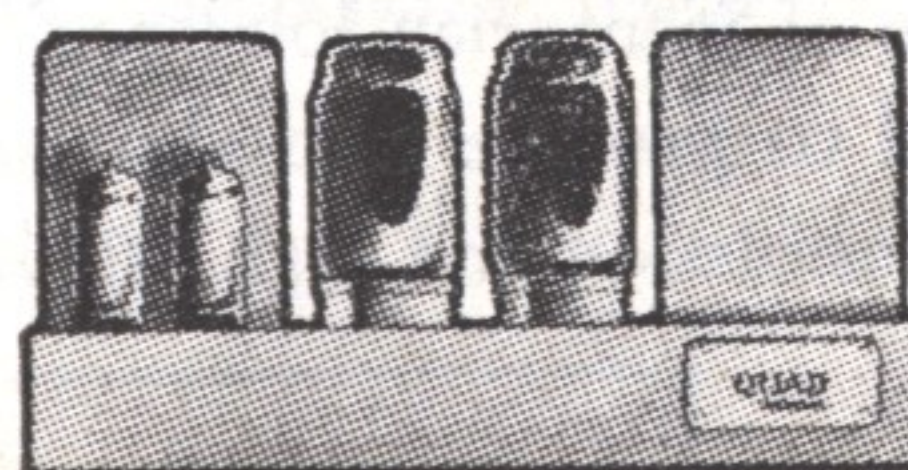
The QUAD FM Tuner is a high sensitivity model of very good stability both long and short term. The double neon indicator gives accurate and positive indication of tuning and is used in conjunction with adjustable station indicators.



The QUAD 22 Control Unit provides full facilities for both stereo and single- and two-channel mono reproduction from disc, tape, radio and microphone. Alternative record equalisation characteristics and pick-up matching on Disc and facilities for direct connection from suitable tape replay heads are among the many features of this unit.



The QUAD II Power Amplifier remains the basis of installations in the home and for professional use throughout the world. Its function is to be neither seen nor heard but unobtrusively to amplify the signal applied to it—besides providing power for ancillary units. Its small size and compact shape have proved their worth in well over 40,000 cases so far.



Stand No. 31 Demonstration Room No. 147

Acoustical Manufacturing Company Limited, Huntingdon, Hunts. Huntingdon 361

The LEAK

"SANDWICH"

... an astonishingly improved
loudspeaker system

The revolutionary LEAK "Sandwich" cone diaphragm weighs the same as conventional cones, but is hundreds of times stiffer, and will support the weight of a man. We have thus overcome the major weakness of the moving-coil system—lack of diaphragm rigidity—for there has been no improvement of practical significance in rigidity during the 36 years since Rice and Kellogg introduced the original "R-K" design in 1925.

A loudspeaker diaphragm or cone, in order to follow accurately the signal applied to the speech coil, needs to be light and stiff but hitherto materials which of necessity have had to be used for their low mass have suffered from a low stiffness factor, resulting in significantly large areas of the cone vibrating in modes uncontrolled by the speech-coil. When reproducing speech and music these uncontrolled vibrations, or break-up motions, are translated to the listener as a complex mixture of ever-present and unpredictably ever-changing audible distortions—transient distortion or "hang-over," intermodulation distortion and amplitude distortion. The immense stiffness of the new LEAK "Sandwich" cone gives, for the first time in history, a direct-radiator loudspeaker diaphragm which behaves in the theoretically ideal manner of a rigid piston and reproduces the signal applied to the speech coil without flexing and free of break-up distortions.



Leak "Sandwich" Loudspeaker
Price £39.18.0

"The group unequivocally voted for the LEAK 'SANDWICH'"

"An extended series of direct comparison tests with three current designs was undertaken. Two speakers cost approximately the same as the Leak, and the third was much more expensive. After tests on speech and music, from records and radio, the group unequivocally voted for the 'Sandwich.' The superiority on speech tests was particularly marked... SUMMARY: We gave the Leak 'Sandwich' loudspeaker the full treatment. It is difficult to fault it. This design must be regarded as a break-through of fundamental and far-reaching importance."

Quoted from the Test Report by Donald Aldous and David Phillips. "Audio and Record Review."



Southdown Cabinet £21
Point One Stereo pre-amp. £21
Stereo 20 power amplifier £30.9s.

"LEAK Speakers won the day"

"... a most stringent test as we were listening to a stereo recording of a very recent orchestral and operatic performance we had enjoyed as audience or performer... other pairs of speakers were switched in, but the very smooth response of the Leak speakers won the day." *Quoted from the Test Report by Ralph West, B.Sc., M.Brit. I.R.E., in "Hi-Fi News."*

"Selecting the Equipment"

"Suggestions? The Leak line comes highly recommended on two continents, and it looks good. The mono amp would thus be the TL/12 Plus and the stereo version would be the Point One Stereo 20 Amplifier. Both run about 10-12 watts per speaker, and frankly I think this is plenty. Even with that you can rattle the windows, and the reason is that this 10W is at minimum distortion, 10W sine-wave power (which means that it'll put out a lot more on peaks). The price of the Leak is also quite reasonable for uncompromised sound quality." *Quoted from the article "Frankly Speaking" by John Berridge. "Hi-Fi News."*

LEAK

... the first name in High Fidelity

H. J. LEAK & CO. LTD.,
Telephone, SHEpherds ush 1173.

BRUNEL ROAD, WESTWAY FACTORY ESTATE, LONDON, W.3.

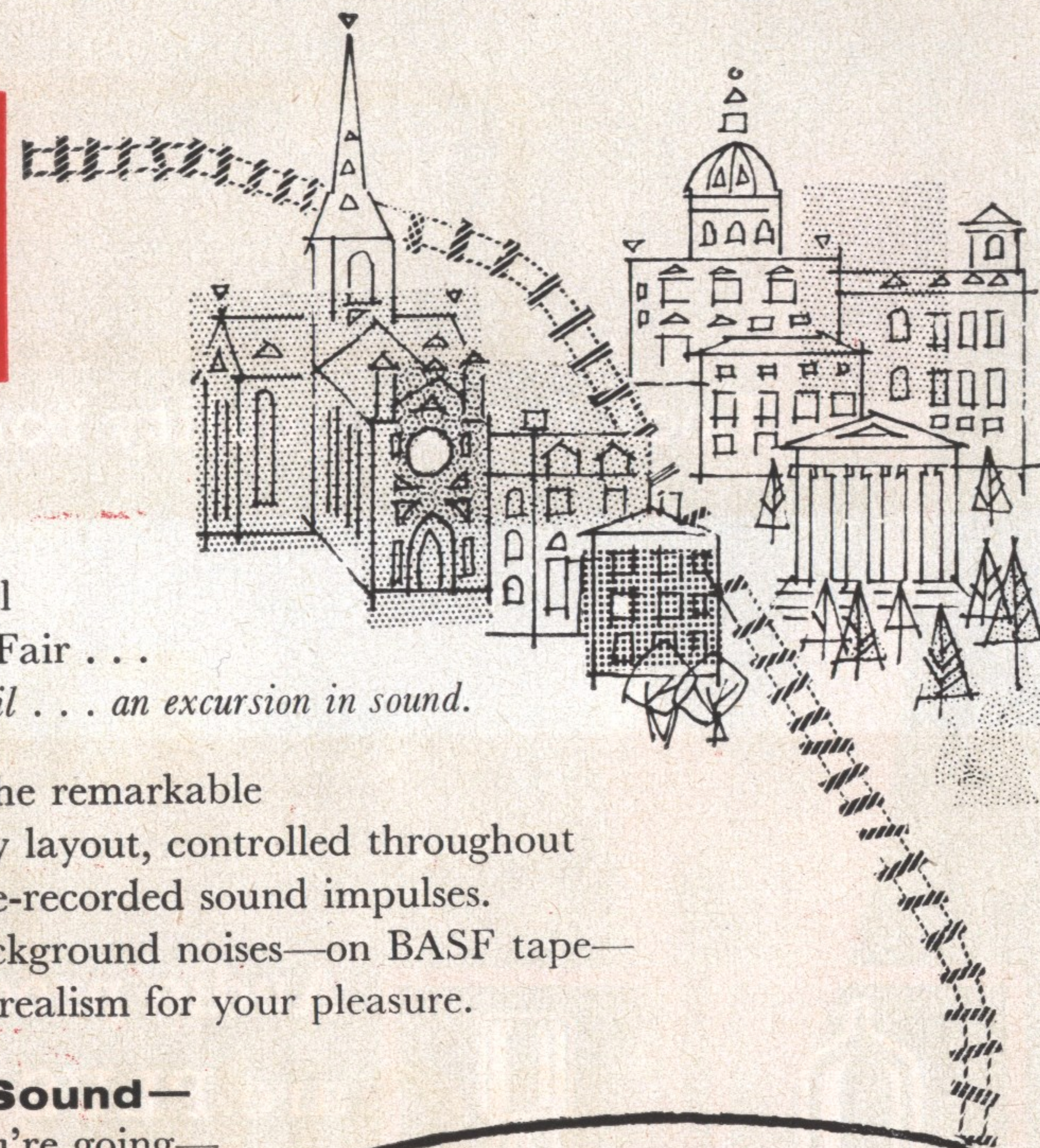
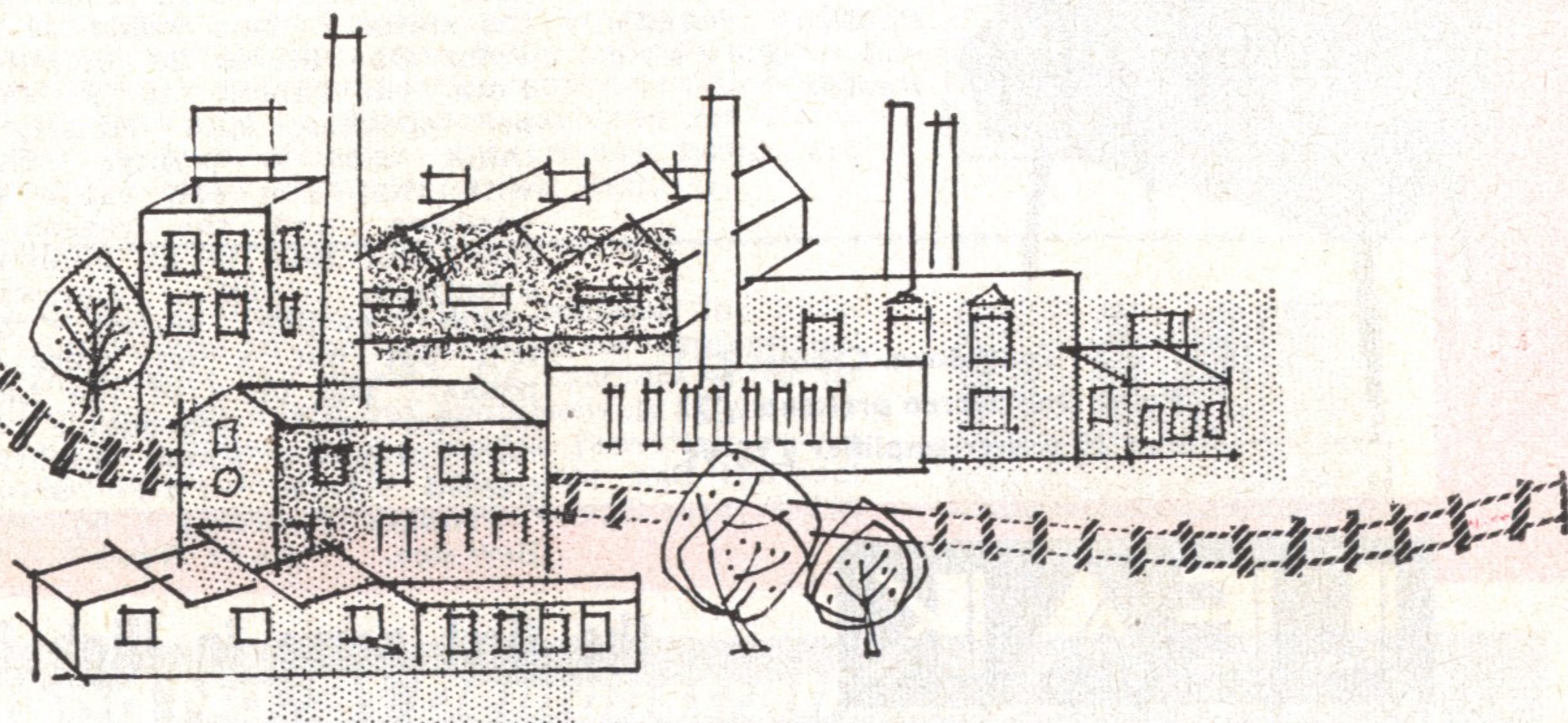
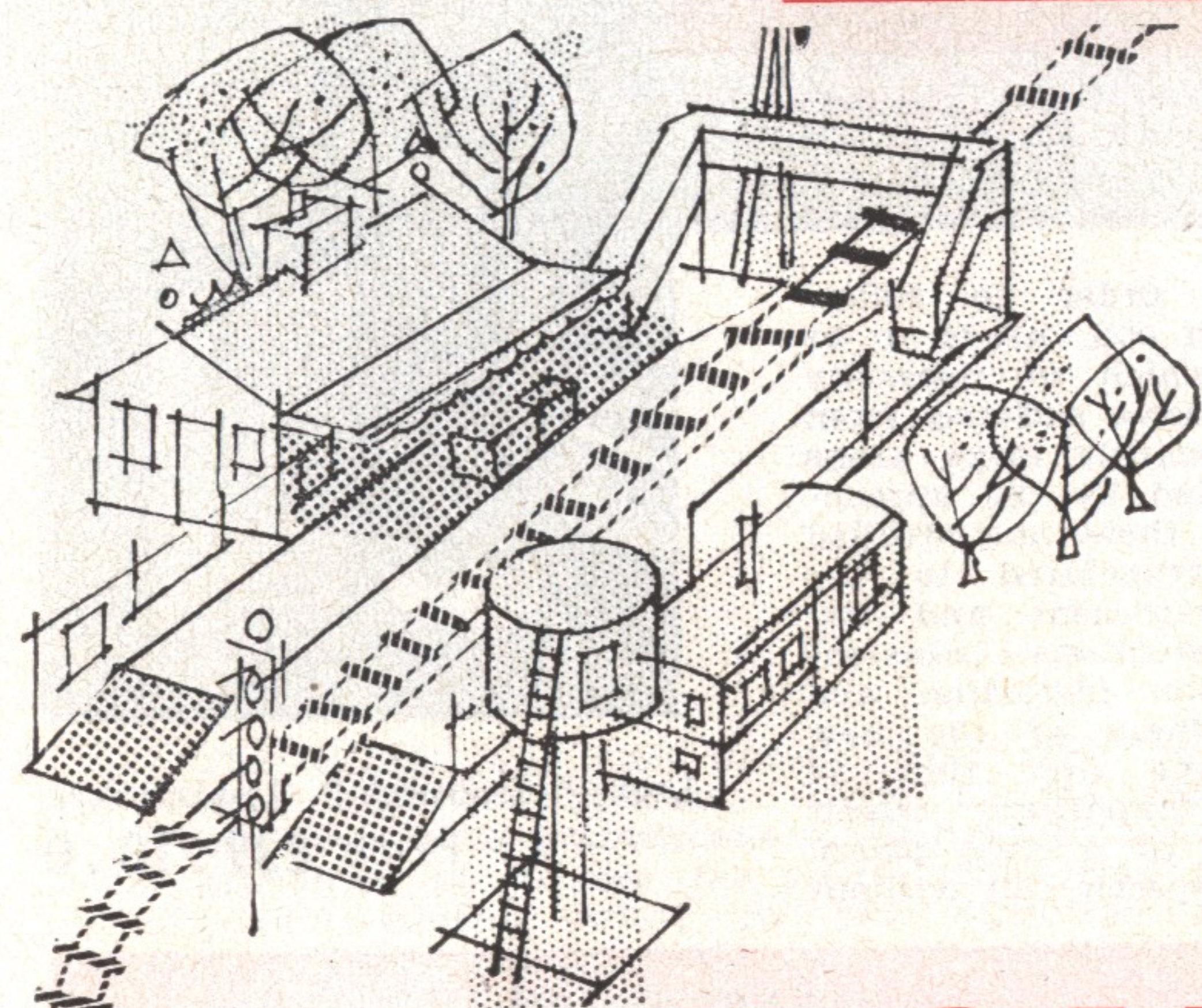
Telegrams: Sinusoidal Ealux, London

go to Room

312

and
**ENJOY
A
DOUBLE
JOURNEY**

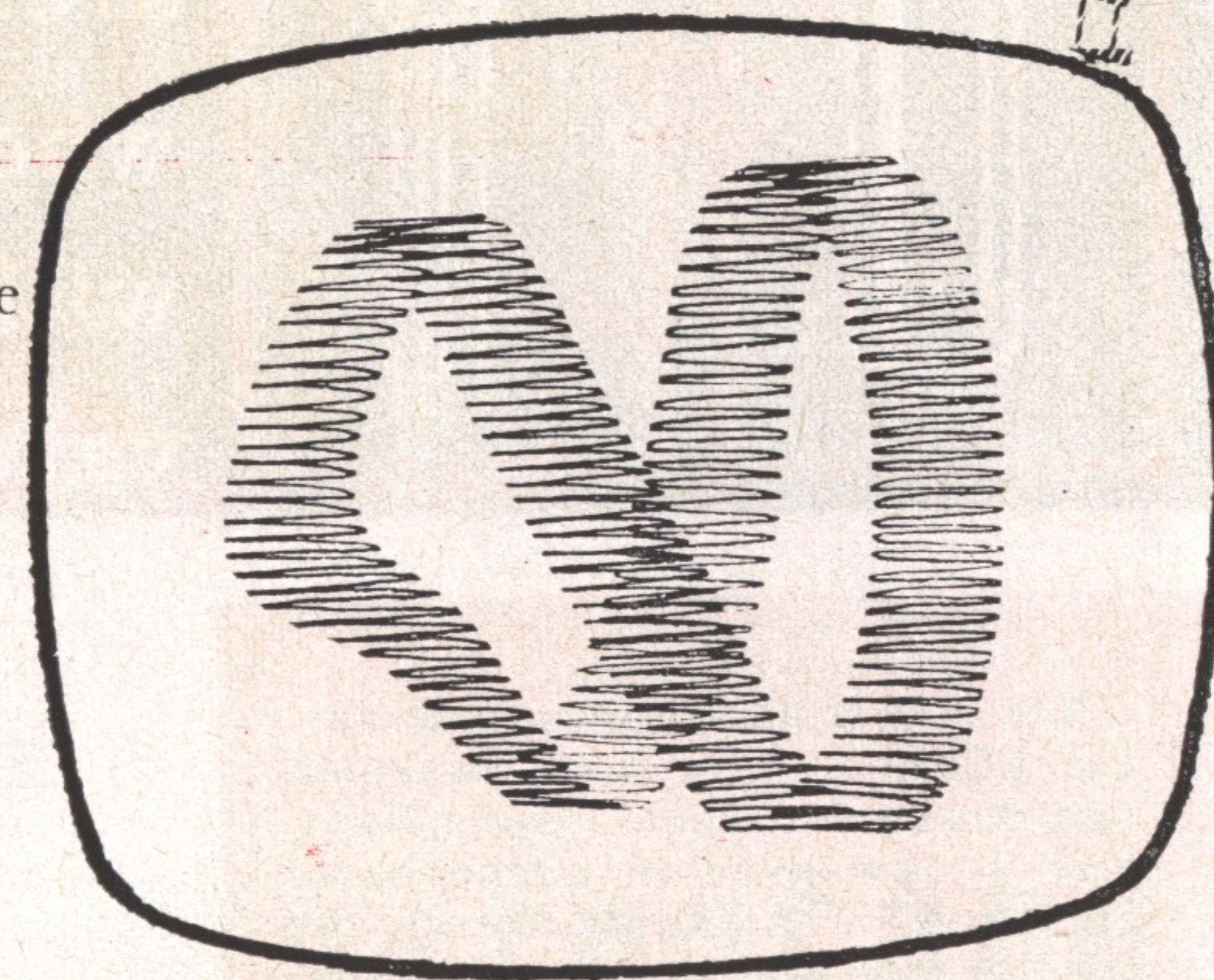
without actually moving!



Top of the bill
at this year's Fair . . .
a journey by rail . . . an excursion in sound.

Travel with the remarkable
model railway layout, controlled throughout
by BASF tape-recorded sound impulses.
Authentic background noises—on BASF tape—
complete the realism for your pleasure.

Travel in Sound—
see where you're going—
through the colourful
fantasy of Chromasonics,
an exciting new technique
publicly displayed
for the first time.
See the music . . .
hear the quality . . .
on BASF tape.

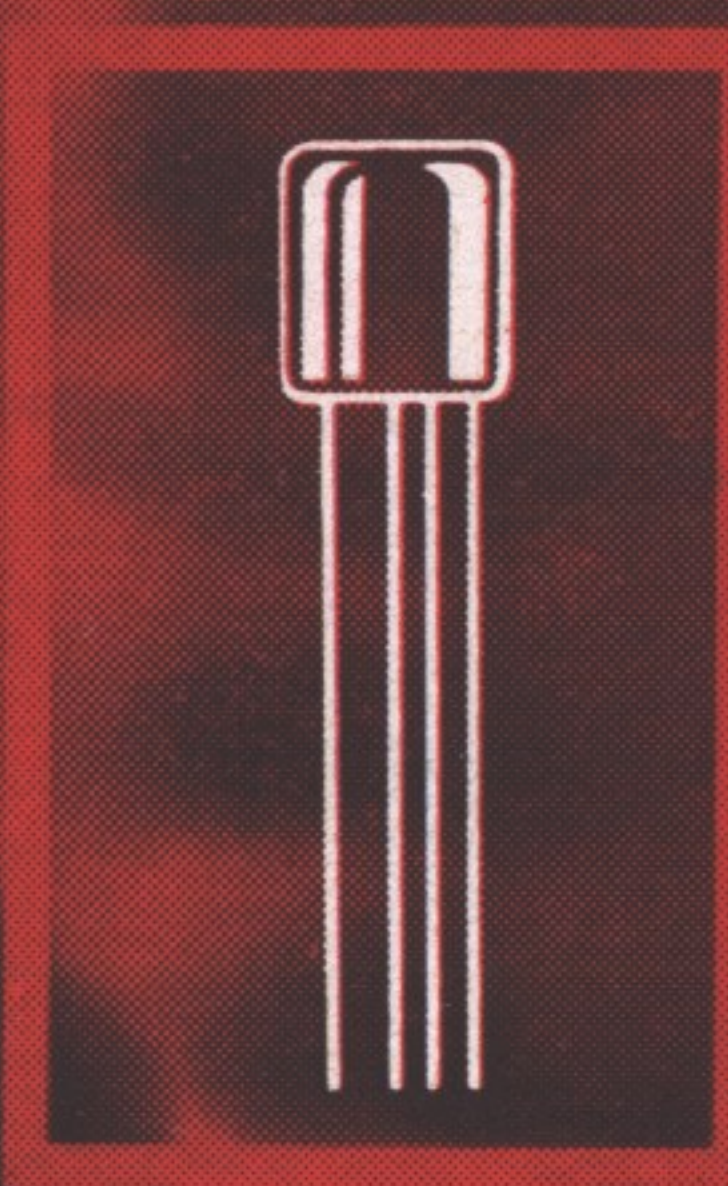


the tape that gives

Authentic Sound

BASF CHEMICALS LIMITED, 5a Gillespie Rd, London N5

Look for the quality bonus



Audio products
are PLUS products
when they're fitted
with **Mullard**
valves or transistors

The new Mullard triode-pentode—the ECL86 — has been designed specifically for audio applications, and is now used in stereophonic amplifiers. The sensitivity of the valve is such that, in a typical single-valve amplifier, a signal voltage of 50 mV at the grid of the triode section will produce the maximum output power from the pentode section. Thus the output derived from low-sensitivity crystal or ceramic stereophonic pick-up heads (about 70 mV) is ample to produce maximum output from the valve and also allow the use of negative feedback.

Backed by unsurpassed research and manufacturing facilities, Mullard products bring you the high excellence of a built-in Quality Bonus.

In all Mullard valves and transistors the Quality Bonus is the proved performance and reliability that gives something extra to your equipment.



MULLARD LTD., MULLARD HOUSE,
TORRINGTON PLACE, LONDON, W.C.1.



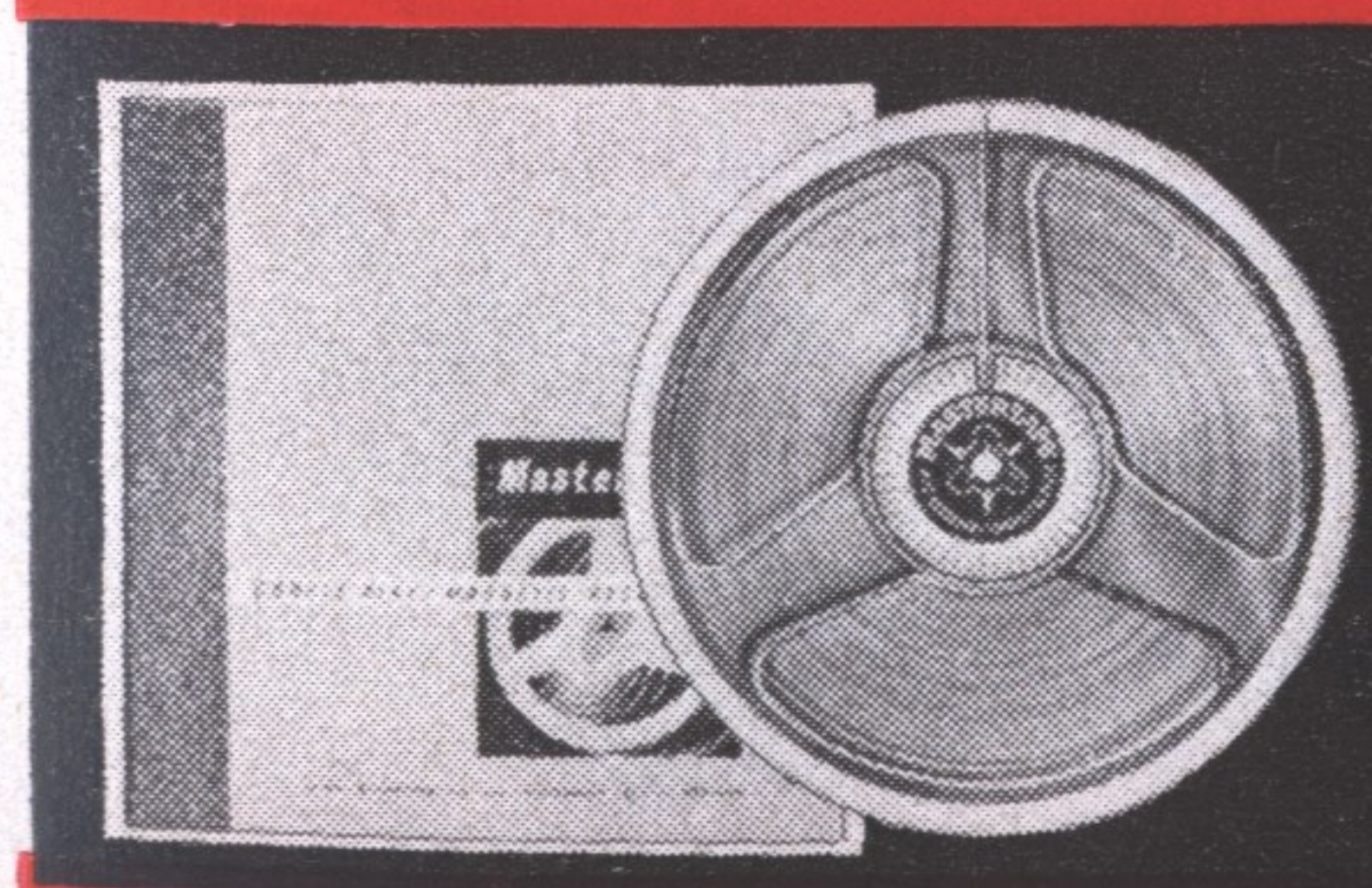
MVE 225



as perfect as
human skill can achieve

The symmetry and perfection of an ancient Greek vase is a criterion for human skill and craftsmanship. In the field of high fidelity sound recording and reproduction no less exacting standards are required in the design and manufacture of fine magnetic tape.

Mastertape is the end product of nearly thirty years research and development by a pioneer company in recording techniques. Mastertape is of a uniform quality and strength which the most discriminating connoisseurs approve. Mastertape is specially approved by Grundig (Gt. Britain) Limited for use on their machines as well as by many other leading tape recorder manufacturers. Those who really care for fine recording always insist upon Mastertype.



Mastertape

A MEMBER OF THE **BICC** GROUP OF COMPANIES

Obtainable from your local dealer or, in case of difficulty, write to the address below for your nearest stockist.

Send for free full colour brochure of useful hints and list of tape prices and accessories.

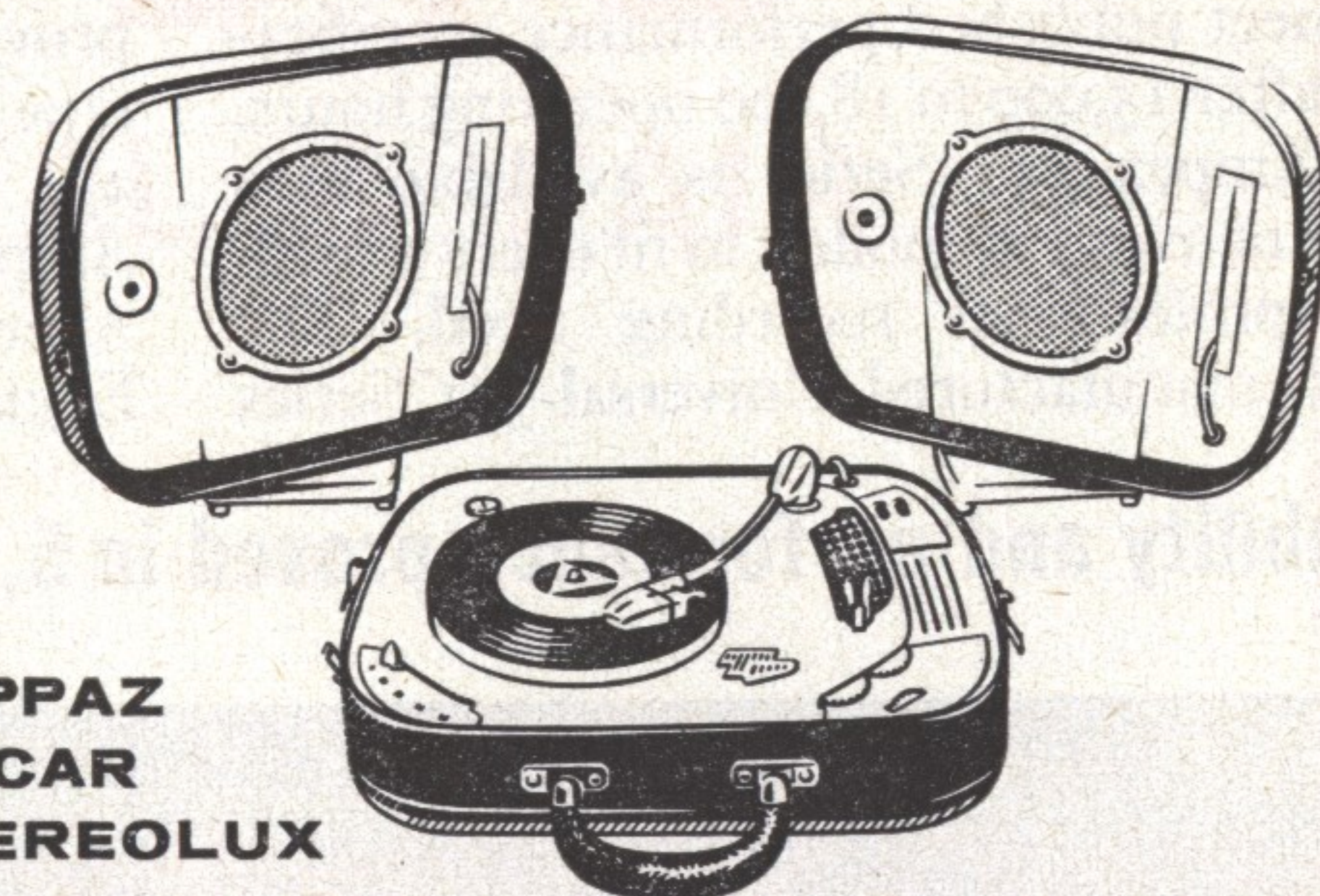
M.S.S. RECORDING COMPANY LIMITED, COLNBROOK, BUCKS. Telephone : COLNBROOK 2431

SEE US AT THE AUDIO FAIR — BOOTH 35

PAZ FOR SUPERB SPATIO-DYNAMIC SOUND!
 PAZ FOR SUPERB SPATIO-DYNAMIC SOUND!
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 PAZ FOR SUPERB SPATIO-DYNAMIC SOUND!
 PAZ FOR SUPERB SPATIO-DYNAMIC SOUND!
 PAZ FOR SUPERB SPATIO-DYNAMIC SOUND!

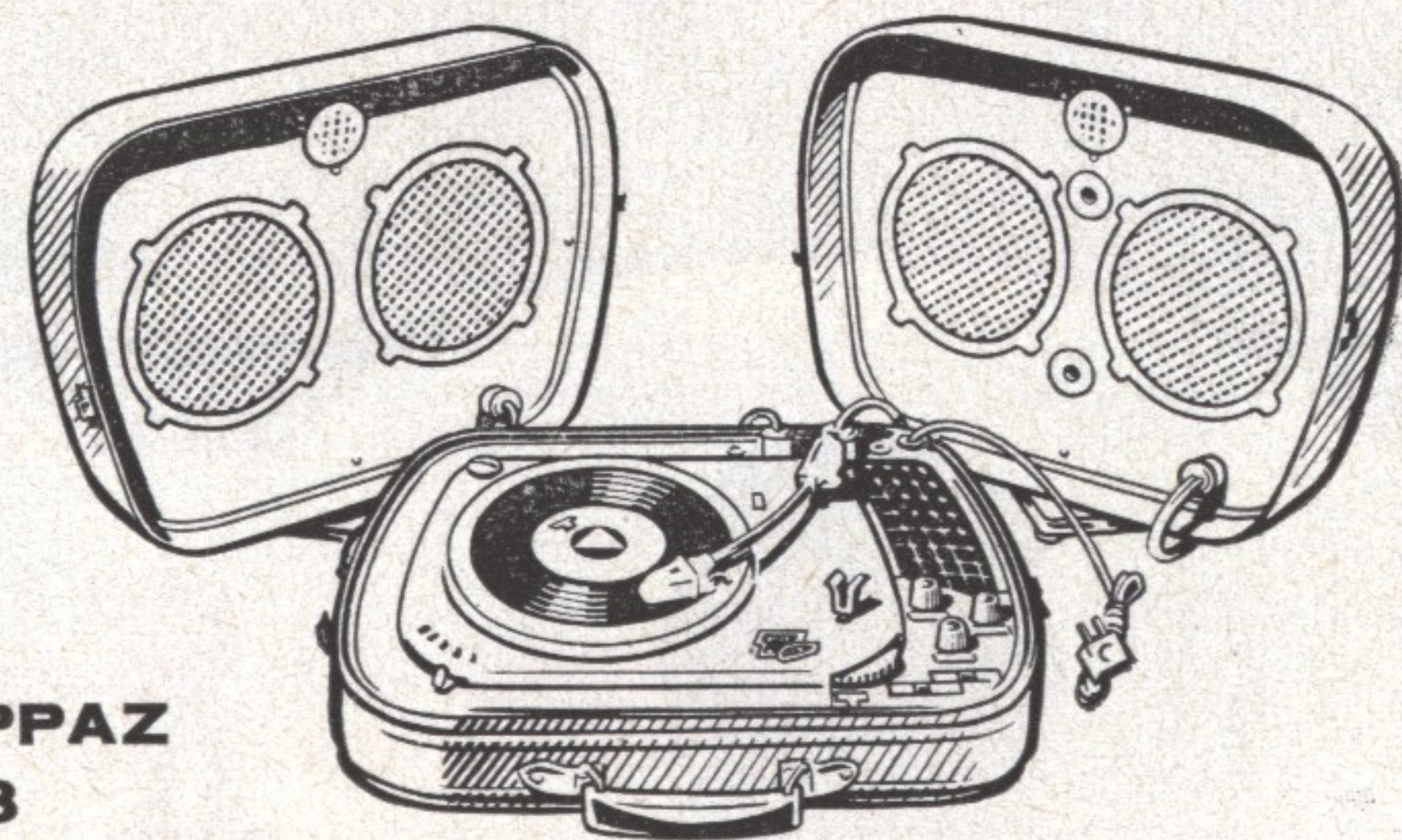
See the TEPPAZ range of modern record players

Every Teppaz record player has the exclusive 'Spatio Dynamic' sound that puts greatness into a small attractive package. Stereo for instance, Teppaz brings you a quality hitherto only possible from large console units . . . brings it to you in a record player weighing only 20 lbs!



**TEPPAZ
OSCAR
STEREOLUX**

4-speed turntable; twin amplifiers; 3 watts output each channel; frequency response 30-1200 cps \pm 2 db; 7" speaker in each detachable baffle cover; treble/bass, volume and balance controls; A.C. mains; weight 20 lbs.



**TEPPAZ
448
STEREO**

4-speed turntable; two 7" speakers and a tweeter in each baffle cover; 6 watts output each channel; bass, treble, balance & filter controls; A.C. mains; weight 22 lbs.

Hear these outstanding record players and other Teppaz hi-fi equipment in Demonstration Room 222 (Booth 45).



TEPPAZ LYON

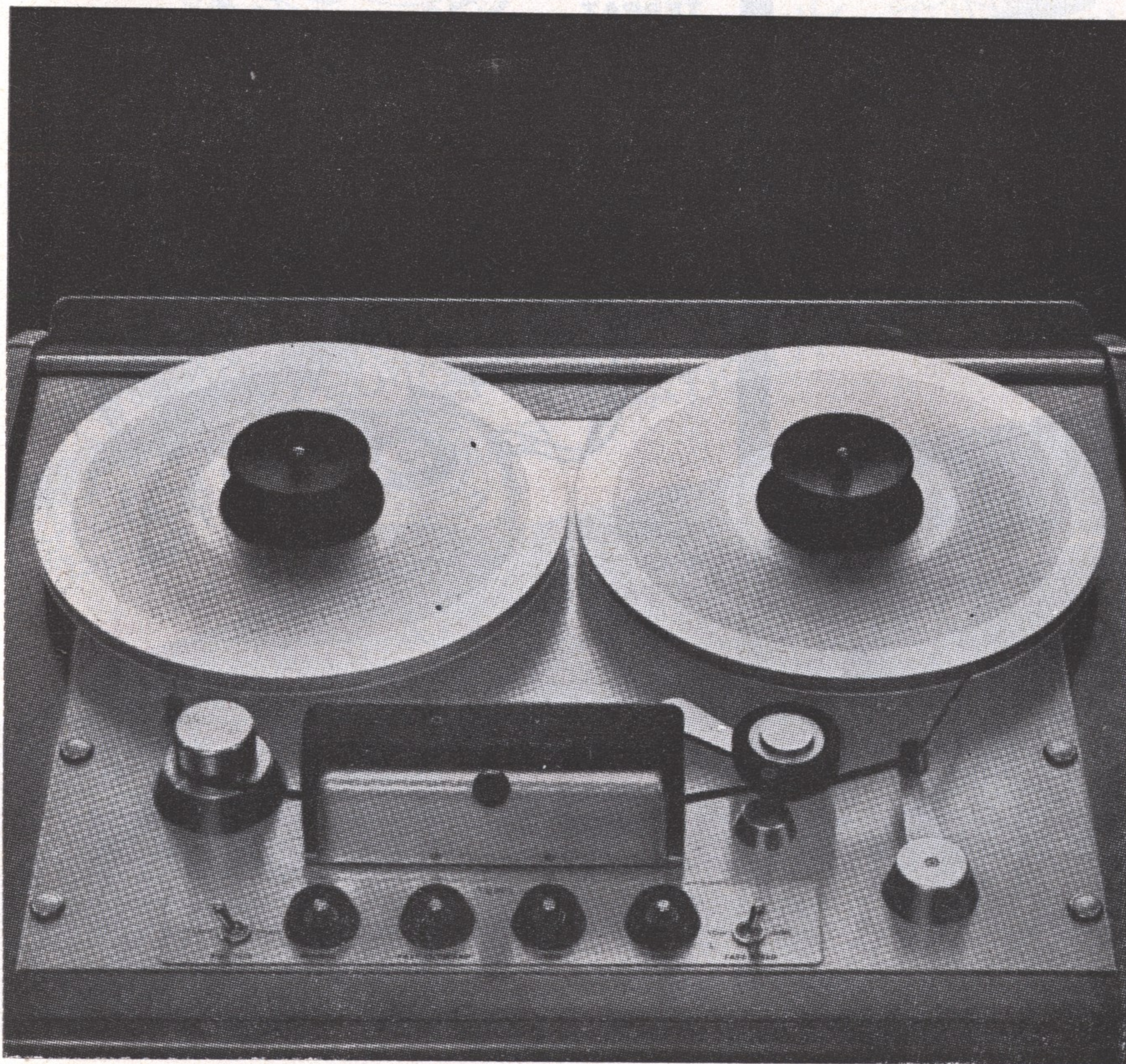
SOLE CONCESSIONAIRES IN U.K.
 SELECTA GRAMOPHONES LIMITED
 SOUTHWARK BRIDGE ROAD
 LONDON, S.E.1

This exceptional magnetic tape transport is common to all Ampex 350 Series professional audio recorders. More than 5,000 radio stations, recording studios, film production companies, and other professional installations throughout the world have found the 350 Series tape transport to be the most reliable mechanism in the field of professional audio recording. Operation and maintenance are remarkably simple. The magnetic heads used in 350 Series recorders incorporate design experience gained by Ampex engineers in creating precision heads for instrumentation and computer use at tape speeds and frequency ranges far greater than those required for audio recording. As a consequence, many Ampex audio heads still meet published performance specifications after 15,000 to 18,000 operating hours. The Ampex 350 Series is available in a choice of over 125 models to fit every worldwide professional recording need. The British manufactured Universal 351 Series

recorder/reproducer, for instance, permits instantly switchable selection of CCIR or NAB equalisation, and thus simplifies international exchange of monaural and stereo tapes. A multi-tapped power transformer allows it to be used on any line voltage from 90 to 130, and 200 to 240 volts. The Universal 352 is a monaural or stereo reproducer that offers Ampex 350 Series performance for those applications where only the playback function is desired. Model 354 is a two-channel stereo recorder/reproducer that combines all stereo electronics in a single chassis for compactness. For specifications and technical performance data on the Ampex 350 Series professional audio recorders which use this most thoroughly proved and respected of all professional tape transports, visit demonstration room 254 at the International Audio Fair. Ampex Great Britain Limited, 72 Berkeley Avenue, Reading, Berkshire, England. Tel. Reading 55341.

AMPEX

Reliability and performance proved in 5,000 professional installations



THE 1962 INTERNATIONAL AUDIO FESTIVAL & FAIR

Festival Director

C. Rex-Hassan

APRIL

26th, 27th, 28th, 29th

Hotel Russell

London, W.C.2



Catalogue 2/6

... for the guidance of visitors

This International Audio Festival is divided into two distinct Sections.

In the **First Section** on the ground floor in the Exhibition Halls are Booths on which Exhibitors are displaying their Products. These Booths are manned by expert personnel who are able to discuss any aspect of their equipment.

The **Second Section**, and the one which is considered the most important, is on the First, Second and Third floors of the Hotel. On these floors the manufacturers who are exhibiting are giving live demonstrations. The way up to their demonstration rooms is by means of the main Hotel staircase, situated straight on through the Halls. There are other staircases for visitors to circulate around and down to visit any room, and there is a special staircase from the demonstration room floors allowing re-entry into the Main Halls.

How to use this Catalogue

On the following Blue pages of this Catalogue will be found a complete Guide to the 1962 International Audio Festival and Fair.

How to get about . . .

The Festival is well sign-posted, and visitors should not have any difficulty in finding their way about.

Overleaf in the Red are Plans showing the layout of the Exhibition. The first is of the Ground Floor Halls giving the positions of the booths and their number. It shows how to progress through these Halls to the main stairway which leads to the demonstration room floors. There is a large Indicator Board in the Glass Hall, on which is shown, floor by floor, the numbers of the Exhibitors demonstration rooms.

The next plan shows the general situation of the demonstration rooms on each floor and where the stairways up and down are to be found. It also shows the special Re-Entry staircase back down to the Exhibition Halls.

On the Corridor Walls this plan is repeated separately for each floor, with the names of Exhibitors written on it. These can be spotted quite easily because of their red frames.

Who is Exhibiting . . . and where

Then, again in Red, there is the Index of Exhibitors. Exhibitors are placed in this alphabetically by their Trade Name. Their booth numbers and demonstration room numbers follow. The initial number of the room denotes the floor, i.e., the 300s are the third floor, the 100s the first floor and so on.

Type and style of Products and Manufacturers names

The remainder, in Black, is made up of a Magazine Section, containing full details, both technical and explanatory, in article form on the Products of each Manufacturer. Each page is headed by the Trade name and beneath is the full title and address. Under this is their type or style of goods.

In the main, Exhibitors in this 1962 International Audio Festival and Fair are Manufacturers and they are entered as from the country of origin of their goods.

If they are Overseas Manufacturers, the U.K. Agent or Company and address is shown in bold type at the end of the article.

Many of the Exhibitors have also taken advertisements in this Catalogue and these advertisements carry the technical aspect further with illustrations. An Advertisers' Index is printed on Page 176, the last page of this Catalogue.

AMENITIES

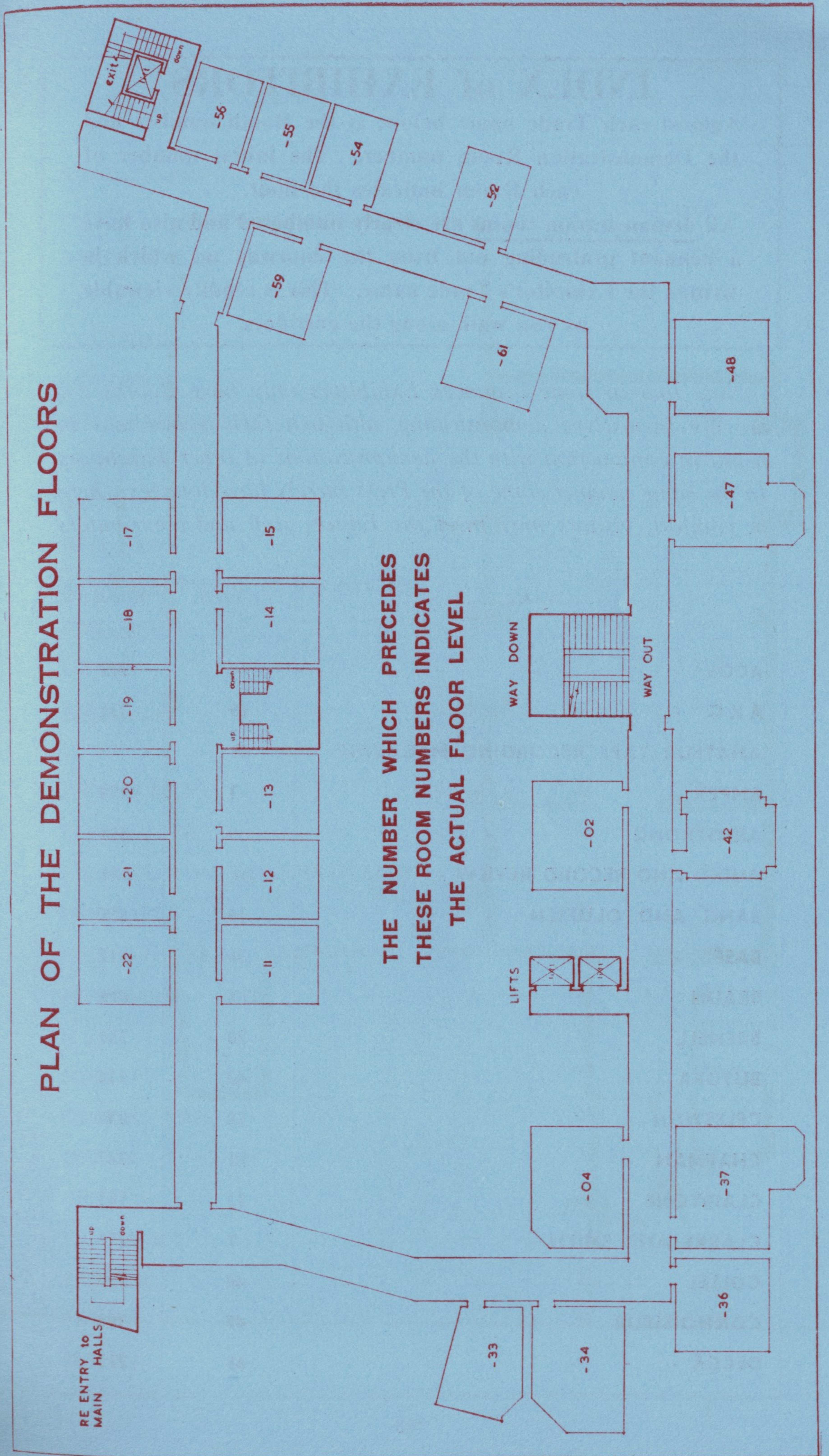
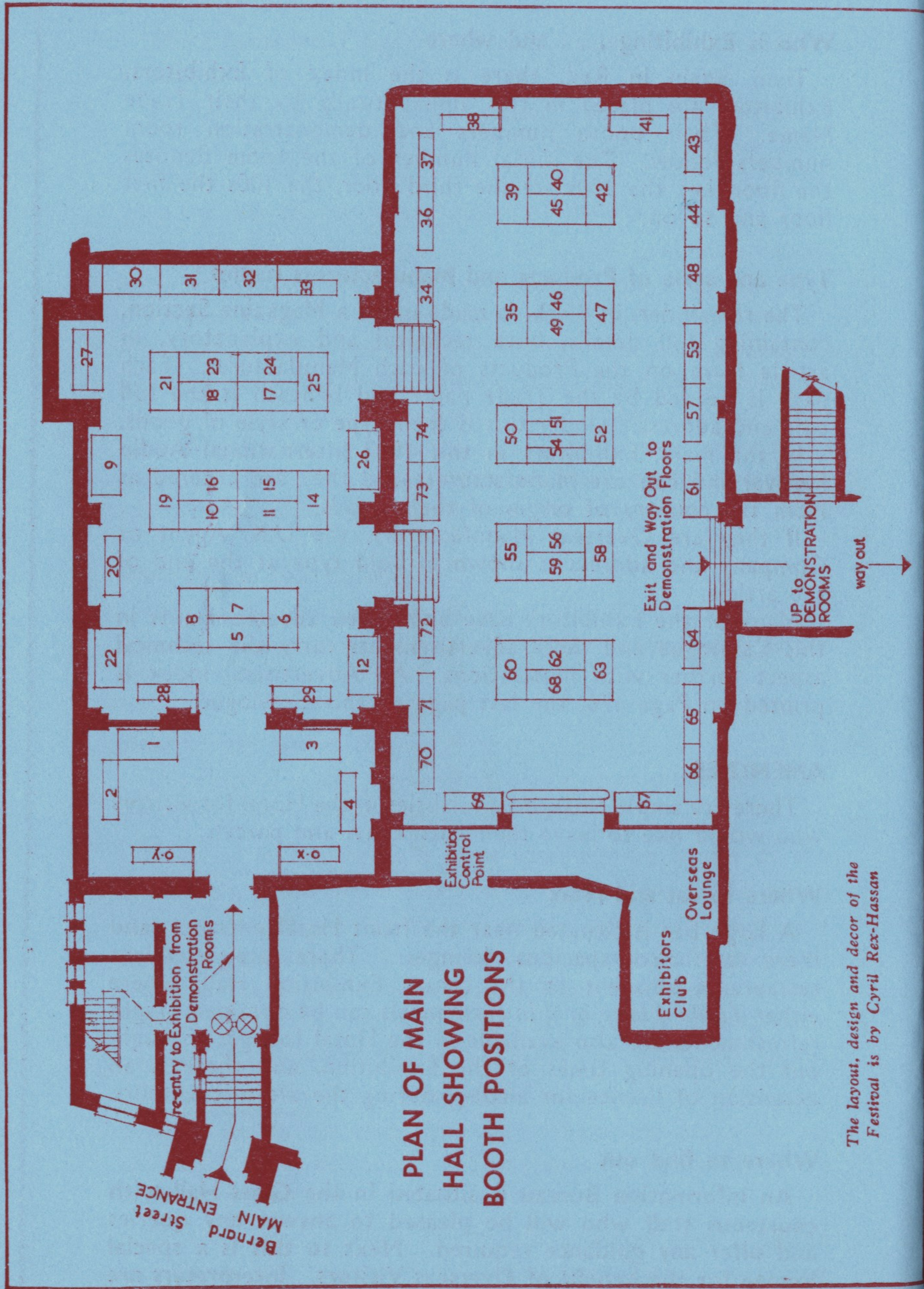
There are ample cloakroom facilities in the Hotel for visitors who would like to leave their hats, coats and parcels.

Where to eat and relax

A large bar is situated near the front Hotel entrance, and there are also spacious lounges. There are excellent restaurants adjacent to the centre Exhibition Hall, where either *Table d'hôte* or *à la carte* meals can be obtained. Light refreshments are also available in the Hotel lounges throughout the opening times of the Exhibition, and there is an extension of licence for alcohol during the afternoon hours.

Where to find out

An Information Bureau is situated in the Glass Hall with courteous staff who will be pleased to answer any queries and offer any guidance required. Next to this is a special lounge for the benefit of Overseas Visitors. Interpreters are available.



INDEX of EXHIBITORS

Against each Trade name below, is the Booth number and the Demonstration Room number. The initial number of each Room indicates the floor.

All demonstration rooms are clearly numbered and also have a pennant protruding out from the doorway on which is written the Exhibitor's Trade name. This is readily viewable as you walk along the corridors.

Note that in some instances Exhibitors only have Booths and are not themselves demonstrating, although their goods may be heard in conjunction with the demonstrations of other Exhibitors. In the same manner some of the Press merely have lounges where, in comfort, visitors may meet the Editor, staff and contributors.

NAME	BOOTH	ROOM NO.
ACOS - - - - -	64	302
A K G - - - - -	69	321
AMATEUR TAPE RECORDING MAGAZINE -	41	—
AMPEX - - - - -	1	254
ARMSTRONG - - - - -	9	359
AUDIO AND RECORD REVIEW - - -	—	344
BANG AND OLUFSEN - - - - -	19	355
BASF - - - - -	36	312
BRAUN - - - - -	OX	319
BRENELL - - - - -	70	259
BUTOBA - - - - -	40	118
CELESTION - - - - -	58	348
CHAPMAN - - - - -	18	347
CLAIRTONE - - - - -	12	161
CLARKE AND SMITH - - - - -	7	211
COLLEL - - - - -	48	320
CONNOISSEUR - - - - -	47	304
DECCA - - - - -	68	212

NAME	BOOTH	ROOM NO.
EMI - - - - -	54	354
FERROGRAPH - - - - -	61	247
FI-CORD - - - - -	71	311
GARRARD - - - - -	37	248
GEVAERT - - - - -	60	122
GOLDRING - - - - -	53	215
GOODMANS - - - - -	14	317
THE GRAMOPHONE - - - - -	—	244
GRAMPIAN - - - - -	59	252
GRUNDIG - - - - -	8	115
HI-FI NEWS - - - - -	67	—
ILIFFE ELECTRICAL PUBLICATIONS - -	3	—
IRISH BRAND - - - - -	23	—
JASON - - - - -	29	217
KEF - - - - -	20	214
LEAK - - - - -	4	113
LEEVERS-RICH - - - - -	22	313
LOEWE-OPTA - - - - -	55	314
LONG PLAYING RECORD LIBRARY - -	—	232
LOWTHER - - - - -	34	237
LUSTRAPHONE - - - - -	6	149
MORDAUNT - - - - -	27	256
M S S - - - - -	35	—
MULLARD - - - - -	10	111
ODHAMS PRESS - - - - -	21	—
ORIOLE - - - - -	28	356
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PAMPHONIC - - - - -	15	—
PARMAN - - - - -	11	352
PHILIPS - - - - -	46	342
PLANET - - - - -	OY	233

NAME	BOOTH	ROOM NO.
PYE - - - - -	30	234
QUAD - - - - -	31	147
RADFORD - - - - -	5	121
RECORD HOUSING - - - - -	63	213
RECORDS AND RECORDING - - - - -	—	241
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RESLO - - - - -	17	—
ROBUK - - - - -	52	315
ROGERS - - - - -	2	202
SAGA - - - - -	57	159
SCOTCH - - - - -	49	120
SIMON - - - - -	65	220
SHURE - - - - -	43	361
SME - - - - -	66	—
SONY - - - - -	74	117
SOUNDCRAFT - - - - -	26	218
S.T.C. - - - - -	50	—
STUZZI - - - - -	56	114
TANDBERG - - - - -	24	255
TANNOY - - - - -	39	204
TELEFUNKEN - - - - -	62	242
TEPPAZ - - - - -	45	222
THOMPSON, DIAMOND AND BUTCHER - - - - -	—	335
TRUVOX - - - - -	44	336
VITAVOX - - - - -	25	337
VORTEXION - - - - -	73	145
WAVERLEY RECORDS - - - - -	51	221
WHARFEDALE - - - - -	38	334
WHITELEY - - - - -	33	322
WYNDSOR - - - - -	32	261
ZONATAPE - - - - -	42	236

ACOS

Cosmocord Ltd.,
Eleanor Cross Road,
Waltham Cross, Herts.
Waltham Cross 27331.

Booth 64
Demonstration
Room 302

*Gramophone Pick-ups, Cartridges and Accessories,
Microphones.*

Cosmocord are showing a wide range of replacement gramophone cartridges including the ACOStereo 81 and the GP.67-0 which are designed to track at 3 grammes in the latest changers. These cartridges bring the advantages of low tracking weights, with consequent low record wear, which were first demonstrated with the Hi-Light pick-up, within the domestic field. Another aid to record care is the ACOS stylus pressure gauge, which enables you to check the downward force on the record over a range of 0-15 grammes and is accurate to within $\frac{1}{2}$ gramme. There is also on show the well known ACOS changer Dust Bug, and the Cecil Watts Dust Bug, which ensure that the record is kept clean while it is actually being played.

Live demonstrations using ACOS Mono and Stereo microphones will be given at regular intervals, and discs will also be featured. These demonstrations are designed to show what ACOS microphones can do whilst working under difficult conditions. In less congested surroundings even better results should be obtainable. Today, with modest equipment, and a little know-how, the amateur can obtain quite professional results. At these demonstrations you can get an idea what can be done.

AKG

Akustische u. Kino-Geräte GMBH,
Vienna, Austria

Microphones, Headphones

Booth 69

**Demonstration
Room 321**

AKG of Vienna is one of the world's leaders in the research and development of condenser and dynamic microphones and headphones.

AKG owns hundreds of patents. Among these are many basic patents covering new principles of obtaining cardioid patterns, extended frequency range and low distortion. Every microphone undergoes at least two full-scale tests in anechoic rooms of the most up-to-date design, where frequency response, front-to-back ratio, etc., is measured and recorded.

Approximately half a million microphones per year for broadcast, TV and film studios, theatres, recording studios, tape recorders and for many other purposes are shipped to destinations all over the world.

AKG manufacture a large proportion of microphones used in the most successful tape recorders.

AKG studio microphones (condenser and dynamic types) are used by leading broadcasting organisations, film studios and recording companies, where they meet the exacting specifications demanded by such users.

D 11 N. Cardioid dynamic microphone with bass attenuation switch and folding stand. Provides low and high impedance inputs. Frequency range 90-13,000 c.p.s. Discrimination over full range approx. 12 db.

D 88 A. New stereo microphone used by Continental tape recorder manufacturers. Impedance 200 ohms, twin line transformer available for high impedance inputs.

D 19 B. Wide band dynamic cardioid microphone designed for semi-professional applications. Frequency range 40-16,000 c.p.s. Discrimination throughout entire range 15 db. Bass attenuation switch. Shielded against magnetic stray fields.

D 24 B. Studio version of D 19 B with built-in wind screen. Flat from 30-16,000 c.p.s. Discrimination approx. 20 db from 30-16,000 c.p.s.

D 25 B. Dynamic cardioid studio microphone specially designed for boom operation. Used by leading TV and film studios.

D 58. New dynamic noise cancelling microphone for close-talking applications in noisy surroundings. Utilises a differential principle which cancels sound originating farther away from the microphone. Extremely small ($\frac{1}{8}$ in. long, $\frac{1}{4}$ in. diam.). Due to its good frequency response in the close-talking model it is very useful as reporter microphone. Suitable for work even in iron dust atmosphere.

C 12. "King of Condenser Microphones," accepted as a standard by many world-famous broadcasting organisations. Provides the choice of nine different directional patterns by remote control even during programme pick-up without disturbances or changes in level. Stabilised power unit supplied. Every C 125 supplied with individually calibrated response curves.

C 24. Stereo version of C 12. Suitable for MS and XY stereophony.

C 28/29/30 A. Condenser microphone system for the highest professional requirements. Cardioid and omnidirectional patterns. Make sure you inspect these beautifully engineered microphones.

C. 60. Miniature condenser studio microphone. Uses the proven CK 28 cardioid or the CK 26 omni capsule. Weight only 2.1 ounces. Operates from mains supply unit N 60 or from rechargeable pocket battery B 60.

K. 50. Dynamic headphones for stereo and mono. 30-20,000 c.p.s. 127 phon output per system. 3 ounces light. No tight coupling to ear necessary—no listening fatigue. Rugged for long life.

K 58. New headphone-microphone boom set. Consists of K 50 headphones and close-talk microphone D 58 (see our advertisement).

Please refer to the AKG advertisement in this catalogue. **U.K. Agents:** Politechna (London) Ltd., 3, Percy Street, London, W.1, LAN 6236/8.

AMATEUR TAPE RECORDING & HI-FI MAGAZINE

Picture Story Publications Ltd.,

168, Regent Street,
London, W.1

REGent 4833

Booth 41

Publishers

All tape enthusiasts look for the striking full-colour cover of "Amateur Tape Recording & Hi-Fi" Magazine on the bookstalls. The promise of the cover is fulfilled each month by the finest team of writers in the field, including such well-known personalities as Norrie Paramor and Rachel Lindsay.

STARTING OFF

The finest start to the hobby of tape recording is a subscription to "A.T.R." It provides the new owner with a complete guide to tape recording, presented simply and clearly each month with diagrams, picture-stories and photographs.

AND AFTER

"A.T.R." reflects the many aspects of tape recording throughout its pages. The person wishing to exchange tapes finds a continuous selection of tape friends to choose from in "A.T.R.'s" Inter-Tape Directory. The Clubmen and the ladies are catered for in special sections and the advanced recordist is not forgotten. Technical articles, construction items, news and reviews of the latest Audio equipment — he can find them all in his current copy of "A.T.R."

Its regular tape record reviews make "A.T.R." compulsory reading for music lovers.

FACILITIES FOR READERS

All readers can make use of the many facilities offered by "Amateur Tape Recording & Hi-Fi." These include a Technical Advisory Service, which has already answered thousands of queries, guidance to people forming local tape clubs, and the publication of requests for tape-contacts.

Exciting competitions, cartoons, hints and tips, all assist in making this the liveliest and most helpful tape magazine on the market. Why not see for yourself? You cannot mistake it. Just look for the full-colour cover.

A.T.R. STAND FEATURES

A Night Out With the Stars

You can win a night out with the stars AND a superb four-track recorder, the Philips STARMAKER, in "A.T.R.'s" latest and greatest competition. Details obtainable from Booth 41.

THE ATRECORD on display. See "A.T.R.'s" own easy-to-build recorder.

AMPEX

Ampex Great Britain Ltd.,
72, Berkeley Avenue,
Reading, Berkshire.
Reading 55341

Booth 1
Demonstration
Room 254

Precision Magnetic Tape Recorders.

Ampex Great Britain Ltd., will be displaying professional and domestic magnetic tape recorders, manufactured by Ampex Corporation in the U.S.A. and Ampex Electronics Ltd., in Reading, England.

The Universal model 351, introduced at this Exhibition last year, will again be shown. A few minor changes only have been made in the past year during which the Universal 351 has found wide acceptance in world markets. The machine is available in a variety of configurations to meet every recording need. On show for the first time at the Audio Fair will be the SA-10 speaker-amplifier units and the MX-35 four-channel Mixer. Both of these units are engineered to professional standards and are designed to increase the flexibility of the Ampex product range.

The domestic equipments now available consist of portable recorders and speakers only. The former contain a series of new, improved mechanisms known as the 1200 series. Over 170 modifications have been made to produce the 1200 series from the earlier 900 series. New head design and improved tape guiding permit 4-track recording as well as reproduction, whilst a switchable erase head gives greater flexibility. The associated speaker/amplifier units have also been changed to match the appearance of the new models and they are now designated as Model 2020.

For the first time in England Ampex will be showing their complete range of high-grade audio tape. Manufactured in three basic types, this tape is designed to meet the most exacting requirements. Series 500 is a high-quality product for the discerning home user. Combined with this is the exclusive Signature Binding* to complete a most attractive package. The 600 series is a general-purpose professional tape with excellent high-frequency response characteristics. The 400 series has been specially designed to meet the most exacting requirements. It combines a very low noise level with high consistency of output and frequency response.

Quality control of this tape is as rigorous as for instrumentation tapes.

Regular demonstrations will be given throughout the period of the Exhibition and experienced engineers will be available to give advice on all aspects of magnetic recording.

* Ampex trade mark.

ARMSTRONG

Armstrong Wireless & Television Co. Ltd.,
Warlters Road, Holloway, London, N.7
NORTH 3213

Booth 9
Demonstration
Room 359

*Complete Tuner/Amplifier Chassis, both mono and stereo.
AM/FM Tuners and FM Tuners. High Fidelity
Amplifiers. Tape Pre-Amplifiers.*

A20 Stereo Power Amplifier. £30.

Incorporates two individual high fidelity amplifiers in one superbly compact unit. Each has a rated power output of 12 watts and a peak output of 25 watts, totalling 24 watts and 50 watts respectively. Frequency response is within 1 db 15—22,000 c.p.s. and harmonic distortion is less than 0.1% at 12 watts.

PCU25 Stereo Pre-Amplifier. £22 10s.

Designed for use with the A20 Power Amplifier, this pre-amplifier is notable for its high sensitivity and versatility and for its effective but simply-operated filter controls.

PCU27 Stereo Pre-Amplifier. £28 10s.

Designed for the professional user who needs the very best and every desirable adjustment is included. Any amplifier, or even dissimilar amplifiers, may be used with it, but generally the A20 Power Amplifier is recommended.

T4B FM Tuner. £23

A self-powered tuner in attractive vinyl-hide case matching the PCU25 Pre-Amplifier. Features include automatic frequency control, cathode follower output and variable output control giving perfect matching to any amplifier or tape recorder.

ST3 Mk. 2 AM/FM Tuner. £28 10s.

A self-powered tuner covering the VHF, medium, and long wavebands. On AM bands the ferrite rod aerial, two IF stages and efficient AVC, ensure good Continental reception. The FM circuit is completely stable and the automatic frequency control provides broad easy tuning.

Stereo 12 Mk 2 Tuner/Amplifier Chassis. £44 15s.

The most complete chassis ever produced, combining an AM/FM Tuner, a comprehensive Control Unit and two High Fidelity Amplifiers in one compact unit. Each amplifier provides 8 watts push-pull output, and the tuner covers the full VHF, medium and long wavebands. There is automatic frequency control on VHF and ferrite aerial with two IF stages on the AM bands.

Stereo 55 Tuner/Amplifier Chassis. £33 15s.

A junior version of the Stereo 12 Mk. 2 chassis providing 10 watts output, 5 watts each amplifier, and covering the full VHF and medium wavebands. Inputs, both mono and stereo, are provided for pick-ups, tape record and playback, and also for possible future stereo radio.

Jubilee Mk. 2 Tuner/Amplifier Chassis. £31 15s.

The high fidelity amplifier provides 8 watts push-pull output and the tuner covers the VHF band, with automatic frequency control, and long and medium bands. Inputs for pick-ups, tape recording and playback.

AF208 Tuner/Amplifier Chassis. £23 15s.

AM/FM chassis 5 watts output covering the VHF and medium wavebands, with inputs provided for pick-up, tape recording and playback.

PABO-3 Tape Pre-Amplifier. £16 16s.

Designed to operate as the essential link between any amplifier and most tape decks. Includes radio and microphone inputs and switched equalising for three tape speeds.

AUDIO & RECORD REVIEW

Hanover Press Ltd.

31, St. George Street, Hanover Square,
London, W.1.

HYDe Park 3936/8

Press
Lounge
344

Publication

The proprietors of *Audio & Record Review* were relative newcomers to the Audio field at the time of last year's Audio Festival and Fair.

Now, however, we look forward to seeing some of the many new friends we have made in the past year.

The magazine has made great strides in this period. An indication of its success is the fact that the current issue of the journal is the largest in its long history.

Perhaps this is an appropriate time to express our thanks to the Audio industry in general—which has been so generous in its support for the magazine.

We have, we feel, made a great deal of progress in one year; and we would like to think that the new and re-vitalised magazine has contributed something worthwhile to the industry it serves.

The staff of *Audio & Record Review* will be on hand during the run of the Fair—Leonard Hibbs, the Editor, Donald Aldous, the Technical Editor, and Malcolm Rayment, the London Editor. They will welcome visits from readers or contributors to the magazine.

B. & O.

Bang & Olufsen,
Struer, Denmark.

Booth 19
Demonstration
Room 355

Hi-Fidelity Reproducing Equipment.

Bang & Olufsen, of Denmark, exhibiting at this Exhibition for the first time, have made the theme of their displays "Hi-Fidelity in the Home."

The range of equipment on show and demonstration include items already acclaimed as some of the finest in the world, together with others recently introduced onto the market.

The range includes:

TONE ARMS.

Available in four different types; ST/M, ST/L, ST/P and ST/A, all are dynamically balanced so that equal pressure is applied to both sides of the Stereo record groove, even with the record player tilted.

STEREODYNE CARTRIDGES.

Designed to provide equal compliance in all directions and smooth frequency response throughout the audio spectrum. True stereo sound is retained even at the highest frequencies, through superior channel separation.

FOUR-SPEED STEREOPHONIC RECORD PLAYER.

Elegantly designed in teak, this record player is available with type ST/M or ST/C Tone Arms and various radii stylii, thus ensuring that stereo, long playing and conventional 78 r.p.m. records can be played correctly. A four-speed, belt-driven motor giving negligible vibration and rumblefree operation, and a stroboscopic turntable mat are only two of the features which go towards making this player one of the finest available.

BEOLIT 609 FM.

The handsome transistorised all-wave portable radio set, covering medium, long, short and VHF/FM bands. A radio for the practical connoisseur, for use on land or sea where a first-class communication receiver is essential.

"BELCANTO" TAPE RECORDER.

A superb recorder, beautifully designed, having a single tape speed of $3\frac{3}{4}$ " per second, with low noise transistorised amplifying stages, giving a dynamic range of better than 50db, with push-pull output stage of 6 watts for natural music reproduction.

This first-class equipment, together with integrated amplifiers, tuners for stereo and mono, and audio accessories are on display in the Bang & Olufsen booth and demonstration room.

U.K. Agents: Aveley Electric Ltd., South Ockendon, Essex.
Sth. Ockendon 3444.

BASF

Badische Anilin & Soda Fabrik A. G.,
Ludwigshafen am Rhein, Germany

Booth 36
Demonstration
Room 312

Tape

This year BASF, manufacturers of high quality recording tape, present two novel applications for their product which will attract the interest of all model makers and music lovers.

The first, a model railway layout, is controlled entirely by impulses recorded on BASF tape. Visitors will be able to see the rolling stock start, stop and carry out instructions given by the tape recorder while authentic background noises recorded on the same tape complete the realism.

The second demonstration provides an excursion in sound. Visitors will have the pleasure of seeing, at its first public performance, a colourful visualisation of music as translated by Chromasonics, a new technique for displaying impressions of sound on a screen. The music, recorded on BASF tape, plays while electronic impulses and waveforms control the display on a cathode-ray-tube, colour being provided by the "spinning disc" system.

BASF tape recording experts will be in attendance to answer any queries relating to Authentic Sound, and colourful newsletters and brochures are available to enable visitors to get the full enjoyment from tape recording.

U.K. offices: BASF Chemicals Ltd., 5t, Gillespie Road, London, N.5. Canonbury 2011.

BRAUN

BRAUN AG,
Russelsheimer Strasse 22,
Frankfurt/Main,
Western Germany

Booth OX
Demonstration
Room 319

Hi-Fi, Stereo, Tuners, Amplifiers, Record Players, Speakers

RCS9 Feeder Unit

For VHF/FM, SW, MW (AM), and LW (Marine Band). Twin-channel AF Amplifier with push-pull output stages for stereo operation. 11 valves, 3 diodes. 8 AM and 12 FM tuned circuits. The principal features are the exceptionally low distortion co-efficient and the high audio output. Rated output 2 x 7 w. Frequency response 25 to 30,000 c/s. Co-efficient of distortion 0.8% at 1,000 c/s.

PCS4 Stereo Record Player

Speeds 78, 45, 33 $\frac{1}{3}$ and 16 $\frac{2}{3}$ r.p.m. for records of all sizes, 50 c/s rumble-free constant speed drive. Frequency range 20 to 15,000 c/s. The low adjustable stylus pressure of the pick-up arm reduces record wear.

Hi-Fi Speaker L40

Frequencies both at the bass and at the treble end of the AF spectrum are reproduced clearly and free of distortion. The sound is radiated solely by the speaker diaphragms. A cabinet baffle is provided to eliminate all cabinet resonances. Can be wall mounted. Overall frequency response 60 to 18,000 c/s ± 2 dB, + 6 dB presence from 2,000 to 10,000 c/s, crossover frequency 5,000 c/s. Matching impedance 4 to 6 ohms. Maximum load 6 (10) w. One special bass loudspeaker 8.3 in., one special tweeter 4 in. in diameter.

Hi-Fi Stereo Amplifier CSV13

10 valves, frequency response 20 to 40,000 c/s. Co-efficient of distortion less than 1% over complete frequency range. Hum suppression greater than 60 dB. Crosstalk attenuation greater than 40 dB at 1,000 c/s.

Tuner CE12

For VHF/FM, SW, MW (AM), and LW. 5 valves, 2 diodes. 8 AM and 11 FM tuned circuits.

Hi-Fi Speaker L50

3 Speakers, one bass 10 in. and two Tweeters 4 in. in diameter. Frequency response 50 to 18,000 c/s ± 3 dB, + 6 dB presence from 2,000 to 10,000 c/s. crossover frequency 2,000 c/s. Matching impedance 4 to 6 ohms. Maximum load 8 (14) w.

U.K. Distributors: The Brattel Electric Company Ltd., 1-9, Dover Yard, Berkeley Street, London, W.1. Tel.: HYDe Park 8978/0.

BRENELL

Brenell Engineering Co. Ltd.,
1a, Doughty Street, London, W.C.1
HOLborn 7356

Booth 70
Demonstration
Room 259

Tape Recording Equipment

A close examination of the Brenell Mark 5 tape deck reveals many of the reasons for the great popularity of this deck in tape recording circles—the synchronous capstan motor which has an **outer** rotor having the action of a flywheel—the large balanced flywheel which is driven by the synchronous motor—the robust, cleanly designed linkage mechanism—the 3 motor system with interlocking to prevent accidental erasure or physical damage to the tape—the facilities of 4 tape speeds, the accommodation of up to four heads and larger spools than on most decks. Little wonder that this deck, which is available as a separate unit for building into one's own Hi-Fi installation or in the Mark 5 range of Brenell complete recorders, has become one of the most popular decks in the world of tape recording.

SPECIFICATIONS:—

BRENELL MARK 5 DECK

3 motors (synchronous type for capstan drive). Large flywheel (statically and dynamically balanced). 4 tape speeds (15, $7\frac{1}{2}$, $3\frac{1}{4}$, $1\frac{1}{8}$ i.p.s.). Low Wow and Flutter less than 0.05% at 15 i.p.s.; 0.1% at $7\frac{1}{2}$ i.p.s.; 0.15% at $3\frac{1}{4}$ i.p.s.; 0.25% at $1\frac{1}{8}$ i.p.s. Spool sizes up to $8\frac{1}{4}$ in. Accommodation for 4 heads—mono or stereo. Digital revolution counter.

BRENELL MARK 5 AMPLIFIER

Designed for use with the Brenell Mark 5 Deck.

For use as:— (a) Recording amplifier. (b) Replay pre-amplifier into external Hi-Fi equipment. (c) Replay into 15 ohm loudspeaker. (d) "Straight" amplifier.

Switched frequency correction. Signal monitoring (headphones) microphone and radio/gram inputs. Power unit fitted with hum balance control. Plug connections to deck and associated equipment (no soldering necessary). Available with magic eye or meter for recording level indication.

BRENELL MARK 5 TAPE RECORDER

Incorporates the above deck and amplifier in a complete recording machine.

BRENELL MARK 5 TYPE 'M' TAPE RECORDER

Incorporating the Mark 5 deck with separate heads for recording and replay purposes.

SEPARATE RECORDING AND REPLAY AMPLIFIERS enabling the actual recording to be monitored a fraction of a second after recording occurs.

4 tape speeds, 15, $7\frac{1}{2}$, $3\frac{1}{4}$, $1\frac{1}{8}$ i.p.s, with frequency correction. Low Wow and Flutter (see deck specification). Spool sizes up to $8\frac{1}{4}$ in. diameter. Digital revolution counter. Pause control. Superimposing control. Fast rewind with special tensioning brake. Meter for modulation indication. Microphone and radio/gram inputs may be mixed. Headphones monitoring of recording amplifier. Straight amplifier facilities. Separate bass and treble controls. Output for external Hi-Fi amplifiers. Output for external speaker. Internal High Fidelity speaker. Hum balance control. Variable bias.

Also available :—**BRENELL THREE STAR MONO AND STEREO RECORDERS. BRENELL MARK 510 DECK** (accommodates spools up to $10\frac{1}{2}$ in. diameter—N.A.B. and standard centres).

BUTOBA

Schwarzalder Uhrwerke Fabrik
Burger. K.G. Western Germany

Booth 40
Demonstration
Room 118

Transistor Battery/Mains Tape Recorder

Only the Butoba has ALL these features !

1. 5 in. tape, giving up to four hours playing time
2. High fidelity frequency range
3. 7 in. x 5 in. speaker and 1 1/5 watts output
4. Adjustable treble control on recording and play back
5. Mixing
6. Monitoring of both radio or mike recordings
7. High quality steel deck, life-lasting ball bearings and dynamically balanced 5 in. flywheel all give lowest wow level and flutter
8. High sensitivity level
9. Extremely low noise level. No more than on expensive mains machines
10. Light in weight—12 lb. complete with batteries. Economic battery life—up to 100 hours
11. Mains converter for home use

Model MT5 66 gns., including connecting lead and empty spool.

Experts are unanimous in acclaiming the Butoba as the finest machine of its kind on sale to-day.

Advance details of the Butoba and accessories, including carrying case, available on request on from **U.K. Agent: Denham & Morley Ltd., Denmore House, 173-175, Cleveland Street, London, W.1. Telephone: EUSton 3656-7.**

CELESTION

Rola Celestion Ltd.,

Ferry Works,
Thames Ditton
Emberbrook 3402

Booth 58
Demonstration
Room 348

Loudspeakers

The introduction of the Celestion COLAUDIO II Loudspeaker has set a new high standard of reproduction in the home and many of the leading authorities in the wide field of Audio have confirmed our opinion.

The outstanding feature of the Colaudio II is its very small cabinet of less than 2 cubic feet. This has been made possible by the introduction of a new 12 in. Bass unit having a diaphragm moulded from one of the new expanded plastic materials. Working with this Bass unit is an improved version of the H.F. 1300 Treble unit as used by many of the leading recording and broadcasting companies. Together, they reproduce the whole range of frequencies from 30-15,000 c/s.

Housed in a cabinet of simple, yet pleasing design, and finished in selected walnut veneers, the Colaudio II will blend with the decor of the most beautiful home. Whether it be the single note of an instrument or the glorious crescendo of a full orchestra, the rich, living sounds of astounding realism will be appreciated by the most critical music lover.

We invite you to judge the high quality of reproduction from the Colaudio II for yourself at our demonstration in Room 348.

CHAPMAN

Chapman Ultrasonics Ltd.,

24, Upper Brook Street, London, W.1
Hyde Park 2291

Booth 18
Demonstration
Room 347

Amplifiers, Tuners and Loudspeakers

The complete domestic range of Chapman equipment may be seen on the Booth and a continuous demonstration of their stereophonic system can be heard in the Demonstration Room.

Model FM.95 AM/FM Tuner

The FM.95 Tuner provides first class drift-free Frequency Modulation reception and excellent reception of the more powerful Continental stations on medium and long-wave bands. It is the ideal tuner for a domestic Hi-Fi system. Complete stable drift-free tuning with the FM band covering 87.5 to 100 Mc/s, having a sensitivity 4 MV for 20 db quieting. Medium and long wavebands cover from 195 m to 550 m and 800 m to 2,000 m, and using A.V.C. circuits, provides high quality reception of good Continental broadcasts.

Model FM.90 Switched V.H.F. FM Feeder

This tuner is a high gain, low noise and low radiation receiver; station selection is by turn of a switch, selecting either the Home, Third or Light B.B.C. FM broadcasts. In addition to the normal fully compensated and completely stable oscillator circuit used in all Chapman FM tuners, the FM.90 is fitted with automatic frequency control.

Model S6BS/FM Six-Stage AM Bandspread and High Gain FM

This is the finest tuner in the Chapman range, combining as it does, the circuits of the highly successful S6BS and FM.91 Tuners, without any compromise on any range. The 9-band AM section consists of 6 electrical band spread wave-bands covering from 11 m-3 m, 2 short wave bands covering 13 m-140 m, and normal medium waves 175 m-570 m, ensures reliable world-wide long distance reception, combining the stability and sensitivity of a first class communication type receiver with the very low distortion and wide frequency response required by the modern High Fidelity Amplifier.

Model 105 Monaural Amplifier, 10-Watt Output

Has great elegance and simplicity of styling, coupled with outstanding performance

Frequency Response: Within 0.2 db, 30-20,000 cps without filters.

Distortion: Less than 1 per cent. at 1,000 cps.

Output Matching: 15 ohms and 3 ohms.

Model 305 Stereo Main Amplifier and Control Unit

A compact double push-pull amplifier rated at 8 watts per channel, designed for use in high quality stereo systems.

Frequency Response: Within 0.2 db 30-20,000 cps.

Distortion: Less than 1 per cent. at 1,000 cps.

The Control Unit is a comprehensive stereo or single channel control, providing every facility for high quality radio, gram and tape reproduction. It is supplied ready for connection to the 305 Stereo Main Amplifier.

The Public Address and industrial sound reproduction equipment also exhibited includes the following:

15-watt, 30-watt, 50-watt amplifiers, types SR.315, SR.330 and SR.350.

Microphone Mixer 5-channel transistorised type SRM.5.

Line Source Loudspeaker 10-watt 6 ft. column type 6LS.

CLAIRTONE

Clairtone Sound Corporation Limited
Toronto, Canada

Stereophonic Hi-Fidelity Reproducers

Booth 12
Demonstration
Room 161

For the first time to be heard in England the CLAIRTONE contemporary Reproducers. The **Signature** (adaptable to wireless remote control operation).

CLAIRTONE Model S-1000.

The S-1000 Signature series is the first Stereophonic unit in the world to produce a flow of sound which travels **with equal clarity** in every direction.

Amplification: Total peak instantaneous musical power **70 watts** (35 watts each channel). Balanced **high-fidelity**, push-pull dual amplifiers. Two RIAA compensated phono pre-amplifiers. Complete DC filament supply to eliminate hum.

Record Changer and Arm: **Garrard, laboratory Type A**, 4-speed, auto **turntable** with separate **die-cast turntable**. Precision weight, counter-balanced pick-up arm with built-in calibrated stylus pressure adjustments. Built-in levelling device.

Cartridge: **Shure** stereo dynetic M7D with **.0007 diamond stylus**. Frequency response 22-19,750 cps.

Tuners: Exceptionally broad band designs for high-fidelity radio reception. Separate, high sensitivity AM and FM tuners. Tuned RF stage on AM and 3-stage IF amplifier on FM with separately amplified AFC signal. **Flywheel tuning** on both tuners.

Controls and Functions: 6 knobs and 12 push buttons. Knob Functions: AM tuning—balance—bass (clutch type) treble (clutch type)—loudness—FM tuning. Push Buttons: (illuminated) AM—FM stereo (multiplex)—external speaker—TV sound—stereo (mono)—channel reverse—tape phono—auxiliary—AFC—FM (mono)—power on (master).

Special Features: Adaptable for stereo FM broadcast. To be used with CLAIRTONE'S own plug-in FM stereo adapter. Space for tape recorder or record storage. Separate AM and FM tuning indicators. Dual shadow, electronic, stereo **balance indicator**. Illuminated record changer compartment. Unit equipped for complete **Wireless remote** operation. Room divider (sound distribution pattern including back of cabinet being finished identically to front).

Tubes and Diodes: **31 tube** and 6 diode functions. (Actual number of tubes 21 and 6 diodes.)

Speakers: Total of **4**. Two 14 in. (Dutton type) EMI, custom made, heavy magnet, woofers (13,500 gauss) with special cone suspension and aluminium centre (DT-1). 2 omni directional, horn type, tweeters equipped with acoustical deflectors for 360 sound radiation. 2 fully enclosed cross-over networks operating at 3,000 cps.

Enclosures: **Infinite baffle**. Fibreglass lined for woofers. Specially engineered **ogee curve** disseminating stereo sound in every direction.

Cabinets: Approx. 82 in. long—19 in. deep—26½ in. high. Special heavy-weight construction for outstanding, overall tonal quality. All visible parts and **back veneered**, for use as a room divider. Selected and **matched veneers**. Available in hand rubbed, oiled walnut.

U.K. address:—**ARGELANE Ltd., 251, Brompton Road, London, S.W.3.**
Telephone: **KNightsbridge 8541.**

CLARKE & SMITH

Clarke & Smith Mfg. Co. Ltd.,
Melbourne Road, Wallington,
Surrey.
Wallington 9252/7.

Booth 7
Demonstration
Room 211

High Fidelity Equipment, Pick-ups, Sound Equipment.

The Clarke and Smith exhibit this year consists mainly of H.M.V. high fidelity components; a range of high quality domestic equipment which has met with considerable success since the introduction of the new models last year.

Every Hi-Fi requirement is catered for by the H.M.V. range, consisting as it does of amplifiers and pre-amplifiers for both mono and stereo, an AM/FM tuner, a complete loudspeaker system and matching modern low styled console cabinet to house the units.

Of particular interest to the experts is the 555 integrated stereo amplifier and the 556 pre-amplifier. Both of these incorporate the now famous "StereoScope" 1" CRT, whose well defined trace is used for stereo balancing, level monitoring and as a response check.

Clarke and Smith have recently taken over distribution of the new E.M.I. pick-up EPU.100 which the manufacturers claim to be the greatest advance in pick-up design for many years and this is being demonstrated with the H.M.V. equipment in room 211. The demonstration is designed to prove that studio quality can be reproduced at home—at a sensible price and with equipment which can be operated with ease by anyone.

The high fidelity components on show:

H.M.V. model 555 10w+10w stereo integrated amplifier. 63 guineas.

H.M.V. model 556 Stereo pre-amplifier. 39 guineas.

H.M.V. model 557 10w+10w stereo power amplifier. 30 guineas.

H.M.V. model 558 AM/FM tuner. £36 1s. 5d. tax paid.

H.M.V. model 599 Stereo pre-amplifier. 12 guineas.

H.M.V. model 582 Console cabinet. 30 guineas.

H.M.V. model 519 Loudspeaker system. 27 guineas each.

E.M.I. model EPU.100 Pick-up. £22 12s. 2d. tax paid.

Other equipment on display includes a miniature rack assembly by the Clarke and Smith Sound Equipment Division and one of the Company's new line source loudspeakers. These items are part of a very wide range of public address equipment which is becoming increasingly popular by virtue of its compact design, multiple facilities and accessibility of components. An item of particular note is the recently introduced crystal controlled FM tuner unit.

COLLEL

Collel Limited.

All Saints Passage, Wandsworth High Street,
S.W.18.

VANdyk 4377

Booth 48

**Demonstration
Room 320**

Stereo Cartridges and Motors

Collel after considerable experimentation and development have produced two outstanding stereo cartridges. The separation between two channels on both cartridges is so wide that the resultant reproduction has clarity and superlative stereo effect that is truly exciting.

The exceptional compliance of **Collel** cartridges will permit tracking and tracing at pressures as low as 3 grammes with the resultant increase in record life and quality of reproduction.

The **Collel SK.1** is a crystal stereo cartridge suitable for temperate climates and moderate humidity. The **Collel SC.1** is a ceramic stereo cartridge which is ideally suited for climates such as tropics and all countries with high temperature and high humidity.

Although these cartridges are sensitive to the smallest vibration they are nevertheless so robust in design that they can be handled as easily as any known cartridges.

SK.1. (Crystal)

Approx. sensitivity when connected to 1 M ohm. 200 Pf capacity cable. 170 mv/cm/s eff (MIN). Lateral compliance (micro tip) 5.1 x 10⁻⁶ cm/dyne. Cross talk damping at 1,000 cps. 20 db (MIN). Frequency range 20-20,000 cps.

SC.1. (Ceramic)

Approx. sensitivity when connected to 1 M ohm. 100 PF capacity cable. 120 mv/cm/s eff (NOM). Lateral compliance (micro tip) 5.0 x 10⁻⁶ cm/dyne. **Separation** at 1,000 cps. 20 db (MIN). Frequency range 20-20,000 cps. Tracks and traces at a recommended stylus pressure of 3 grammes.

Summary

The **Collel** stereo cartridges are beautifully engineered and designed to fit into all standard international pick-up arms, and supplied complete with the necessary hardware to facilitate installation. All **Collel** cartridges are supplied with choice of diamond or sapphire styli, and the unique design permits the instant and simple changing of stylus arms without requiring special tools.

The **Collel "Trilec"** motor is a new revolutionary motor unique and amazingly simple in design and operation, reliable, economical and ruggedly built.

As a **Synchronous Motor**, the **"Trilec"** motor runs smoothly with a high starting torque.

The original design of the magnetic field circuit suppresses all the variations of reluctance due to rotation of the rotor. This gives synchronous motors with a starting torque hitherto unknown.

The motor type 36, 50 cycles A.C., has an average starting torque of 250 gr./cm. and gives 500 gr. before slip. The synchronous speed is 500 r.p.m. under full load. The output is 2.5 watts on the shaft for a power consumption of 10 watts and an apparent power of 15 ampere volts.

This motor may be stalled indefinitely under power should any mechanism powered by it seize or be blocked.

It runs perfectly well from square or rectangular signals from a battery 6-12-24 volts.

CONNOISSEUR

A. R. Sugden & Co. (Engineers) Ltd.,

Market Street,
Brighouse, Yorkshire
Brighouse 2142

Booth 47

**Demonstration
Room 304**

Transcription Turntables, Pick-ups and Arms, Speaker Enclosures

The Connoisseur Craftsman III. Three speed transcription turntable for stereophonic and monaural records. Requires minimum mounting space. Styled in black and satin silver. Heavy non-ferrous 12 in. lathe-turned turntable. Speeds 78, 45 and 33 $\frac{1}{3}$ rpm. 4% variation on all speeds. Large stroboscope fitted beneath turntable viewed through mirror and illuminated by neon light source. Synchronous motor balanced dynamically and electrically, runs at constant speed irrespective of large variation in supply voltage. No braking action employed to obtain change of speed. Precision ground large diameter idler wheel retracted in "off" position. Shafts lapped to mirror finish, fitted with adjustable bearings.

The Connoisseur Craftsman fixed 2 speed transcription turntable has been designed specifically to answer the stringent requirements of stereo disc playback and, in addition, provides superior performance for monaural reproduction. Speeds 33 $\frac{1}{3}$ and 45 rpm. Synchronous motor, 12 in. lathe-turned turntable; all shafts precision ground running in adjustable bearings.

The Connoisseur Variable 3 Speed Gramophone Motor Type B, with large stroboscopic disc fitted beneath the turntable being viewed through reflecting mirror with internal light source. Heavy lathe-turned turntable of non-ferrous material. All spindles hardened, ground and lapped. Adjustable bearings fitted to all points. Synchronous motor. Low noise level and hum induction. Speed change arranged mechanically and gives 4% variation on all speeds. The synchronous motor runs at constant speed at all settings. No braking action is employed to obtain speed change.

Connoisseur Stereophonic Pickup CSI. Ceramic type with diamond stylus. Developing approximately 20m.V from normal stereophonic discs. 20db separation channel to channel. Frequency range 20-16,000 cycles ± 2 db. The arm has been designed to accept both stereo and Mark II heads. This arm is also fitted with a precision lifting device.

Connoisseur Super Lightweight Pickup, Mark III Arm with Mark II Heads for standard and microgroove recordings. The arm is adjustable for height and playing weight and is wired to accept both stereo and Mark II heads. The Mark II heads employ easily replaceable Diamond on Sapphire armature systems. Total mass 5 milligrams; top resonance 20/21K; Frequency range 25-20,000 cycles ± 2 db.

Connoisseur Craftsman Speaker Enclosures are entirely new concepts in speaker design and construction and make the most effective use of new materials. They provide the maximum performance in the minimum of required space and are equally suitable for monaural and stereophonic reproduction. **Major** enclosure accommodates 8 in. foam surround speaker and 3 in. HF unit. Range 30-15,000 cycles. Height 43 in. x 14 in. maximum diameter. **Minor** enclosure accommodates 8 in. foam surround unit. Range 40-12,000 cycles. Height 36 in. x 11 $\frac{1}{2}$ in. maximum diameter. Finished in attractive "Vynair" plastic with medium walnut and matt black trim.

DECCA

Decca Radio & Television

Ingate Place, Queenstown Road, S.W.8

MACaulay 6677

Booth 68

Demonstration
Room 212

Stereophonic Pick-up, Hi-Fi Units, Ceramic Cartridge, Records

Undoubtedly a great deal of interest will be centred around the Decca exhibits at this year's International Audio Festival for the long-awaited Mark II head and "Professional" arm are on show for the first time in the South of England. In spite of the universal praise which greeted the Decca ffss pick-up, constant research has gone on which has resulted in the improved crosstalk figures of the Mark II head.

The "Professional" arm (which can be used with the Mark I or II heads) is a beautifully finished piece of precision engineering. It has a uniquely designed coarse balance, fine balance and sliding weight which determines the exact playing weight of 3.5 grammes, and incorporated in the design is an accurate lowering device with a damped spring mechanism.

Easy lateral movement is conditioned by an upper instrument quality ball race carefully damped by viscous fluid and single steel ball engaging with spring loaded nylon cup. Free vertical movement is ensured by polished steel balls in a nylon cup. A template is supplied to facilitate the correct positioning of the arm on any motor-board, and the arm has a total height adjustment range of 1.1 in.

For those who cannot afford the luxury of the ffss pick-up or the new "Professional" pick-up, Decca are demonstrating the "Deram" cartridge and setting out to substantiate their claim that, for its price, it is the only cartridge in the world with such an impressive specification. In recent comment on the "Deram" perhaps too little emphasis has been placed on the fact that it is a truly revolutionary break-through, being the only cartridge in the world at such a low price which can be demonstrated to cause such an absence of record wear. Particular emphasis is being put on this fact in the demonstrations with reference to the high compliance and low tip-mass of the "Deram" cartridge. It is fully tropicalised and suitable for amplifiers of 100 mV sensitivity. The "Deram" will play both stereo and mono records and Decca are confident that it will affect the conception and design of domestic equipment for many years to come.

The wives of hi-fi enthusiasts will be particularly interested in the Decca Stereo Decola "separates"—independent speaker units, amplifier and playing deck—based on the single unit instrument which Decca introduced three years ago, for here, at last is a set of equipment that is already built into attractive pieces of furniture. At the time of going to press full technical information on the separate units was unfortunately not available, but these may be obtained on request from Demonstration Room 212.

Without gramophone records to reproduce there would, of course, be no hi-fi equipment, and without recordings of the very highest technical quality the care and trouble taken by hi-fi enthusiasts would be in vain. In order therefore to demonstrate their equipment, Decca will be using passages from their most recent LPs whose technical and artistic excellence is recognised the world over.

Inquiries from overseas territories should be sent to: The Decca Gramophone Company Limited, Decca House, 9, Albert Embankment, London, S.E.1.

EMI

EMI Electronics Ltd.,

Hayes, Middlesex.

Hayes 3888.

Booth 54

Demonstration
Room 354

Professional Tape Recorders; also Emitape Magnetic Tape.

EMI Electronics Ltd., will be demonstrating the RE321, RE301, TR52 and TR90 professional tape recorders.

Model RE321 is designed for complete portability and simple operation, coupled with the very high standard of recording required by the professional user. The unique design gives it a very wide field of application, including on-the-spot news reporting and sport commentating by the BBC and other broadcasting organisations throughout the world. It is also used for data recording by government and industrial establishments in research work in the mining, aircraft and motor car industries, and in many other scientific and industrial spheres.

The RE301 is the latest addition to the EMI range and is intended to provide an extremely flexible two channel recorder in transportable form, capable of meeting the specialised needs of the communication field in addition to research work on audio analysis, noise measurement and comparison tests. A tubular steel trolley, fitted with heavy duty smooth running casters, is available for use with this model.

The TR52/2 portable stereophonic tape recorder is designed for professional use on those occasions when it is necessary to leave the studio and can be employed not only for formal recordings such as actual performances, but also whenever critical assessment and judgment of performance is of paramount importance. In addition to auditions and rehearsals in theatre and concert halls, there is a wide range of applications for the recording of noise and sound effects in scientific and industrial research establishments. A trolley is also available with this model.

EMI studio tape recorder TR90 meets the requirements of the professional user in recording and broadcasting companies where magnetic tape recordings of the highest quality are essential. Variations of this model have been supplied to almost all the broadcasting and TV organisations in the United Kingdom and also many major networks abroad. It is available in console, transportable, trolley or rack mounted versions.

Demonstrations will be given of the EMI studio column loudspeaker type RE350. This high quality loudspeaker is designed primarily for use in recording and broadcasting studios where uniformity of response and consistency of performance are of prime importance.

Also on show will be a full range of Emitape, accessories and Emiguides which are manufactured and marketed by EMI Tape Limited, who also manufacture Emitape for video recording, Emifilm magnetic recording film and Emidisc lacquer recording blanks.

FERROGRAPH

British Ferrograph Ltd.,
84, Blackfriars Road, S.E.1
WAT 1981

Booth 61
Demonstration
Room 247

Tape Recorders

The exhibits to be shown on Booth 61 will consist of the two current models of the Ferrograph viz. series 4A/N which is by now very well-known indeed and the series 420 which has been introduced to the market in the past six months.

The former is, of course, the standard monophonic instrument, and the latter is the mono/stereo version which is produced without end amplifiers since it is assumed that the user of such a device would already be provided with his own high fidelity set-up.

As well as these two main types of recorder, a series of accessories including plugs and sockets, defluxers, reels of four sizes and microphones with stands will also be shown.

The Demonstration Room No. 247 will contain one of the model 420 series Ferrographs, which will be continuously demonstrated with excerpts from the serious musical works on tape.

The Ferrograph engineers will be on hand to answer technical queries both at the Booth and in the Demonstration Room.

FI-CORD

Fi-Cord International,
40a, Dover Street,
London, W.1.
Hyde Park 3448

Booth 71
Demonstration
Room 311

Tape Recorders.

Established specialists in the field of portable tape recording equipment, FI-CORD now introduce the Fi-Cord 202 as a worthy successor to the world famous Fi-Cord 1A.

The Fi-Cord 1A, now being used throughout the world by broadcasting companies, film units, governments and professional organisations, will shortly be joined by the Fi-Cord 202, which has been designed to meet the exacting requirements of the professional and amateur in the field.

In addition, special features make the Fi-Cord 202 an attractive home recorder requiring little space and capable of giving high quality recordings.

FI-CORD 202 Specification

Dimensions: $4\frac{5}{8}$ in. x $8\frac{7}{8}$ in.
Weight: 6 lbs. (including Mercury Batteries).
Speeds: $7\frac{1}{2}$ i.p.s. and $3\frac{3}{4}$ i.p.s.
Frequency response:
at $7\frac{1}{2}$ i.p.s. — 50 to 12000 \pm 3db
at $3\frac{3}{4}$ i.p.s. — 50 to 8000 \pm 3db
Wow and Flutter at
 $7\frac{1}{2}$ i.p.s. — Less than 0.3%.
Noise level: 50db weighted.
Head gap: 0.00014 inches.
Erase frequency: 60 Kc/s.

Recording tape time:

	Each Track $3\frac{3}{4}$ i.p.s.		Each Track $7\frac{1}{2}$ i.p.s.	
	Total		Total	
Long Play	24 mins.	48 mins.	12 mins.	24 mins.
Double Play	32 "	64 "	16 "	32 "
Triple Play	48 "	96 "	24 "	48 "

Power: Separate batteries for motor and electronics, in interchangeable cassettes. Each cassette may be loaded with the special Fi-Cord 202 Mallory mercury pack or with SEVEN Mercury cells (Mallory Type XM12 or RM12).

Provision is made for the coupling of mains supply through a power unit. The same provisions allow for a 12 volt power unit.

Battery Life (RM12R):

Motor Batteries (Mercury) at $7\frac{1}{2}$ — 20 hrs. (approx.)
Motor Batteries (Mercury) at $3\frac{3}{4}$ — 30 hrs. (approx.)
Electronic Batteries.
Mercury at either speed — 60 hrs. (approx.)

Loudspeaker: Built-in 3 in.—20 ohms.
Output — 180 milliwatts.

Direct Line Recording: Voltage required to load tape to standard level —0.2mV.

GARRARD

Garrard Eng. & Mfg. Co. Ltd.,
Newcastle Street, Swindon
Swindon 5381

Booth 37
Demonstration
Room 248

Sound Reproducing Equipment

Garrard have been specialists in the manufacture of Sound Reproducing Equipment for over 40 years. A wide range of models is available as follows:—

Laboratory Series Auto Turntable Type A

A transcription record player with a heavy sandwich constructed turntable which includes a non-magnetic outer turntable. It has fully counter-balanced pick-up arm. Records may be played automatically if desired.

Autoslim

A small and compact record changer designed to occupy minimum cabinet space.

Autoslim De Luxe Record Player and Changer

This model incorporates a heavy turntable and transcription pick-up arm which has a built-in stylus pressure adjustment with no variation from first to last record. It has the plug-in head feature.

301 Transcription Motor

A unit of the highest class which is used by the B.B.C. and many other broadcasting stations. It is incorporated in high fidelity systems throughout the world.

Magazine Tape Deck

An advanced, superbly efficient tape deck with magazine loading. Library storage units and a tape position indicator are available.

Supplied in either $\frac{1}{2}$ -track or $\frac{1}{4}$ -track version.

T.P.A.12 Transcription Pick-up Arm

Is precision made and has all the latest requirements for the critical expert who requires the best. The plug-in pick-up head will house nearly all types of pick-up cartridges.

Pick-ups

Model G.C.8 Turnover Crystal Monophonic suitable for long playing and 78 r.p.m. records.

EV.26 Turnunder Ceramic which may be used for both stereophonic and monophonic records including 78 r.p.m.

Single Record Players

The 4 H.F. Unit is a high quality model with a 12 in. turntable. It incorporates the T.P.A.12 transcription pick-up arm.

The T.A. Mark 11 is an inexpensive record player of sound design. It has the plug-in pick-up head feature.

Stylus Pressure Gauge Model SPG.3

An indispensable accessory for those who value their records. Easily readable scale, 0-12 grammes. Supplied complete with a 5 gramme checking weight.

Styli

The complete range of replacement styli is available for all Garrard pick-ups. Diamond styli can also be supplied.

GEVAERT

Gevaert Photo-Producten N.V.,
Mortsel, Antwerp, Belgium

Booth 60
Demonstration
Room 122

Magnetic Tapes

Gevaert were among the first manufacturers of magnetic tape, but it is only in recent years that Gevasonor tapes have become widely known in Britain. Now, however, they may be found in use wherever recordings of superior quality are required, and an increasing number of tape recorder manufacturers supply Gevasonor tapes as standard with their equipment.

The Gevasonor range of magnetic tapes comprises a full selection of types and sizes, meeting both domestic and professional needs, as follows:

Gevasonor Type M Standard Play tape on cellulose triacetate base. An inexpensive tape of high quality for all general purposes. In spool sizes 4 in., 5 in., $5\frac{1}{4}$ in., 7 in. and 10 in. Also 2,400 ft. lengths on NAB spools for professional use.

Gevasonor Type LP. An inexpensive Long Play tape on cellulose triacetate base. In spool sizes 3 in., 4 in., 5 in., $5\frac{1}{4}$ in., 7 in. and 10 in.

Gevasonor Type LRP. An exceptionally strong Long Play tape on tensilised polyester base. In spool sizes 3 in., 4 in., 5 in., $5\frac{1}{4}$ in., 7 in. and 10 in.

Gevasonor Type DP Double Play tape on tensilised polyester base. In spool sizes 3 in., 4 in., 5 in., $5\frac{1}{4}$ in. and 7 in.

Gevasonor Type F Standard Play tape on cellulose triacetate base, with rough backing to ensure trouble-free rewind at high speed when working with single-sided spools. For use on professional recorders only. Supplied in 1,000 metre (3,290 ft.) lengths on European cores.

Gevasonor Magnetic Film. For the motion picture and television industries.

Of particular interest to the serious recording enthusiast this year, is the introduction by Gevaert of tapes on 10 in. plastic spools for use on recorders such as the Revox D 36 and the new Brenell deck. At a recording speed of $7\frac{1}{2}$ i.p.s. this makes possible uninterrupted recordings of up to 64 minutes with Standard Play tape and 96 minutes using Long Play tape.

U.K. Sales: Gevasonor Tape Division, Gevaert Limited, Great West Road, Brentford, Middlesex (Isleworth 2131).

GOLDRING

The Goldring Manufacturing Co. (Great Britain), Ltd.

486-488, High Road, Leytonstone,
London, E.11

LEYtonstone 8343-4-5

Booth 53

Demonstration
Room 215

*Transcription Units, Pick-up Arms, Cartridges,
Stylus Replacements*

An even wider range of Transcription equipment will be demonstrated this year, and new items of interest will include the Lenco model GL70, which has been added to the range of Transcription Units. This unit incorporates an 8 lb. diecast turntable and a Swiss manufactured light alloy pick-up arm, model L70, designed for extremely low tracking errors and wired for both monaural and stereophonic purposes. Continuously variable speed adjustment and automatic lifting and lowering device for the pick-up arm are also features of this new Unit. This, together with the model GL58, which has already proved to be one of the most popular Transcription Units available, will also be demonstrated.

Pick-up Arms will also include the remarkable Pickering Unipoise model No. 198, which has a single-pivot bearing, acclaimed in the United States and now available in this country.

The Goldring popular model G60, which has the unique slide-in platform device, and the Lenco L80, which is the 12 in. version of the new L70 model, will also be exhibited.

Cartridges will also prove of considerable interest, presenting a range of types to suit all demands. The No. 700 Mk. II is introduced, representing a modified version of the original model No. 700 Variable Reluctance type, and is a result of recent research and development in order to produce a stereophonic cartridge which would compare in quality with the model No. 600, which is still unsurpassed among British cartridges for monaural use.

New types of Ceramic and Crystal cartridges will also be introduced, together with the range of variable reluctance models manufactured by "Pickering" which will result in considerable interest to the professional.

The range of replacement sapphire and diamond styli has again been increased to include all the known makes recently introduced in this country.

Other accessories, such as the Stylus Pressure Balance, Microscope, etc., will also be displayed.

GOODMANS

Goodmans Industries Ltd.,

Axiom Works, Wembley, Middlesex.
Wembley 1200.

Booth 14

Demonstration
Room 317

High Fidelity Loudspeakers and Loudspeaker Systems.

With the introduction this year of four radically new, full range loudspeakers—plus an additional six "export only" models—Goodmans Industries have further consolidated their position as the largest manufacturers of High Fidelity loudspeakers in Europe.

The 1962 Audio Fair marks the first public showing, in their new form, of the latest of the long established favourites Goodmans 12" diameter AXIOM twin-cone High Fidelity loudspeakers. These are the AXIOM 201, for amplifiers of up to 15 watts r.m.s. (30 watts peak) and the AXIOM 301 for amplifiers up to 20 watts r.m.s. (40 watts peak).

As with the smaller types the Axiom 10 and Axiette 8, these Axiom 12" loudspeakers have been completely redesigned and all now employ enormously rigid unitary die-cast chassis, housing the entire moving and static components. Ferroba II magnet material is employed, enabling a much shallower profile for these loudspeakers.

The distinctive natural quality of sound reproduction for which Goodmans Axiom loudspeakers have so long been known is evident from the number of broadcasting studios that now use them for programme monitoring.

For lower powered domestic amplifiers Goodmans are demonstrating also for the first time their new 10" Axiom (10/20 watts) and the latest 8" Axiette (6/12 watts) loudspeakers. The Axiette 8 has been described as the smallest true High Fidelity loudspeaker in the world, and it is because of their conveniently small size yet astonishing performance and reliability that Axiettes have among other uses been specified for passenger lounge and cabin sound installations on several luxury liners. Here, as in the home, the Axiette 8 of the Axiom 10 satisfy the two essentials, High Fidelity sound quality with minimum space. Even a modest collection of records or tapes means a sizeable investment of money, and much of the enjoyment and benefit obtainable from them is lost where the sound reproducing equipment, especially the loudspeaker, is inadequate. Free Drawings for constructing Goodmans enclosures, and details of the Audiom Bass woofers, pressure units, and speaker systems, are available on request.

Main list of Goodmans 15/16 ohms High Fidelity Loudspeakers.

Axiette 8	8"	6/12 watts.	40-15,000 gauss	...	£5. 10. 0.
Axiom 10	10"	10/20 watts.	40-15,000 gauss	...	£6. 2. 6.
Axiom 201	12"	15/20 watts.	30-16,000 gauss	...	£9. 15. 0.
Axiom 301	12"	20/24 watts.	30-16,000 gauss	...	£14. 0. 0.

"THE GRAMOPHONE"

General Gramophone Publications Ltd.,
379, Kenton Road, Kenton,
Harrow, Middlesex.
Wordsworth 2010.

Press
Lounge 244

*Publishers of "The Gramophone" and "The Gramophone"
Classical L.P. Catalogue and "The Gramophone" Popular
Record Catalogue.*

"The Gramophone" is Britain's oldest and most widely read gramophone record journal. It was founded in 1923 by Sir Compton Mackenzie and Christopher Stone and today has a circulation in excess of 75,000 copies per month, circulating to very nearly every country in the world.

Record reviews, in conjunction with a comprehensive technical section, form the basis of the journal. In the technical field the team of experienced writers is led by Percy Wilson and includes John Gilbert. The team of record reviewers is necessarily larger and includes such well-known critics as Alec Robertson, Lionel Salter, Andrew Porter, Philip Hope-Wallace, Deryck Cooke, Roger Fiske, John Freestone, Edward Greenfield, Trevor Harvey, Malcolm Macdonald, Jeremy Noble, Stephen Plaistow, Denis Stevens, Roger Wimbush and W. A. Chislett. On the lighter side, and in the field of Jazz and Swing, further reviews are contributed by Charles Fox, Alun Morgan, Brian Rust, Nigel Hunter, William Gilman and Michael Cox. Quarterly retrospective articles are contributed by Desmond Shawe-Taylor and John Warrack (Music Critics to the *Sunday Times* and the *Sunday Telegraph* respectively).

"The Gramophone" is published on the 1st of the month, price 1s. 6d. Annual subscriptions (home and overseas) 24s. per annum.

In addition the Company publishes two quarterly record Catalogues — one related to Classical music and the other to Popular music.

GRAMPIAN

Grampian Reproducers Limited
The Hanworth Trading Estate,
Feltham, Middlesex
Feltham 2657

Booth 59
Demonstration
Room 252

Sound Equipment

A Grampian ribbon microphone makes its debut at this 1962 International Audio Fair. Small in size, attractive in style, and outstanding in performance, this long-awaited instrument is bound to attract much interest.

Two models are available. The GR.1 having a reduced back sensitivity and the GR.2 with the usual figure 8 sensitivity pattern. Full information and price details can be obtained from the Grampian Booth or Demonstration Room.

The versatile DP.4 range of wide sensitivity microphones, ever popular among tape recording enthusiasts is, of course, being continued and is displayed together with a comprehensive range of stands, swivel-holders, and other accessories. The smaller DP.5 and DP.6 microphones can also be seen.

Visitors interested in outdoor recording have an opportunity to examine the Grampian Parabolic Reflector which has become extremely popular with bird-song recordists, in particular, during the past year. The reflector is designed to concentrate sound from a distant source to a focal point—the microphone head. Thus ensuring maximum amplification and realism with a minimum of interference and unwanted side noise.

Another addition to the Grampian range, well worthy of examination is the new reverberation unit—it can be heard in the Demonstration Room. During the period of the Fair there will also be demonstrations of the Vibromajor, Valencia and Tremulo-Super guitar amplifiers.

Grampian have for many years been well known for the very comprehensive range of public address equipment which they manufacture. New items are frequently being added, the latest being the Model 621 Radio Receiver Amplifier. This has transistorised pre-amplifier stages with very high gain.

GRUNDIG

Grundig (Great Britain) Ltd.,
39/41, New Oxford Street, London, W.C.1
COVent Garden 2995

Tape Recorders

Booth 8
Demonstration
Room 115

Grundig (Great Britain) Limited are exhibiting their current range of tape recorders—the TK 1, TK 14, TK 23, TK 40 and TK 60.

Of particular interest are the two new four-track machines, the TK 40 and TK 23, and visitors will have an opportunity of hearing both for the first time in Grundig's demonstration room—Number 115 on the First Floor. Tremendous advances have been made in the design of both the TK 40 and the TK 23.

The TK 40, virtually a professional model for the intelligent enthusiast, incorporates every facility that the keen amateur could possibly need—4 track, 3 speed— $1\frac{7}{8}$ i.p.s., $3\frac{3}{4}$ i.p.s. and $7\frac{1}{2}$ i.p.s. Facilities for superimposition and the mixing of two inputs. Socket and wiring incorporated so that a remote control can be fitted. Sockets for recording from microphone, wireless set, radio tuner, telephone adaptor, and gramophone pickup. Outputs for the connection of an extension loudspeaker, monitor amplifier for synchronised recordings, extension amplifier, and magnetic heads fitted to cine projectors.

The technical specification is impressive and includes:—

Frequency response	60-18,000 at $7\frac{1}{2}$ i.p.s. ± 3 dB
	60-15,000 at $3\frac{3}{4}$ i.p.s. ± 3 dB
	60- 9,000 at $1\frac{7}{8}$ i.p.s. ± 3 dB
Wow and Flutter	± 0.1 % at $7\frac{1}{2}$ i.p.s.
	± 0.12 % at $3\frac{3}{4}$ i.p.s.
	± 0.2 % at $1\frac{7}{8}$ i.p.s.
Signal to Noise Ratio	Better than 50dB at $7\frac{1}{2}$ i.p.s. and 45 dB at $3\frac{3}{4}$ i.p.s., and $1\frac{7}{8}$ i.p.s.

The TK 23 follows closely the design of its popular twin track counterpart, the TK 14. A single speed machine operating at $3\frac{3}{4}$ i.p.s., its frequency response is substantially level between 60-12,000 c/s at a signal to noise ratio of 47 dB, and the wow or flutter figures are extremely low at ± 0.2 %.

Provision is made for input mixing between microphone and radio or pick-up, and facilities are available for superimposition and synchronised superimposition by monitor amplifier and headphones.

All other models in the Grundig range are now well established. The chart below gives the main facilities, specification and price of each model and leaflets containing all details and full technical specification are available for all recorders.

	Speed(s)	Spool Size	Weight	Frequency Response *
TK 1	$3\frac{3}{4}$ "	3"	8 lb.	100- 8,000c/s ± 3 dB
	Price : 29 Gns., including microphone.			
TK 14	$3\frac{3}{4}$ "	$5\frac{3}{4}$ "	20 lb.	60-12,000c/s $\pm 3-5$ dB
	Price : 35 Gns., including microphone.			
TK 23	$3\frac{3}{4}$ "	$5\frac{3}{4}$ "	20 lb.	60-12,000c/s $\pm 3-5$ dB
	Not yet available.			
TK 40	$1\frac{7}{8}$ " $3\frac{3}{4}$ " $7\frac{1}{2}$ "	7"	27 $\frac{1}{2}$ lb.	60-18,000c/s ± 3 dB
	Price : 75 Gns., including microphone.			
TK 60	$3\frac{3}{4}$ " $7\frac{1}{2}$ "	7"	55 lb.	50-15,000c/s ± 3 dB
	Price : 128 Gns.			

* These figures refer to the highest speed of the particular recorder. All Grundig Recorders are supplied with Spare Spool, 1 reel of Grundig Tape and a Spare Lead.

Members of the Grundig staff will be available on Booth No. 8 and in the Demonstration Room, No. 115, to answer all queries, whether of a general or technical nature and to give demonstrations.

HI-FI NEWS

Miles Henslow Publications Ltd.,

Booth 67

99, Mortimer Street, W.1

Museum 3967

Magazines and Books

Hi-Fi News first appeared on the bookstalls in the Spring of 1956, to serve the interests of Audio Enthusiasts—users, dealers and manufacturers. Since then its scope has been considerably widened, and its readership has steadily increased from an initial 5,000 to nearly 24,000—which must be its own best recommendation (and for our many supporters in the advertising world we add the note that our latest, officially published ABC figure was 23,272. **Hi-Fi News** is read regularly in all parts of the world, and is held in high esteem for its reliable reviews, its informative articles, and its lively but well balanced interest in all audio matters. (Published Monthly, 2s.).

The Tape Recorder

The Tape Recorder, serves the tape recording enthusiast, the manufacturer and the dealer on parallel lines with its sister journal, **Hi-Fi News**, and has also made many thousands of firm readers since it first appeared in February 1959. (Our advertising supporters will again like to note that its latest, officially published ABC figure was 21,206. **The Tape Recorder** is a well-balanced publication for the newcomer, the hardened enthusiast, and the experimenter. Its reviews of equipment and accessories are the finest to be found anywhere—reliable, readable and well presented. Its editorial features are always well illustrated and full of information. **The Tape Recorder**, like **Hi-Fi News**, is read in all parts of the world, and is regarded by the user and the Trade alike as the leading journal in its field. At 1s 6d. monthly it is a monthly "must" for everyone who is seriously interested in "Tape."

Hi-Fi Year Book

Hi-Fi Year Book was founded in 1956 for the purpose of collecting and presenting all the usefully available data on Audio Equipment. Year by year since, it has reliably filled this need, increasing its directory sections to follow the expanding and changing market. This year, the 1962 edition provides a remarkably large summary of audio products. **Hi-Fi Year Book** is the buyers' guide for all things audio, and is referred to annually in more than 8,000 homes, shops and laboratories. (Annually, 10s. 6d., posted 11s. 6d.).

Hi-Fi Books

Hi-Fi For Beginners. This book has been welcomed as the ideal introduction to High Fidelity, easy to understand and profusely illustrated. Price 7s. 6d.

Experimental Recording. Twenty practical experiments and the full details on how to make a clockwork portable recorder of exceptional performance. Price 5s.

Cine Year Book. A similar publication to the **Hi-Fi Year Book**, contains complete details and specifications of all available cine products.

Write for details of titles in the course of preparation.

WIRELESS WORLD ELECTRONIC TECHNOLOGY WIRELESS & ELECTRICAL TRADER

Iliffe Electrical Publications Ltd.,
Dorset House, Stamford Street,
London, S.E.1.
WATERloo 3333.

Booth 3

Wireless World is Britain's leading technical journal in the general field of radio, television and electronics. Providing a complete and accurate survey of the newest British technique in design and manufacture, its articles cover every phase of the radio and allied industries. Contributions by recognised experts deal with design data and circuits for every application. High fidelity receives searching attention. **Wireless World** is published monthly, 2s. 6d.

Electronic Technology caters for the world's advanced technicians and designers in electronics, radio and television, with an authority and understanding of their needs based on many years' continuous service. It covers not only the latest results of pure research; original articles by leading physicists open up many new lines of approach and make practical contributions to further progress. Its abstracts and reference section is one of the finest sources of research information published anywhere, whilst the journal has the benefit of an Editorial Advisory Board representing the country's leading technical bodies. Every month, 5s.

Wireless & Electrical Trader is the leading trade journal of the radio, television and light electrical industries, widely read by dealers, service engineers, manufacturers and wholesalers. Obtainable only on subscription basis by bona fide members of the trade, it provides an invaluable weekly survey of trade trends, experienced observers reporting on every development, technical or commercial. "Audiotopics," a regular feature now in its fifth year, presents the latest technical and commercial aspects of the audio field—an invaluable aid to dealers in keeping right up-to-date in this increasingly important subject. Practical details of new products, sales promotion and display schemes are supplemented by service sheets compiled in the Trader's own laboratory. **Wireless & Electrical Trader** costs £3 a year, including postage.

Technical Books. Authoritative and up-to-date works on many aspects of radio and television are also on show, together with sales aids, etc., for the trade.

IRISH BRAND

Orradio Industries, Inc.
Opelika, Alabama, U.S.A.

Booth 23

Magnetic Recording Tape

Behind "IRISH" brand is the romantic success story of JOHN HERBERT ORR, who as a young officer on the U.S. technical staff was required to produce magnetic recording tape for the revolutionary Magnetophone recorders captured intact, with the aid of the Underground Fighters, in the Luxembourg Radio Station. Later, from the smallest beginnings in a tiny factory in Alabama, he built up ORRADIO INDUSTRIES INC. until it attracted the attention of AMPEX CORPORATION requiring tape of superlative quality for their world-famous AMPEX professional Sound and Video recorders. To-day ORRADIO INDUSTRIES INC. is the world's largest exclusive magnetic tape manufacturer and is a DIVISION OF AMPEX CORPORATION.

A landmark in the rise of this remarkable firm was their development and introduction of the FERRO-SHEEN process, which rendered ordinary tape old-fashioned, if not obsolete. "IRISH" FERRO-SHEEN has by far the smoothest, most firmly anchored and most homogeneously bonded magnetic oxide coating of any recording tape. It ends your worries about wearing out or gumming up your costly tape recorder heads with the abrasive, easily shed oxide coating of ordinary tape. Uniformity of oxide coating gives unprecedented fidelity for it minimises the danger of high-frequency losses in recording and of print-through during tape storage.

Now all grades of "IRISH" have FREE "SIGNATURE BINDING" in each box (5 in., 5½ in., 7 in.), a strip of specially mounted 23 carat goldleaf and a self-adhesive box-edge binding, for personalised titling in gold.

There are three types of "IRISH" brand tapes:—

Special purpose Sound Plate 231

The ultimate in professional premium tape for broadcast or studio use. FERRO-SHEEN processed on 1½ mil (Standard Play) Mylar base, 5 in. x 600 ft., or 7 in. x 1,200 ft. reels only.

Professional Recording Tape 211-241-251

A premium-quality recording tape but at the standard price. Same extraordinary characteristics as other "IRISH" Ferro-sheen process tapes. All sizes of 211 Acetate (Standard), 241 Mylar (L.P.) or 251 Mylar (D.P.).

General Purposes 195-196

A popular-priced name brand quality tape, FERRO-SHEEN processed, and backed by the famous "IRISH" guarantee. Widely used wherever a good, inexpensive tape is needed.

All sizes of Acetate 195 (Standard) or Acetate 196 (Long Play).

U.K. Distributors: A. C. Farnell, Ltd., Hereford House, North Court, Vicar Lane, Leeds, 2. Phone 35111. Also at 27, Broomhall Street, Sheffield. Phone 27466.

JASON

Jason Electronic Designs Ltd.,
2, Kimberley Gardens,
London, N.4.

Booth 29
Demonstration
Room 217

Tuners, Amplifiers, Tape Unit, Kits

From the time of the first Jason FM Tuner (FMT.I) the company's activities have always been closely associated with tuner design and production. Jason were first to produce a stable switched FM tuner for reception of BBC transmissions. Jason next pioneered tuners (FM and AM) in various forms which matched with Jason Mono and Stereo Amplifiers, and both ready-built and constructional kits were then made available. Tuners (which are sold by all leading stockists) offer a wide choice of models designed to meet present-day listening requirements.

The Jason range of tuners comprises Model FMT. 4, Model FMT. 2 in kit form, Model JTV 2, Monitor and Mercury II. These last 3 are switched Tuners for both FM and TV sound reception.

J2-10 Mk. III Stereophonic Amplifier

The J2-10/Mk. III is certain to meet developments for years to come. Every possible combination of speakers and amplifier-sections is obtainable from front-mounted controls which assists and simplifies matching to room environment. Stereo tape heads and all modern high-sensitivity stereo as well as mono P.U.s may be fed directly to the amplifier, and there is even correction for playing mono records. High-Z stages for crystal pick-ups prevent record wear. D.C. heating for valves in first stages reduces hum risk. Good circuitry and mechanical design results in complete operational stability under the severest working conditions, and all controls are front-mounted. Power output 12 watts per section, within 1 dB from 30 to 10,000 cycles with greatly extended frequency response. Outputs adjustable for 4, 8 and 15 ohms. A.C. mains, 100/110 and 200/250 volts. The exceptional versatility of the J2-10 Mk. III makes it ideal for every keen audio fan, for its design permits its use in the widest number of applications.

Also to be shown—the new Jason JTL Tape Unit.

Many Jason designs are available in kit form for the home constructor and well detailed literature makes building simple and sure.

KEF

KEF Electronics Ltd.,
Tovil, Maidstone, Kent
Maidstone 55761

Booth 20
Demonstration
Room 214

Loudspeakers

Audio engineers and high fidelity enthusiasts are aware that mechanical reproduction remains far short of reality, notwithstanding the tremendous advances in technique which have made the last ten years so exciting.

Many of these shortcomings are attributable to loudspeakers which, although available in tremendous variety, show no likelihood of approaching a uniform standard of performance.

High on the list of faults are poor transient response, roughness at high frequencies and unfavourable directional characteristics, all of which contribute to listener fatigue.

KEF speakers are designed to minimise these faults and set fresh listening standards. They incorporate new ideas, new materials and new constructional methods, all developed to improve reliability and performance.

K1 SERIES

A series of systems employing three direct radiators for bass, mid-range and high frequencies.

Bass. 16 in. x 12 in. rectangular expanded polystyrene diaphragm fitted with double roll surround. High flux ceramic magnet.

Mid-range. 6 in. x 4 in. elliptical Tri-ply diaphragm, foam surround and ceramic magnet.

Tweeter. 1½ in. diameter spherical dome in moulded Melinex. Alcomax II magnet.

Available as a slim line system only 7 in. deep or in a 4 cu. ft. version for superior LF performance.

The baffle assembly is also sold separately for the "do-it-yourself" enthusiast.

K2 SERIES

This latest system which is being shown for the first time at the exhibition, is an entirely fresh attack on the problem of very small loudspeakers.

The K2 has been built down to a size but not to a price. It employs two units of revolutionary design in an enclosure of incredibly small size, 18 in. x 10¾ in. x 6¾ in. (½ cu. ft.).

Low frequencies up to 1,000 c/s are handled by a small rectangular woofer fitted with a Tri-ply diaphragm, 2 in. voice coil and high flux magnet. The tweeter is the 1½ in. spherical dome model used in the K1 models.

At last stereo becomes a possibility in small rooms since a pair of K2 systems are sufficiently compact to fit unobtrusively into bookshelves, stand on a sideboard or fix to a wall.

Models are available in polished cabinets or baffle assemblies for home constructors.

These and other KEF models are being demonstrated in conjunction with the following first class equipment:

ADC Stereo Pickup
Garrard 301 Turntable
Tandberg Tape Recorder
Quad Amplifiers.

LEAK

H. J. Leak & Co. Ltd.,

Brunel Road, Westway Factory Estate,
London, W.3
Shepherds Bush 1173

Booth 4
Demonstration
Room 113

Amplifiers, Loudspeakers, F.M. Tuners, Pick-ups

For 28 years the Company has been engaged exclusively on research, development and the manufacture of audio frequency equipment of the highest quality. Leak gave the world the first very-low-distortion amplifier in 1945, and the amazingly low distortion content of the first "Point One" amplifier, one-tenth of one per cent., is still an accepted world-wide standard.

Now, Leak have set a new standard with a very-low-distortion moving-coil loudspeaker system which employs a revolutionary cone of sandwich construction which weighs the same as conventional cones, but is hundreds of times stiffer and thus overcomes the major weakness of the moving-coil system—lack of diaphragm rigidity. To quote John Gilbert ("The Gramophone"): "Throughout the history of broadcasting and sound recording certain developments in loudspeakers have become milestones in sound reproduction progress . . . It was obvious that this was a new approach that might offer a solution all designers of loudspeakers have sought, a diaphragm that worked as a piston over a range of several octaves . . ." And to quote Donald Aldous and David Phillips ("Audio & Record Review"): "We gave the Leak 'Sandwich' loudspeaker the full treatment. It is difficult to fault it. This design must be regarded as a breakthrough of fundamental and far-reaching importance."

The "SANDWICH" loudspeakers are being demonstrated in Room 113 with the "POINT ONE STEREO" pre-amplifier and "STEREO 20" power amplifier.

The "Stereo 20" is built to the same standards and has the same high quality performance as Leak amplifiers supplied to the B.B.C., I.T.V. and many other Commonwealth and overseas broadcasting and T.V. authorities who use them for monitoring (quality checking) the transmissions. For use in the home, the power output of 10 watts per channel is adequate. To quote John Berridge ("Hi-Fi News") on "Selecting the equipment": "Suggestions? The Leak line comes highly recommended on two continents, the pre-amp isn't cursed with superfluous knobs, and it looks good. The mono amp would thus be the TL/12 Plus and the stereo version would be the Point One Stereo 20 Amplifier. Both run about 10-12 watts per speaker, and frankly, I think this is plenty. Even with that you can rattle the windows, and the reason is that this 10W is at minimum distortion, 10W sinewave power (which means that it will put out a lot more on peaks). The price of the Leak is also quite reasonable for uncompromised sound quality." The comparatively low price of Leak studio quality equipment is made possible by our being kept fully and efficiently employed by the world-wide demand which resulted from the lead we established in this field.

The above, and other Leak products, may be inspected at Booth 4.

LEEVERS-RICH

Leevers-Rich Equipment Limited,

319b, Trinity Road, London, S.W.18
VANDyke 9054

Booth 22
Demonstration
Room 313

Professional Sound Recording Equipment and Accessories

Leevers-Rich sound recorders and accessories are designed particularly to satisfy the exacting requirements of professional users such as recording studios, film production units and research establishments. Accordingly, all equipment shown is conservatively rated as regards technical performance and reliability.

The range of portable, console and rack mounted recorders will be represented by the model **E141P** heavy duty portable recorder and the new model **E142M** stereo recording console. Both these models are in wide use by the B.B.C. and I.T.V. contractors and many other broadcasting and television authorities.

The **Syncropulse recorder Model CS621P** is already widely known to film production units and the latest version will be shown, together with transcription equipment including the model **F1621P magnetic film recorder** for 16 mm. striped or fully coated film.

The above equipment includes the new **6 band audio equaliser**, a wide range instrument giving an accurate visual presentation of the response curve to which it is set.

The low loss, high efficiency heads used in Leevers-Rich magnetic recorders are now available as separate components and examples of the main types will be exhibited.

Bulk erasing facilities are essential to every recording installation whether commercial or professional, and are provided by the range of Junior, Standard or Senior types of LeeRaser now available.

LOEWE-OPTA

Loewe-Opta,
Kronach, West Germany

Tape Recorders

Booth 55
Demonstration
Room 314

Loewe-Opta—the leading name in radio, television and tape recorders in Western Germany—now bring to you the results of our 35 years' experience, and the backing of our 3,000 employees, in the shape of our Tape Recorders (Radios and Radiograms)—available for the first time in this country through our appointed agents—Highgate Acoustics.

This masterpiece of engineering is the most versatile portable tape recorder available in this country and is beautifully styled in a light metal-framed carrying case.

All our products are built to high engineering standards as well as being attractively styled. Below are brief descriptions of our new range of Tape Recorders.

Optacord 403. A 2-track, 2-speed tape recorder with a flat response curve from 40 c.p.s. to 16,000 c.p.s. at $3\frac{3}{4}$ i.p.s., and up to 6 hours playing time at $1\frac{7}{8}$ i.p.s. 5 watts undistorted power output from an elliptical P.M. dynamic speaker. Push-button recording input selection. Mono control for stop, pause, playback, and fast forward/reverse. Superimposition, or "trick" facilities. Auto cut-off switch acting on the metallic strip at the end of the tape. Override button for auto cut-off switch. Provision for foot control switch. Complete with microphone, tape, and recording lead. Dimensions: $14\frac{1}{2}$ in. wide, $13\frac{3}{4}$ in. deep, $7\frac{1}{4}$ in. high. Approx weight: 21 lb.

Optacord 404. A 4-track, 2-speed tape recorder with similar specifications to the 403, but with doubled playing time. Also permits simultaneous listening on one track whilst recording on other track, or simultaneous playback from two tracks. Embodies facilities for playing back stereo-tapes. Complete with microphone, tape, and recording lead. Dimensions: 14 in. wide, $13\frac{3}{4}$ in. deep, 7 in. high. Approx. weight: 21 lb.

Optacord 412. A 2-track, single-speed transistorised tape recorder for use on internal dry batteries, motor car battery or A.C. mains. Up to $1\frac{1}{2}$ hours playing time at $3\frac{3}{4}$ i.p.s. from $4\frac{1}{4}$ in. spools. Will operate in any angular position. Push-button controls for recording (locked position), playback, fast forward/reverse, pause, input selection, and stop. Rim wheel-drive controls for volume and tone. 1 watt power output.

Complete with microphone, tape, and recording lead. Dimensions: $14\frac{3}{4}$ in. wide, 9 in. deep, $4\frac{1}{8}$ in. high. Approx. weight: $8\frac{3}{4}$ lb.

Optacord 500. Video tape recorder. For further information on this, or our other products, enquire at Room 314, or contact our exclusive agents.

U.K. Distributors: Highgate Acoustics, 71-73, Great Portland Street, London, W.1. Telephone: MUS 2901.

L/P RECORD LIBRARY

The Long Playing Record Library Ltd.,
Squires Gate Station Approach,
Blackpool, Lancs.

Press
Lounge
232

Library Catalogue

Since its inauguration in 1954, the Long Playing Record Library Ltd. has built up a nation-wide (indeed, one might say world-wide) reputation for its postal record lending library service. The Library Catalogue is completely comprehensive, and in the mono field, includes **every LP** of classical music of any merit. Since the very first stereo release the Stereo section of the Library has maintained a complete coverage and as a new venture, light music was included as well as serious issues. Poetry, plays, and the spoken word are included in both mediums.

Moderate hiring charges and the simplest possible form of permanent packing (the member has merely to reverse an address card and re-secure the outer casing—an operation taking about 45 seconds—and records are ready to return), have attracted the Library service not only to thousands of private borrowers all over the British Isles, including the Shetlands and Western Isles of Scotland, but also to universities and educational institutions of all kinds. A special **Society Subscription** enables such organisations, together with Gramophone Societies and Music Clubs (of whom over a hundred are permanent members) to reserve records in advance for specific recitals.

Besides its loaning service, the Library also operates a superior **Factory Fresh Sales Service**, enabling customers to obtain guaranteed unplayed and blemish-free copies of new records to order, such records also being **Para-stated** without charge. This service is used extensively by public libraries as well as private purchasers.

During 1960, the Library extended its operations to begin the first of a planned chain of branches where members can change records personally, rather than by post, and such branches were opened at Blackpool and Manchester. In 1961 further branches were opened in central London and Bradford and 1962 plans include a branch in Bristol.

It is as publisher that the LP Record Library Ltd. participates at the Audio Festival. Its selective Classical Catalogue has long been world-renowned and a new edition of this is in preparation. In 1960 the Library followed up with a publication which was an even greater success: **The Stereo Record Guide**. Beautifully produced and luxuriously bound, this book was a comprehensive review of all stereo LP's and included a section on light music. The co-authors were Edward Greenfield, Denis Stevens and Ivan March. Later in 1960, Volume I of **The Stereo Record Guide** was published in America and during the year reached readers in nearly every other country (including Russia!). Volume II of **The Stereo Record Guide**, which is supplementary to Volume I, was published in 1961 and the latest L.P.R.L. publication speaks for itself. It is the same authors' "**Guide to the Bargain Classics**."

LOWTHER

The Lowther Manufacturing Co.,

Lowther House,

St. Mark's Road,

Bromley, Kent

RAVensbourne 5225

Booth 34

Demonstration
Room 237

Electronic and Electro-Acoustic Engineers

Lowther Stand will be displaying power amplifiers and control units with minor improvements which keep this fine range of control and amplifying equipment among the foremost throughout the world.

Lowther high flux drive units are well represented and still offer the highest efficiency attainable.

Lowther F.M. tuners Mark V, powered and self-powered, have been joined by a self-powered crystal controlled switched (3 station) tuner Mark VI. One of these superb trio should meet every requirement for listening, monitoring, or recording.

We proudly introduce a fully transistorised front end stereo integrated amplifier with valve output of 10 watts per channel. This unique design offers the best of "two worlds" of transistor v valve.

Other supporting equipment will be on display.

Our demonstration will cover the range of Lowther High flux-folded horn enclosures, all of which are equally famous through the world of sound reproduction.

The Acousta has been changed in decor and reduced in size. At last we introduce the CORNER ACOUSTA ENCLOSURE, for its size 32"l. x 9"w. x 18"d. must be heard to be appreciated!

Members of the Lowther staff look forward to entertaining their many friends and dealing with all matters relating to sound reproduction.

LUSTRAPHONE

Lustraphone Ltd.,

St. Georges Works, Regents Park Road,

London, N.W.1

Primrose 8844

Booth 6

Demonstration
Room 149

Microphones, Microphone Accessories

Lustraphone exhibits at this International Audio Festival have been grouped to show the numerous Microphones, Transistor Amplifiers, Transistor Microphone Mixer Units, Matching Transformers, Floor and Table Stands as well as many convenient accessories available for: Educational Services, Public Address, Broadcasting, Recording Studios, Tape Recorder Users and Social Services. All Lustraphone products are of British design and manufacture.

The Microphones which cover a very wide range—from the well known "Stereomic" (dual head) Stereo Microphones, Studio Ribbon Velocity Microphones to the general purposes moving coil Microphones, such as model LO/66 for domestic users, offer a unique selection for every Tape Recorder user who wishes to obtain the best possible reproduction from the Recorder—the Music and the voice spectrum.

The model LV/59 "Lavalier" has been designed to enable users to record and announce with full freedom of hands and movement. Complete with adjustable swivel for positioning the Microphone to the person being interviewed, as well as an adjustable neck band.

For those who favour ribbon microphones, Model VR.64 complete on swivel and base enjoys a high degree of popularity.

A well favoured addition to the special dual head Stereo Microphone is the new "Stereolus" which has the identical performance characteristics, but without the particular phase switching facilities. The substantial difference in cost makes this high quality instrument available to a wider and non-professional circle of those interested in Stereo recording.

The Model MU/577 Transistor Mixer Unit permits a variety of combinations for Microphone mixing, as up to four channels can be provided for Microphones, or alternatively less channels for Gram or Pick-up facilities.

There is a wide selection of Floor Stands—heavy base and folding, Table Stands of varying heights and Table Bases that allow for consideration of every requirement.

Additionally to the fully Mumetal Screened Matching Transformers, there are available many very useful accessories such as:—

1. Flexible "Stayput" positioning tubes of various lengths.
2. Cable exit bushes and plug and socket releases enabling Microphones to be lifted from Stands, used as a Roving or Hand Microphone and just as readily replaced without interfering with any of the cable connections.

All these accessories are most valuable to orchestral and singing groups and individual recordists.

The equipment described can be seen at the Booth or in the demonstration room where descriptive leaflets are available.

MORDAUNT

Mordaunt Sound Reproducers,
32/34, Rupert Street, London, W.1
GERard 1067

Loud Speakers

Booth 27

Demonstration
Room 256

From the time it was realised that loudspeaker design involved more than the use of a simple baffle mounting or Helmholtz resonator, the name Norman Mordaunt has been closely associated with the design of high quality loudspeaker assemblies. With the advent of stereophonic reproducers inevitable limitations of size and price were automatically made upon design since two speakers are required. Out of these terms of reference, Mordaunt Sound Reproducers produced the "Arundel," a superb reproducer which is equally efficient used singly or in pairs. Within a well proportioned cabinet 36in. high x 15in. x 12in., a special assembly of bass/mid range and ribbon treble units are used to provide a loudspeaker of phenomenally good quality. This is characterised by remarkable forward presence, freedom from "colour," superb transient response and level output over the entire audio spectrum. Finished in medium walnut or mahogany the "Arundel" retails at 39 gns. Loading is up to 12-15 watts; input impedance 15 ohms. The measured frequency response covered by this fine assembly extends smoothly from 30 to 25,000 c/s without any pronounced dips or peaks.

Also on show will be the new Mordaunt electrostatic loudspeakers which include the Mordaunt "Audistatic" high frequency reproducer as well as other electrostatic types with special dynamic units to cover the complete audio range. These new Mordaunt models are being shown for the first time at this International Audio Festival and Fair, 1962.

M.S.S.

M.S.S. Recording Co. Ltd.,

Poyles Farm,
Colnbrook, Bucks.
Colnbrook 2431

Booth 35

Magnetic Tapes

The main feature of the M.S.S. Stand and Demonstration Room will be the new range of four grades of magnetic recording tape in seven spool sizes, now on sale in unique ready-for-your-library book style containers with programme and title panels.

M.S.S. Magnetic Recording Tape is the result of many years' research. For instance, dispersion thickness which is very critical, is maintained during manufacture by means of a special radio active detector unit.

As a result the fine finish of the working surface, combined with the specially treated plastic base, ensures intimate contact with the recording and replay heads and gives excellent spooling properties; it reduces wear on the heads to a negligible value, it gives a high output level from the tape at the high frequencies, allowing an overall flat frequency response with a minimum amount of equalisation and less distortion.

The excellent dispersion of the magnetic oxide in the coating, combined with the exceedingly small particle size, ensures extremely low background noise, giving a very high dynamic range. Print through from layer to layer is negligible.

MULLARD

Mullard Limited,

Mullard House, Torrington Place,
London, W.C.1

LAN 6633

Booth 10

Demonstration
Room 111

Valves and Semiconductors for Audio Applications

This year the Mullard range of Audio Valves and Transistors appears under the heading "Look for the Quality Bonus." This theme is a concise way of saying that Mullard products are to be found in the best equipments everywhere, and are the Quality Bonus to look for.

AUDIO VALVES

Mullard World Series Audio Valves are fitted as standard in audio equipment made by many leading manufacturers in the U.K. and overseas. In addition to the usual World Series range there are two interesting developments in valves for tape recorders and stereo.

In many present-day tape recorders, the recording output voltage available for driving the voltage-level indicator is about 10V, which is often insufficient to close the display of existing types of indicator. For this reason Mullard has introduced a new indicator—the EM87—which has a grid base of only 10V. This valve has the same type of display and the same dimensions and pin connections as the EM84 with, of course, a grid base of 10V instead of 22V.

The new Mullard triode-pentode — the ECL86 — has been designed specifically for audio applications, and is now used in stereophonic amplifiers. The sensitivity of the valve is such that, in a typical single-valve amplifier, a signal voltage of 50mV at the grid of the triode section will produce the maximum output power from the pentode section. Thus the output derived from low-sensitivity crystal or ceramic stereophonic pick-up heads (about 70 mV) is ample to produce maximum output from the valve and also allow the use of negative feedback.

AUDIO TRANSISTORS

With the present range of Mullard transistors outputs from 100mV in small personal receivers to 20 watts in high-power audio amplifiers can now be obtained. Details of audio amplifiers are available which provide outputs of 100mV, 200mV, 500mV, 1 watt, 3 watts and 15 watts. Also displayed is the AC107 low noise transistor, a recent addition to the range which is particularly intended for the input stages of audio amplifiers.

DESIGN INFORMATION

Various leaflets are available and two in particular give details of Mullard publications which will be of interest to audio designers. These are "Circuits for Audio Amplifiers" and "Reference Manual of Transistor Circuits."

ELECTRICAL & RADIO TRADING MELODY MAKER

Odhams Press Limited,

96, Long Acre, London, W.C.2

TEMple Bar 2468

Booth 21

Publishers

"ELECTRICAL and RADIO TRADING." A weekly news magazine for the radio-electrical dealer and his service staff, with many features of particular appeal to the audio specialist. Up-to-the-minute detailed information on new sound products such as amplifiers, speakers, pick-ups and tape recorders is published regularly, together with free loose-leaf Service Charts giving full technical information on tape recorders, radiograms, etc.

Feature articles on selling and servicing audio equipment appeal both to sales staff and technicians, while E.R.T.'s special review supplements are in a class by themselves for comprehensiveness and detail. Electrical and Radio Trading was first in the field among trade papers to recognise the importance of the tape recorder and in producing a full scale tabular review of all models. This has now become a regular annual feature and is used throughout the trade for reference. Similar coverage is given to record players, radio and television.

The International Audio Festival is another E.R.T. highlight, with a complete review of all equipment on show and supporting articles on audio topics.

In addition to a special interest in audio, E.R.T. covers all aspects of the electrical and radio trade and offers a number of free services to dealer readers. These include an Advice Bureau providing help with business and technical problems, a twice-yearly Price List covering all the principal products sold through the trade, and an exclusive annual Servicing and Repairs Directory.

"MELODY MAKER"—Britain's leading Jazz and Pop weekly brings news of Jazz and Pop personalities to thousands of readers every week. Founded in the Roarin' Twenties, it was the first newspaper to be devoted to the new jazz idiom. Edited by Jack Hutton, "Melody Maker" is noted for its wide-awake and witty style and for its exclusive interviews with top show-biz personalities. Every year "Melody Maker" presents the MM Awards—the prize most coveted by British jazz artists to-day. The MM Award is the "Oscar" of the British jazz world; a high honour for it represents the votes of many thousands of jazz enthusiasts in the "Melody Maker" Jazz Poll. "Melody Maker" is also famous for its weekly charts of "Top Twenty" records compiled from hundreds of returns from record shops all over Britain giving the sales position of pop discs. "Melody Maker" charts have become the established authority in the world of pop music and are followed by countless millions of people both at home and overseas. Newspapers which reproduce the "Melody Maker" charts include "The People," "The News of the World," "The Daily Mirror," "The Daily Sketch," and a large number of provincial and overseas newspapers. "Melody Maker" is published every Friday, price 6d.

ORIOLE RECORDS

Oriole Records Limited,
104, New Bond Street, London, W.1
GROsvenor 5301

Booth 28
Demonstration
Room 356

Gramophone Records

At last! something new, the sound of which you've never heard before!
SERIES 2000.

If only a few years ago someone said you would one day hear the ultimate in sound reproduction on gramophone records, you would not, even in your wildest moments, have thought it could be as good as we are giving you on these new, sensational discs.

SERIES 2000 is produced by the foremost artists and technicians in the world of music and sound. The last decade has become an era of intense specialisation, no matter what the field. **TIME-ORIOLE** recognises this and has applied its force to its **SERIES 2000.**

The creed of **SERIES 2000** is craftsmanship. This product originates through multi-channel recording. All recordings whether for monaural or stereo reproduction are produced on three track stereo. The eventual result is a quality of sound previously unknown in the history of records. **SERIES 2000** is thus able to reach the maximum peak of recording efficiency.

SERIES 2000 aims to prove that people interested in increasing their intellectual and instructive knowledge towards music and sound respond readily when confronted with new dimensions.....**SERIES 2000.**

You must come to room 356 to hear and see how we manufacture these superb records.

Our demonstrations will be mounted and staged by the Levy Sound Studios, who will reproduce all the atmosphere of a real advanced Recording Studio.

See the disc cutting, processing and pressing equipment used to bring you the marvel of the recording world **SERIES 2000.**

ORTOFON

Ortofon A/S,
5, Trommesalen,
Copenhagen, Denmark

Booth 72
Demonstration
Room 112

Moving Coil Pick-ups, Pick-Up Arms and High Fidelity Equipment

Specifications :

STEREO CARTRIDGES

Model SPU-G/T—the **only** Moving Coil Pick-Up in the World incorporating Built-In MicroTransformers enabling it to be matched into almost any High Fidelity Amplifier. Frequency response : 20—20,000 cps. Channel Separation : 25 db.

Model SPU-G—as above but without the Built-in MicroTransformers. **Ortofon** Stereo Moving Coil Cartridges are designed for Profession Use having extremely high compliance and low inertia of the Stylus Armature.

MONAURAL CARTRIDGES

High Fidelity Type A—frequency characteristic flat over 20—14,000 cps. Professional Type C—Still recognised as the World's finest Monaural Cartridge—extremely low values of directional force—frequency response 20—20,000 cps.

PICK-UP ARMS

SMG.212—Professional Grade Pick-Up Arm—a unique zeroing device for adjustment of stylus pressure—Ball Bearings are applied for both Horizontal and Vertical Action—Turntable Levelling is **unnecessary.**

SKG.212—High Fidelity Pick-Up Arm includes all the features associated with **Ortofon** craftsmanship and engineering skill.

RMG.309—RKG.309 16 in. Adaptations of the above for Broadcasting and Studio use.

AMPLIFIERS AND LOUDSPEAKERS

Stereo Amplifier KS.601—incorporates two push-pull outputs each of 15 watts undistorted, and control unit built into a superbly styled contemporary casing. Features include Stereo Balance Control, Rumble Filters and provision for crystal pick-ups, tape, microphones, etc.

Now being introduced and shown for the first time in the U.K. at this Audio Fair are the new **Ortofon** Loudspeakers, custom built to the same peak standards that have made **Ortofon** synonymous with all that is best in High Fidelity Sound Reproduction.

Demonstrated in Room 112, you can hear the **Ortofon** combined Stereo Gramophone Equipment Unit incorporating **Ortofon** Cartridges, Pick-Up Arms, the new **Ortofon** Stereo Amplifier KS.601 and for the first time in the U.K. the **Ortofon** Stereo Loudspeakers in their attractive yet superbly functional cabinets.

Descriptive Literature giving full technical specifications of all items described above freely available at Booth No. 72.

Distributors for the United Kingdom : Metro-Sound Mfg. Co. Ltd.,
19a, Buckingham Road, London, N.1 (CLIssold 8506/7).

PAMPHONIC

Pamphonic Reproducers Ltd.,

Westmoreland Road,

London, N.W.9

Booth 15

Sound Reproducing Equipment

Pamphonic Positive Policy is one of continuous development, and during the past year, improvements in all our equipment have been made. Our successful model 3001 integrated stereo amplifier is still available, with its matching 646 FM Tuner and other accessories, although they are not being shown.

Instead we are presenting this year a novel advance in the presentation of natural sound equipment, designed for the average living room. On stand No. 15 we are showing the Cosmonaut Cabinet, designed to accommodate the Reflectograph tape recorder and occupying a floor space of only 12 in. x 24 in. This is achieved by mounting the Reflectograph on a panel which folds into the cabinet, and holds the Reflectograph in a vertical position when not in use.

The cabinet has been craftsman designed to match the pillar loudspeakers, and is finished in sateen sapele mahogany veneer with contrasting pearl grey vynair trim and satin chrome fittings. The base plate and clamps for the Reflectograph, attached to the folding panel, are finished in florentine bronze. Fitting or removal of the Reflectograph is a simple operation. It is placed on the panel and slid onto locking clamps, which hold it securely in position.

In the space at the top of the cabinet there is an accessory locker, designed to accommodate the microphone, tape spools, cables, etc., or alternatively the user may fit a Pamphonic FM/AM tuner, which can be supplied with a matching wood panel, thus enabling the Reflectograph to be used as an amplifier for the radio, with or without recording, as required.

The matching Pillar Loudspeaker also represents a considerable advance in loudspeaker design. Hitherto cabinet enclosures have been bulky and cumbersome in order to gain sufficient volume of air to develop the full frequency response. The Pamphonic Pillar Loudspeaker takes the volume of air enclosed in the average living room, and uses this to achieve a crisp, cleaner reproduction with improved transient response, with a marked saving in the volume required for acceptable reproduction of the original sound.

The Pillar occupies only one square foot of floor space, and thus may be positioned anywhere in the room for the best effect, either monaural or stereo. In Demonstration Room 152 a pair of Pillar Loudspeakers are used with a Reflectograph in order to demonstrate their qualities to the best effect.

PARMAN

Parman Electronics Ltd.,

Horley, Surrey

Horley 4344

Booth 11

Demonstration
Room 352

High Fidelity Sound Equipment

Parman Electronics, a newcomer to the Audio Festival, is a branch of the famed aeronautical engineers. From their works at Horley, craftsmen who are used to precision engineering are making high-fidelity equipment on the highest sound levels. Already, in a short space of time, the name Parman has been known for its quality tape recorders, although their products have been in a very high priced market. They are now introducing the "Parman 16," a superb luxury home instrument of highest fidelity and elegance. Among its superior features are—

Unit Construction—hand-built Amplifiers for Recording and Replay. Separate Power Unit; **Ultra-Linear Push-Pull Power Amplifier**—providing 5 watts output (10-watt equipment to order); **Push-Pull Oscillator**—reducing background noise on recording to absolute minimum; **Automatic Electronic Circuitry**—ensuring utmost simplicity of control and enabling perfect recordings to be made with the minimum of complications; **Special 6 Tape Deck**—a really superb precision engineered assembly, giving smooth running and ease of control; **High Quality Loudspeakers**—Wharfedale 8-inch and 4-inch Tweeter with crossover, housed in separate acoustical chamber, built into main cabinet.

Elegant Cabinet—Satin finished in medium Walnut, with the back finished in the same treatment as the front. Provision is made on the control panel for fitment of an F.M. Tuner if desired; **Medium**—International $\frac{1}{4}$ in. (6.34 mm.) plastic tape. Track width 0.1 in.—accommodates up to 7 in. reels; **Tape Speeds**, $7\frac{1}{2}$, $3\frac{3}{4}$ to $1\frac{7}{8}$ i.p.s.; **Wow and Flutter Content**—better than 0.15% R.M.S. at $1\frac{7}{8}$ i.p.s. Ref. frequency 3 kc/s. Long term speed stability better than 0.5%; **Rewind Time**—approximately one minute for 1,200 ft. (7 in. standard tape).

Power Requirements—200-250 volts A.C., 50 c/s, 140 watts. (110 volt, 50 or 60 c/s machines available to order); **Replay Characteristic**—to C.C.I.R. International Standards; **H.F. Bias**—60 kc/s H.F. bias and erase frequency; Bias set for optimum results with B.A.S.F. LGS tapes; **Frequency Response**—power amplifier response:—25 c/s-25 k/s ± 1 db—at 1 watt power level; 30 c/s-18 kc/s ± 3 db—at 5 watt power level. From tape at 7.5 i.p.s. 35 c/s—16 kc/s ± 3 db. 3.75 i.p.s. 40 c/s—12 kc/s ± 3 db; **Amplifier Distortion**—less than 0.15% at 1 kc/s at rated output; **Signal/Noise Level**—measurement for main amplifier—not less than—70 db referred to 5 watts output at 1 kc/s. Overall signal/noise level—referred to 5 watts output from fully modulated tape—not less than—52 db.

Tone Controls— independent controls for bass and treble: Bass—10 db; + 18 db at 30 c/s. Treble—12 db; + 11 db at 10 kc/s; **Input Levels for 100% Modulation**—Radio: 100 m/v. impedance—250 k/ohms. Pick-up: 80 m/v. impedance—25 k/ohms. Microphones: 10 m/v. impedance—1 m/ohm.

For other equipment see advertisement, page 144.

PHILIPS

Philips Electrical Limited,
Century House, Shaftesbury Avenue,
London, W.C.2
GERrard 7777

Booth 46
Demonstration
Room 342

Tape Recorders and Tapes

The full range of five domestic tape recorders developed from the highly experienced and established sound laboratories of Philips is on the stand and working in the demonstration rooms. All the domestic models are produced by the same team of research engineers who were responsible for producing the EL3566 professional tape recorder which the B.B.C. have recently selected after extensive field trials, placing an order for a total of 90 machines.

Each of the Philips domestic models fits into a different category and price bracket of recorders, helping to make Philips this country's leading tape recorder company.

EL3585 "BATTERY PORTABLE"

Philips' first all-transistor battery tape recorder was introduced last June. The new upright styling makes for ease of operation when using out of doors. Both reels and the controls are on top of the machine. The six U2-type batteries which operate this machine can be replaced by a mains supply unit—(an optional extra at 5 gns.)—for indoor use. This machine costs only 24 gns. A shoulder strap and carrying case are an optional extra.

EL3514 "STARMAKER"

The newest model in the range, the mains-operated Starmaker, was introduced in January this year. The successful upright styling of the battery model has been repeated in this machine—with its narrow base it can be kept on a bookshelf. This 27 gns. machine gives excellent quality four-track recording/playback with extremely simple operation.

EL3541 "FAMILY MODEL"

The ever-popular Family model at 34 gns. gives four-track recording/playback at 3½ i.p.s. Mixing facilities are available with this machine and tone can be controlled on playback. By using a preamplifier (EL3774) replay of prerecorded stereo tapes is possible. A parallel track feature is now incorporated. The recorder can be used as an amplifier for a record player or microphone and there is facility for connecting an external loudspeaker.

EL3542 "3-SPEED HI-FI"

For the enthusiast three speeds, automatic tape stop and superimposition facilities are added to the features of the Family model in this machine. Price 59 gns.

EL3536 "3-SPEED HI-FI STEREO DE LUXE"

This one superb instrument contains every worth-while modern development in tape recording, including stereo. Features include four-track stereo or mono recording/playback at three speeds, mixing, recording level indicator, push button operation, auto-tape stop, detachable second loudspeaker and amplifying facilities. Price 92 gns.

MAGNETIC TAPES

For the past year Philips tapes have been in colour coded boxes; standard play in green boxes, long play in red and double-play in blue.

In addition to the microphones supplied with all the tape recorders there is a display of other Philips microphones on the stand, including the neck microphone (EL1045), the cardioid microphone (EL6031), and the condenser microphone (EL6050), which is used by the B.B.C., A.T.V. and Granada TV.

PLANET

Planet Projects Ltd.,
Planet Works, Conlan Street,
London, W.10
LAD 0436.

Booth OY
Demonstration
Room 233

Tape Transport Mechanisms.

Description of The Planet U.1 Tape Deck

The Planet U.1. Tape transport mechanism is an instrument of the highest quality, manufactured with the finest materials available and reaches a new height in tape deck manufacture, utilising a powerful Papst hysteresis synchronous motor and idler drive system.

Three speeds of recording or playback are available, according to the application required, namely 7½ in. 3¾ in. and 1½ in. per second. The standard machine is for twin track recording, using standard ¼ in. magnetic tape on any reel size, up to 7 in. Four track facilities are obtainable at slight extra cost.

The Deck has been designed to give the lowest possible wow and flutter figures obtainable, and incorporates a fully interlocked push button control system, recording latch, pause and lock, variable speed magnetic clutch, balanced drag system, four digit position indicator, and a system of stainless steel pins to wrap tape around the face of the heads; no pressure pads are used, thus prolonging the life expectancy of tape and heads.

A solenoid operated auto stop, incited by metal foil at each end of tape, is fitted, which, at the same time, removes all idler and pinchwheel pressures.

A twelve contact switch is built internally into the Deck to allow for bias and oscillator switching.

Head to amplifier connections are made via co-axial plugs, situated on the underside of the base plate—thus enabling the Deck to be removed or replaced in your case or cabinet in a moment.

Specification:

Motor: Single Papst hysteresis synchronous (driving 2¾ lb. balanced brass flywheel).

Tape Speeds: 1½ in. 3¾ in. 7½ in. per second.

Wow and Flutter: Better than .1 at 7½ in. — .15 at 3¾ in. — .2 at 1½ in. per second, on record and playback.

Heads: Up to four heads in line can be fitted. The standard model is fitted with one special triple field erase; one record; one playback; half track Miniflux heads. Quarter track or half track stereo, or full track may be supplied to order.

Controls: Press Button—including normal record with interlock to prevent accidental erasure, fast rewind, fast wind on, pause control with pause lock. Solenoid operated automatic stop through metal foil. When the automatic stop operates, all idler pinchwheel pressures are released. The design is such that the leader tape does not wind off the empty reel on actuation of automatic stop, thus obviating the necessity to rethread.

Spool Size: Up to 7 in.

Tape Position Indicator: 4 digit.

Dimensions: Top mask 14 in. x 12¼ in. (with spools 14¾ in. x 12¾ in.)

Bottom plate 11½ in. x 10¾ in.

Depth (Between mask and bottom plate) 2 in. Motor protrudes a further 2¾ in.

PYE

**Pye Hi-Fi Division,
Faraday Electronic Instruments Ltd.,
Blue Town, Sheerness, Kent
Sheerness 3076**

**Booth 30
Demonstration
Room 234**

Amplifiers, Pre-Amplifiers, Speakers, Tuners

The "Mozart" range of amplifiers and tuners is shown. These are available in chassis form or in expanded metal cases, and a standard panel size of 10½ in. x 3½ in. allows the best presentation in any cabinet. Panels are finished in burnished copper.

The 18-watt stereo amplifier (Series HFS20) features a D.C. heated pre-amplifier and a main amplifier with an output of 9 watts per channel. Frequency response is 10-50,000 c.p.s. and hum and noise is 70dB with 100K input impedance. There are five controls; push-button on/off switch, balance, treble, bass and volume controls; and a five-position selector switch. The amplifier works off 200-250 volts A.C. and costs 35 gns.—or 45 gns. in a cabinet.

A monaural amplifier (Model HF10) has provision for tape, radio or pickup inputs, and a new printed circuit design has made possible an undistorted output of 10 watts. There are filter, bass, treble, volume and selector controls and the panel presentation is identical to that of the stereo amplifier.

Chassis version: 22 gns.

With extended metal case: 23½ gns.

An AM/FM tuner combines interference-free FM reception with additional entertainment from medium wave stations. Provision is made for stereo broadcasting reception. Size and presentation are identical to those of the FM-only tuner. The tuning range is 88-108 mc/s on FM/VHF and 200-550 metres (545 Kc/s-1.5 mc/s) AM. This tuner (Series HFT113) costs 28 gns. or 30 gns. with expanded metal case.

The FM-only tuner (Series HFT108) gives good FM reception up to 80 miles if an outdoor aerial is used. Automatic frequency control gives easy tuning without the need for a "magic eye." The frequency response is 20-20,000 c.p.s.

Chassis version: 22 gns.

With expanded metal case: 24 gns.

Attractively presented loudspeakers match the Pye tuners and amplifiers in quality and faithfulness of reproduction. The Pye Mozart "Minor" has an enclosure of unique, patent pending design housing one 12 in. speaker and a twin-cone 10 in. x 6 in. speaker, giving a frequency range of 50-15,000 c.p.s. The cabinet measures 28 in. x 13½ in. x 10½ in. and is finished in walnut to match other units in the range. The "Minor" costs 18 gns.

To-day's best looking listening is offered in the HF15SMT "Major," a speaker of unrivalled design and performance costing 27 gns. This speaker measures 31 in. x 17 in. x 13½ in. and has a frequency response of 50-15,000 c.p.s.

All the refinements of modern Hi-Fi stereo are incorporated in the luxury Mozart "Stereo Ensemble," priced at 195 gns. Its amplifier gives 9 watts per channel, HFT113 AF/FM tuner is used for radio reception. Specially tuned speakers covering the entire audible frequency range are removable for maximum stereo effect. A Garrard 4-speed autochange transcription unit handles all types of record and is fitted with the "Stereodyne" magnetic cartridge with a diamond stylus. The whole is enclosed in a beautifully designed rosewood and walnut cabinet.

QUAD

**Acoustical Manufacturing Co., Ltd.,
Huntingdon, Hunts.
Huntingdon 361**

**Booth 31
Demonstration
Room 147**

Amplifiers, Loudspeakers, Control Units and Tuners

Someone said recently that if there has been no change in requirement and no major technical development, the introduction of a new model can only mean that the designer failed to get it right the first time! While this may possibly be an over-simplification of the complex business of design we nevertheless make no apology for showing exactly the same range of units as at last year's Audio Fair.

Illustrations of the QUAD range of units may be found elsewhere in this catalogue, but further details and descriptive literature are available from our stand or from the factory at Huntingdon.

The demonstrations in room 147 will, as usual, be of about a quarter of an hour's duration, and will endeavour to provide a brief but enjoyable mixture of different types of music, not with the aim of impressing, but of pleasing those who are willing to sit and listen.

We regret questions cannot be answered in the demonstration room but our staff on the stand will be pleased to assist with any advice or information that may be required either about the units themselves or their installation and use.

RADFORD

Radford Electrical Ltd.,
Ashton Vale Estate,
Bristol 3
Bristol 662361

Audio Equipment

Booth 5
Demonstration
Room 121

The new range of equipment comprises:—

STEREO CONTROL UNIT Type SCU 3

This control unit has an exceptional S/N ratio, and is better than 70 dB for an input of 5 mV (disc RIAA) for 0.5 v output. Push button selection provides for disc, tape and two auxiliary inputs (100 mV and 500 mV). An n.f.b. rumble filter cutting in excess of 20 dB/octave below 30 c/s; three switchable treble filters with graduated roll offs minimising transient distortion, low noise triode input buffer stages and cathode follower output stages on all channels are features of this design. Of particular note is the composite third channel output with independent control which can be used to control the "sound stage" width in large rooms.

STEREO CONTROL UNIT Type SCU 2

The SCU 2 is similar in many respects to the SCU 3 with the exception that it has no third channel output. The S/N ratio is better than 65 dB for 5 mV input (0.5 v output). A steep cut rumble filter at 35 c/s and a graduated roll off treble filter are included. The unit has cathode follower output stages, a feature not normally associated with such reasonably priced equipment. The tone control circuits have a range of ± 12 dB instead of ± 20 dB for the SCU 3.

* MA 15 Mk. 2—15 WATT MONO POWER AMPLIFIER

The circuitry of this amplifier is the basis of the new range of power amplifiers. The use of a triode pentode phase splitter has reduced the amplifier phase shifts, resulting in a phase margin in excess of 90° up to 3 Mc/s and a gain margin of approximately 30 dB. Increased negative feedback over a wider frequency band has reduced distortion to below .05% in the range 40 c/s to 3 Kc/s and less than 0.5% at 15 Kc/s at 15 watts continuous sine wave output. The basic sensitivity of the amplifier is 500 mV for 15 watts and auxiliary supplies are provided for a pre-amplifier.

* STA 15 STEREO POWER AMPLIFIER

Two identical amplifiers of the MA 15 type together with a power supply are mounted on a compact chassis giving a saving in both space and cost but maintaining the same performance standards of the MA 15.

STA 12—12 WATT/CHANNEL STEREO POWER AMPLIFIER

This amplifier is a lower power output version of the STA 15 amplifier, and has all of its desirable features.

STA 7—7 WATT/CHANNEL STEREO POWER AMPLIFIER

The STA 7 is intended for use with the SCU 2 control unit for small, economic installations.

* MA 25—25 WATT MONO AMPLIFIER

The MA 25 is a high-power version of the MA 15 using KT88's in the UL output stage instead of EL34's.

FMT. VHF TUNER 88-108 Mc/s

This high-sensitivity self-powered tuner unit is styled to match the two new control units. It has variable tuning over the range 88-108 Mc/s and includes a tuning indicator. The tuner, like the control units, can be used free standing or cabinet mounting.

All the equipment above is similarly styled. All power amplifiers are provided with switched load impedance matching of 4, 8 and 16 ohms and are suitable for use on voltages of 105-150 v and 210-250 v.

Items shown * will shortly be available in kit form.

RECORD HOUSING

N. & S. B. Field & Co. Ltd.,
Brook Road,
London, N.22
Bowes Park 7487

Booth 63
Demonstration
Room 213

Audio Cabinet Manufacturers

Record Housing occupy a unique place at this International Audio Festival as the only exhibitor specialising in the **housing** of hi-fi equipment. With a range of over 20 different, matching cabinets they can almost say: "You name it—we'll house it." This includes not only turntables, amplifiers, tuners, etc., but loudspeakers, gramophone records, and even complete tape recorders. Before you go to the trouble and expense of a specially built cabinet take a look at our catalogue, and don't hesitate to ask advice while here.

We value your questions as much as you will value the answers. All the designs are based not only on ten years specialist experience but on the requests and information supplied by the hi-fi public in the course of using Record Housing's Hi-Fi Advisory Service.

There isn't room to show the entire range (the largest in the world incidentally) but most standard cabinets have been improved since last year, while four new ones make their appearance:

1. The Luxurious "Brahms" at 26 guineas, which will hold just about everything.
2. The "Strauss 10" speaker enclosure: £10 19s. 0d. and "Goodmans-approved."
3. The "Liszt," a stylish cabinet designed to accommodate the most popular set-up of all: turntable, tuner and amplifier. Price: £11 19s. 0d.
4. The "Elgar," a "hi-fi radiogram" cabinet at 19 guineas for those "philistines" who want all their equipment in one attractive box.

RECORDS & RECORDING

Hansom Books Ltd.,
7 & 8, Hobart Place, Eaton Square,
London, S.W.1.

Magazine Publishers.

Press
Lounge 241

Records and Recording, now in its fifth year of publication, is the only illustrated monthly magazine devoted entirely to reviewing all recorded classical music issued in Britain and giving, in addition to more than 100 extended record reviews each month, also news, opinions and ideas of recording artists and technicians.

Experts discuss the latest equipment in terms understood by the general reader, Thomas Heinitz regularly reports on new technical advances and the recording companies' technicians write about new recording techniques and experiments long before official announcements are made.

In *Records and Recording* there is news of recording activities in New York, Paris and elsewhere; lists of all new classical recordings and features on recording artists and the making of outstanding new records. There are more than 40 illustrations each month of recording sessions, sleeves, new equipment and recording artists, many exclusive.

Feature articles in recent issues include "What to Record and Who to Record It" by Decca's classical recording manager, John Culshaw; "A Sound-Museum," by the secretary of the British Institute of Recorded Sound; "Plaster-cast Speakers," by Thomas Heinitz; "Records from Petri," by the Marquess of Londonderry. Typical monthly contributors from past issues include Elisabeth Schwarzkopf, Sir Malcolm Sargent Andor Foldes, Dietrich Fischer-Dieskau, Julius Katchen and Lottie Lehmann.

Visitors to the Audio Festival who visit our room 241 will be given a free specimen back issue of *Records and Recording* or may write for a copy post-free from the publishers, Hansom Books Ltd., 7 & 8, Hobart Place, Eaton Square, London, S.W.1.

Postal subscriptions are only 13s. 6d. for six months, or copies may be ordered through any newsagent or bookstall in Britain providing a firm order for regular monthly delivery is given. In case of difficulty please let the publishers have the name and address of your newsagent and they will arrange delivery.

Music and Musicians is the companion magazine to *Records and Recording* and is devoted to covering the whole field of live classical music and opera in Britain and abroad. Now in its tenth year of publication *Music and Musicians* is the leading illustrated music magazine with the largest circulation in its field in the world.

There is news of musical personalities, feature articles about the music, and those who make it, explained in straightforward writing by experts; famous composers write about their own music; experts comment in advance on first performances of new works, and there is a full chronological list of the coming month's musical events all over Britain, with programmes.

Music and Musicians is obtainable in the same way as *Records and Recording* and a free specimen back issue will be given to Audio Festival visitors to Room 241, or you may write for a free back number.

REFLECTOGRAPH

Pamphonic Reproducers Ltd.,
Westmoreland Road,
London, N.W.9
COL 7131

Booth 16
Demonstration
Room 152

Tape Recorders

The Reflectograph Tape Recorder is now so well known that anything we could say would be superfluous. Instead we quote extracts from reviewers comments on the Reflectograph, proving that it is without doubt the "Quality without Compromise" tape recorder.

"Gramophone Record Review"

"Our unanimous opinion is that the Reflectograph Model A is one of the most satisfying two-track tape recorders we have yet handled, irrespective of price. Classified as a semi-professional machine, its modest specification is exceeded in practice. Elegant seems to be the best word to describe its design and performance. Such refinements as fast wind-on and rewind by variable knob, permitting 'inching' of the tape past heads, are important, but in our opinion are secondary to the inclusion of separate record and playback amplifiers and a tape/input switch, which allows direct comparison of incoming signals with the signals recorded on the tape. This continuous monitoring is a supreme test, and only manufacturers with complete confidence in their recorders dare fit this facility. The discriminating enthusiast cannot fail to be delighted with this British machine."

Donald W. Aldous
David Phillips

"The Tape Recorder"

A month's use of the Reflectograph revealed no troubles of any kind. I liked the separate control of rewind speed and the ease in editing which it gives, but the user has to remember that the stop button only functions on play and record but not on rewind. The large internal speaker gives unusually good reproduction, but the necessity of keeping any tape recorder portable limits the size of the enclosure and hence the quality of reproduction. All the response curves, but particularly that obtained at the pre-amp socket, are unusually smooth; and this in conjunction with the low values of wow and flutter result in a smoothness in quality that is rarely evident in the average domestic tape recorder.

The handbook that accompanies the machine is well worthy of comment for its unusual completeness. Circuit and complete details of all components are included, a particularly valuable feature for an owner living abroad and thus out of immediate contact with spare parts. Undoubtedly a tape recorder with an all-round performance much above the average. Definitely a machine for the semi-professional user, and not intended as a birthday present for your daughter, whatever your income bracket.

J. Moir

RESLO

Reslosound Ltd.,

Booth 17

24, Upper Brook Street, London, W.1

Telephone : Hyde Park 2291

Microphones, Accessories and Loudspeakers

"Reslo" are world famous for their range of competitively priced ribbon microphone, their rugged high output moving coil microphone and the associated range of floor stands and the mounting accessories that are available. "Reslo" also manufacture to the same performance standards their more recent "cardioid" type ribbon and dynamic microphones.

A wide range of reflex horns is also available for medium and high power Public Address purposes for use with the "Reslo" S.U.10 pressure horn unit well known the world over.

Reslosound Ltd. will be showing their most versatile ribbon microphone, the RB/T series, the performance of which can be modified to suit particular purposes by the fitting of "acoustic correction pads" which are available from them without extra charge. The "T" model (tubular base) is now available with on-off switch in addition to the usual six impedance values.

The following new items will be exhibited in addition to the above:
(1) Stereo twin microphone mount, type TM1. This mounts two RBL/T Microphones spaced at 5 ins. and has adjustable mounting plugs so that the two heads may be adjusted at the best angle for the correct stereo effect. Each mounting plug is fitted with 30 ft. of twin screened cable and is so arranged that the cable can be run internally or externally if preferred.

The twin mount is also excellent for Public Address purposes allowing the speaker to move his head considerably without affecting the volume or quality. The twin leads from the separate microphones also allow a double amplifier system for maximum reliability during a VIP function.

(2) A slim and versatile "pencil ribbon" microphone—type PR—specially designed for the amateur recordist who requires lifelike reproduction at a modest cost. Type PR is available in three different impedance models and is so arranged that the red "Reslo" label side is most appropriate for music recording and the opposite side for medium close speech announcing.

(3) A transistorised line coupling unit—type G.E.1—in addition to the popular line transformer unit, type LTU 1, which will also be exhibited. The transistor coupler is very versatile and accepts any low impedance input from 15 to 1,000 ohms. The output is designed to plug directly into the high impedance input socket of the associated tape recorder or amplifier. Noise has been successfully reduced to a very low level whilst maintaining a wide and level frequency response. The coupler is energised from its own internal 9-volt battery which is connected in circuit when the associated microphone cable plug is inserted.

Copies of the Technical Sales leaflets describing the above and complete range of "Reslo" equipment are available upon request from the Sales Division at 24, Upper Brook Street, W.1, and spares and a complete repair service is provided from the Works at Spring Gardens, London Road, Romford, Essex.

ROBUK

Robuk Electrical Industries Limited

559-561, Holloway Road, London, N.19

ARC 1022

Booth 52

Demonstration
Room 315

Robuk Tape Recorders

The ROBUK RK3 was first shown at a public exhibition at last year's International Audio Festival. At that time the machine was little known, either to the public or to the trade. At this exhibition the RK3 is shown again in much the same form, the differences being confined to detailed improvements and to general advancement of production techniques.

During the past year, however, the RK3 has become a firm favourite, not only with members of the public, but also with the several thousand radio dealers throughout the country who handle it.

This popularity is not confined to the Home Market; in fact, on balance, rather more ROBUK'S have been exported than have been sold in this country. Distribution has been established in no less than 51 overseas markets, including substantial distribution in hard currency areas.

At a risk of repeating that which was noted in last year's catalogues, the reader's attention may well be drawn to the general specification of the RK3, which provides, at the modest price of 36 guineas, a first-class standard of performance, either as a unit or in association with other equipment. Providing as it does three operating speeds, mixing of two microphones, or gram and microphone, superimpose, full monitoring facilities, pause control and sockets for the use of extension loudspeakers or for additional amplification, the RK3 offers a versatility which would be difficult to match when considered within its price context. A particularly interesting feature is the facility offered by the recorder to mix, during playback, a recorder tape signal with an additional signal fed into the unit through the gram input. This, in particular, offers numerous possibilities to the enthusiast who wishes to add the "professional touch" to the projection of his film slides or home movies.

The ROBUK machines demonstrated to visitors will be playing normal "home" recordings, not specially prepared professional studio recordings, and the visitor is invited to the ROBUK demonstration room in order to establish the excellent standard which he himself may hope to reproduce privately.

ROGERS

Rogers Developments (Electronics) Ltd.

"Rodevco Works," 4-14, Barmeston Road,
Catford, London, S.E.6.

HITher Green 7424/4340

Booth 2

**Demonstration
Room 202**

*Mono and Stereo Amplifiers and Control Units, FM Receivers,
Loudspeaker Systems*

Three entirely new models are being introduced at this year's Festival; an improved Mk. II version of the Variable FM Receiver and stereo versions of the RD CADET Mk. II amplifier and control unit.

Mk. II Variable FM Receiver. Although externally similar and selling at approximately the same price as the existing unit, this model is a completely new design. Increased sensitivity, improved AM rejection and provision for stereo multiplex are the main features. A printed circuit coil pack having exceptional frequency stability is employed and twin limiters afford improved AM rejection. Dual outputs are via low impedance cathode followers. Provision is made for the connection of a multiplex adaptor to permit reception of stereo broadcasts when this service is introduced. A tuning indicator fed from the discriminator ensures maximum accuracy; sensitivity is such that the indicator will respond to a signal of only 5 microvolts. The use of a Foster Seeley Discriminator provides for optimum audio quality. A particularly effective A.G.C. circuit provides a constant audio output with an input signal ranging from 5 microvolts to 500 millivolts. The unit is completely self-powered and fitted with brushed brass panel to match any control unit in the ROGERS range, including the HG88 11. Chassis or Teak Case models will be available.

RD CADET Mk. II Stereo Amplifier and Control Unit. The main amplifier employs four Mullard ECL86 valves and provides a nominal rating of 6+6 watts (push-pull) peak output 7+7 watts. Harmonic distortion at 6 watts is .25%. Output matching is 4 or 16 ohms. The control unit is of medium sensitivity and provides inputs for Tape, Disc and Radio. Tape connections, via a Continental Pattern Panel Socket are intended for use with complete Tape Recorders. The Dis Input is intended for the new high quality crystal and ceramic cartridges especially the new Decca DERAM. Controls include a 3-way push-button Input Selector, Bass and Treble, Function, Balance, separate ON/OFF and P.U. Mono/Stereo slide-switch for compatible cartridges. Styling is similar to the RD JUNIOR III Stereo Control Unit and features a brushed brass panel and matt black sub-panel. The two units will be sold together as a pair and will NOT be available as separate units.

In addition to the new models the Static Display will include the remainder of the ROGERS range, in particular, the very successful HG88 Mk. II Stereo Amplifier introduced at last year's Festival.

As in previous years two sets of equipment will be used for demonstration purposes, the first in the higher priced bracket, the second featuring inexpensive units. The former will be based on the RD JUNIOR III Stereo Control Unit and Stereo Amplifier, the latter on the new CADET stereo equipment.

We would emphasise that the units used for demonstration and static display are standard production models in every respect and have not in any way been modified or prepared for exhibition purposes. This applies particularly to the standard of wiring to be seen on the Static Display.

SAGA

Saga Records Ltd.,

127, Kensal Road,
London, W.10.
Ladbroke 6651

Booth 57

**Demonstration
Room 159**

Disc Records and Tape Records

Saga Records are producers of SAGA, DANDY and LANGUAGE disc records, SAGA and DANDY tape records. The SAGA disc catalogue contains the famous SAGA "Sovereign," 12 in. LP's of popular and classical music retailing for 21/- inclusive of purchase tax, and including such distinguished items as the only available version of the Bruckner 2nd Symphony, Berlioz' *Symphonie Funèbre et Triomphale*, Faure's *Shylock* and many others. Other 12 in. LP lines are the "Scala" and "Studio" series retailing at 29/9 and the "Celebrity" series at 39/9. DANDY children's records are 7 in. extended-play records (45 r.p.m.) retailing for 7/6. Also on the DANDY label are attractive DANDY RECORD BOOK, complete with fully illustrated and descriptive textbooks (9/11). LANGUAGE records are 7 in. extended-play records (45 r.p.m.) each carrying the 200 basic words of the principal European languages.

A new catalogue of SAGA tape records has been published in time for this International Audio Festival. It contains full details of all SAGA tape releases up to and including June, 1962. The structure of the catalogue has been simplified and all mono SAGAtapes are 5 in. spools at 3½ in. per second, and all stereo tapes are 7-in. spools to be played at 7½ in. per second. Attention is drawn to a special new release, the SAGA Superstereo Sampler, a demonstration tape consisting of complete tracks from a dozen tape albums introduced by the unique SAGA "Bouncing Ball" balancing signal. The tape is also available in mono form.

In addition to original SAGA recordings, the SAGA repertoire is drawn from distinguished sources including the renowned Concertapes and Audiophile catalogues of the United States. Repertoire from the famous Storyville jazz catalogue is also available on SAGAtapes. Retail prices of SAGAtapes are 32/6 (mono) and 63/- (stereo). Scotch Brand Magnetic Tape is used exclusively on SAGAtapes. A special series of children's DANDY tapes is also available from SAGA, on 3 in. spools in 5 in. boxes, to be played at 3½ in. per second.

The SAGA tape record is of the reel to reel type, i.e., the magnetic tape with the music already recorded upon it is spooled upon a plastic spool of conventional type. The tape record is presented in an attractively designed box with a pictorial cover similar to an LP sleeve. The quality of the tape is assured by manufacture on Ampex equipment, the finest available in the world.

SAGA disc records are cut on modern high-quality cutting lathes, processed in accordance with the latest techniques and pressed by the conventional (and best) compression process in the modern, fully-equipped plant at SAGA's headquarters at Kensal Road.

Come and hear us in Demonstration Room 159.

SCOTCH

Minnesota Mining & Manufacturing Co. Ltd.,
3M House, Wigmore Street,
London, W.1
Hunter 5522

Booth 49
Demonstration
Room 120

Magnetic Recording Tape

Featured by the Minnesota Mining & Manufacturing Co. Ltd. at this year's International Audio Festival and Fair is the full range of "SCOTCH" Magnetic Tapes and Accessory Items.

The range includes three standard play tapes. No. 111 acetate All-Purpose tape enjoys a world-wide reputation for high fidelity and clarity of reproduction. No. 311 All-Purpose has the same fine coating as No. 111 and its P.V.C. coating, the finest available, gives additional strength and ease of handling. The third standard play tape, No. 102, has a tough polyester base and is manufactured to the same critical standards as a high-grade Instrumentation Tape such as "SCOTCH" No. 499 Heavy Duty Instrumentation Tape which was used on a recorder inside the Mercury Capsule on Col. Glenn's recent historic space flight.

No. 150 is the Extra-Play Tape of the range and has a tough polyester base of similar characteristics to No. 102.

The fifth tape in the range is No. 200 Double-Play, which, with its super thin yet tough polyester base, gives an improved signal to print-through ratio, excellent reproduction and double the playing time of standard tapes.

Accessory items include coloured leader tapes and No. 41 pressure-sensitive splicing tape.

Copies of the popular "How to do it Booklet of Tape Recording" and the "SCOTCH" Playing time calculator will also be freely available on the ground floor booth and in the 3M Demonstration Room.

SIMON

Simon Equipment Limited,
48, George Street,
London, W.1
WELbeck 3271

Booth 65
Demonstration
Room 220

Tape Recorders

The latest in the line of high quality Simon Tape Recorders—the SP5—makes its appearance as the main attraction of the Simon exhibit. The outstanding quality and range of facilities of the Simon SP5 have quickly established its popularity with Hi-fi enthusiasts.

The Simon SP5. Tape Speeds— $7\frac{1}{2}$ i.p.s. and $3\frac{3}{4}$ i.p.s. Spools up to 7 in. dia. Twin track.

Wow and flutter—better than 0.15 per cent at $7\frac{1}{2}$ i.p.s.

Frequency response—at $7\frac{1}{2}$ i.p.s. 30—20,000 c.p.s. + or - 3dB. At $3\frac{3}{4}$ i.p.s. 30—10,000 c.p.s. + or - 3dB.

Output—6 watts. Modulation indicator—meter.

Speakers—10 in. x 6 in. bass, 4 in. tweeter.

Facilities—Monitoring of recorded signal.

Re-record of signal from one track to second with mixing of microphone or radio input.

Master record fader.

Tape bias adjustment.

Easy conversion from monaural to stereo with plug-in circuits.

Price—Monaural 93 guineas. Stereo 106 guineas. Special export model is available which includes disc replay facilities.

The Simon Minstrella 4 and companion 4S unit. Offering 4 track mono record/play back and full stereo record/play back or record two tracks at once, the Minstrella 4 and 4S offer top quality stereo facilities at low prices, in the distinctive polished mahogany cabinet styling which has proved so popular.

Specification. Deck: Magazine loading, 4 track. Speed: $3\frac{3}{4}$ i.p.s. Amplifier: Triode push/pull (2 x EL84) gives 3 watts at 3 ohms with negligible distortion. Loudspeaker: 7 in. x 4 in. Elliptical. Output: To internal loudspeaker, or Microphone, Radio/gram. Microphone: Inbuilt high output crystal. Modulation indicator: Magic eye. Total Weight: Approx. 30 lb. Size: 19 in. x 12 in. x $18\frac{1}{2}$ in.

Price—Minstrella 4 tape recorder 41 guineas. Minstrella 4S stereo amplifier companion unit 22 guineas.

The Simon Cymbal. The low priced recorder carrying the Simon reputation for quality. The two-colour cabinet combines with the Simon amplifier to provide reproduction of unusually high quality.

Specification: Deck: Magazine loaded twin track. Amplifier: Simon 3 watt output. Frequency range: 70—9,000 c/s at $3\frac{3}{4}$ i.p.s. Loudspeaker: 5 in. x 3 in. Microphone: Crystal. Input: Microphone, Radio/gram. Outputs: To internal loudspeaker or external loudspeaker with automatic cutout of internal speaker. Modulation indicator: Magic eye. Total Weight: 22 lb. Size: 13 in. x $6\frac{1}{2}$ in. x $9\frac{1}{2}$ in.

Microphones. The Simon Cadenza Ribbon and Crystal Microphones are on display, representing the finest standards in their respective designs. Price: Ribbon (head) $8\frac{1}{2}$ guineas. Crystal (desk stand) $3\frac{1}{2}$ guineas.

SHURE

Shure Brothers Inc.,
222, Hartrey Avenue,
Evanston, Illinois, U.S.A.

Booth 43

Demonstration
Room 361

Pick-ups, Arms, Cartridges, Microphones

Shure audio components are the prelude to fine sound reproduction. Pickups, microphones and tape-heads set the standard for any system and must be carefully chosen if the capabilities of amplifiers and loudspeakers are to be exploited to the full.

The Shure range of pickups and cartridges is more comprehensive than that of any other manufacturer. The Shure Dynetic moving-magnet system is established as combining the most faithful and distortion-free reproduction with absolute reliability and consistency. Stylus assemblies which can be replaced instantly in the home without special tools are a valuable feature.

Records are costly and the aim should be to reduce wear to a minimum by keeping the playing weight as low as possible consistent with accurate tracking. Thus the Shure range includes cartridges to match the characteristics of any arm, player unit or record changer.

For playing weights of 5-8 grammes the Model M8D Standard Stereo Dynetic Cartridge provides excellent performance at modest cost. With arms and units permitting a slightly lower playing weight the Model M7D is recommended. The same cartridge can be fitted with the high-compliance N21D (compatible) or N25D (stereo) Stylus Assemblies for use with precision arms capable of tracking at 2 grammes and under.

Compatible styli provide excellent results from both stereo and mono records whilst the stereo versions are for those who require the finest possible reproduction from selected stereo records only.

The M3 Series Professional Cartridges cover playing weights ranging from 3-6 grammes for the M3D to below 2 grammes for the M3-N21D and M3-N21D. The response of these cartridges in the upper frequency range is particularly smooth and extended giving musical reproduction remarkably free from colouration.

Mono records still attract the attention of many users and the Model M5D (L.P.) and M6S (78) Cartridges meet the requirement of these users admirably.

Professional Transcription Arms Model M232 and M236 enable any Shure cartridge to be used to the best advantage.

The Shure Studio Dynetic Integrated Pickups are the supreme result of treating design of arm and cartridge as complementary and provide unequalled performance for the connoisseur.

Shure microphones cover broadcast, recording, public-address and communications grades, the range including moving-coil, ribbon, controlled-magnetic, ceramic, crystal and carbon types with directional characteristics to suit any application.

Stop Press.—New from Shure are the M77 and M33 Stereo Dynetic Cartridges incorporating the most advanced design features—even simpler stylus replacement—superior hum shielding—higher output—improved compliance. The M33 has the phenomenally high compliance of 20×10^{-6} cms/dyne permitting the playing weight to be reduced to below 1 gramme in the finest arms. A unique feature is that a stylus for playing 78 records can be fitted without removing the cartridge from the shell.

U.K. Distributors: Shure Electronics Ltd., 84, Blackfriars Road, London, S.E.1. Waterloo 6364.

SME

SME Ltd.,
Stevington, Sussex, England
Stevington 2228

Booth 66

Precision Engineering Products

Precision Pick-up Arms Models 3009 and 3012, Series II

These new series II precision pick-up arms embody all the best features of the earlier models to which have been added improvements for still greater ease and flexibility of use. Decreased mass and extended range of balance anticipate lighter, higher compliance cartridges in addition to those of the present day. Reduced height simplifies use with low turntables. The bias adjuster formerly an accessory is now standard equipment. SME arms meet all the following essential requirements for optimum reproduction and use:—

Minimum vertical and lateral friction.

Resonances placed well outside recorded range and damped.

Accurate longitudinal and lateral balance.

Good geometry so that distortion due to tracking error can be minimum.

Compensation for the natural tendency of a pick-up arm to try to move towards the centre of the record.

Flexibility in operation so that a wide range of cartridges may be used.

In addition a built-in hydraulically damped control effects raising and lowering of the arm anywhere on the record and different stylus positions are quickly accommodated by moving the arm base on its bed plate which is graduated for easy reference.

GENERAL CONSTRUCTION

Engineered and finished throughout to instrument standards. All parts precision machined, heat treated and ground where necessary. Finished in satin chrome plate, gun black and polished stainless steel and alloy.

Main Pillar: Adjustable for height through 1 inch.

Pillar Bearings: High precision ball races fully protected against dust, etc.

Bed Plate: Mounted through four soft rubber grommets to reduce the transfer of motor vibration. Permits 1 inch of movement for tracking adjustment.

Weight System: Provides for longitudinal and lateral balance adjustment.

Socket: The tone arm terminates in a four-pin socket for plugs having two, three or four contacts in square or diagonal arrangement.

Shell: Black Plastic. Tapped at $\frac{1}{2}$ in. centres. Complete with wiring, screws and spacers.

Arm Rest: Mounted on pillar with convenient "throw-over" retaining link.

Wiring: Suitable for all mono and stereo circuits.

Output Socket: Screened four-pin plug and socket of improved design is carried beneath the base providing a rigid junction for the "hard wiring" and the delicate pick-up lead eliminating a common cause of influence on tone arm movement. Each arm is packed complete with standard shell, mounting template, alignment protractor, fixing screws, hexagon wrenches and full instructions for use.

D.2. Adaptor: This accessory plugs in instead of the standard shell and enables Decca heads to be mounted direct on the SME arm.

SONY

Sony Corporation of Tokyo,
Tokyo, Japan

Booth 74
Demonstration
Room 117

Tape Recorders—Tapes—Microphones

The Sony Corporation of Tokyo is an internationally known organisation with an unparalleled reputation of leadership in the field of electronics. Their products range from all transistor miniature radio to data recording instruments, and their world firsts include pocket transistor radio, single and two waveband, and all transistor VHF/FM radio.

From the Sony range at this Audio Festival there will be displayed:—

Sony 521. The 521 is the centre of the Sony display. This has a most impressive specification and includes the following features:—

2- and 4-track monaural/stereo record and playback. Frequency response of 30—18,000 c.p.s. at $7\frac{1}{2}$ i.p.s. Flutter and wow less than 0.15% at $7\frac{1}{2}$ i.p.s. Separate channel recording level controls and indicators. Professional mixing facilities. Complete facilities for editing and cueing. Full safety and easy-to-use controls. Advanced rim drive motor principle. All accessories including two dynamic microphones.

Sony 777. This is a professional tape recorder that through advanced engineering provides studio console quality in a compact size. Its specification includes:—

3-motor system—2-speed 4-8 pole Hysteresis synchronous capstan motor and two heavy duty reel motors. Wow eliminator. Special reel retainers permit vertical operation. Push-button electrical control. Three head recording system. All transistor circuit. Separate treble and bass tone controls. Instantaneous monitoring. 8-watt amplifier. Remote control unit and all accessories.

The Sony range of tape recorders is fully comprehensive and other instruments on display include the:—

Sony 362b. A luxury, general-purpose, 3-speed, high fidelity, tape recorder, with every facility of control and specification for home use. It incorporates push-button mixing, earphone monitoring, single control functioning, and a synchronous hysteresis motor for constant tape speeds.

Sony 464. This multi-purpose tape recorder permits 2/4-track monaural recording and playback, and stereo recording with playback through an extension speaker amplifier. Its facilities include mixing and parallel recording, 8 mm. synchronisation, a full technical specification, and instantaneous control.

Sony 262. A compact high quality tape recorder with the specification and features necessary for an exacting user.

Sony 101. This is a full specification, small, light, and compact tape recorder which will take up to a 7 in. reel, and fulfil all the requirements of home use.

Sony 111. A truly portable tape recorder with an outstanding performance for its size, supplied complete with accessories and carrying case.

These Sony tape recorders with tape, microphones, including a condenser microphone C-37A, and speaker systems, are on display, and all visitors will be welcome either at Booth No. 74 or in Demonstration Room 117.

Sole distributors in the U.K.—Tellux Ltd., 44, Brunel Road, Acton, London, W.3. SHE 0333.

SOUNDCRAFT

Reeves Soundcraft Corporation
Great Pasture Road,
Danbury, Connecticut, U.S.A.

Booth 26
Demonstration
Room 218

Magnetic Recording Tape

Soundcraft Magnetics Ltd. are exhibiting in this country for the first time a full range of products manufactured by Reeves Soundcraft Corporation, for which they are exclusive distributors throughout the U.K. and certain Commonwealth countries. Reeves Soundcraft Corporation are one of the three principal manufacturers of Magnetic Recording tape in the U.S.A., and are world famous for their range of magnetic coated film, both fully coated and striped, which are being offered in this country for the first time.

Soundcraft $\frac{1}{4}$ in. audio tapes

Available in two types of Soundcraft Tri-Acetate, Standard and Long Play and two types of Dupont's Mylar (Polyester) Long Play and Tensilised Double Play. Each type is available in 4 separate size reels, 3 in., 5 in., $5\frac{1}{4}$ in. and 7 in. Tapes are provided with coloured Mylar leaders and trailers with metal stop foils.

All $\frac{1}{4}$ in. audio tapes have identical magnetic properties and are coated with exclusive Soundcraft FA.4 formulation, the product of years of development and especially suitable for 4 track recordings where critical track separation is vital.

For professional recording by sound studios Soundcraft can supply $10\frac{1}{2}$ in. fibre glass or metal reels upon special request.

Instrumental tapes

A comprehensive range of Digital and Analogue tapes for specialised applications is available. Soundcraft instrumentation tapes are currently being used in all the major computer systems including equipment made by such companies as Burrough's R.C.A., I.B.M., etc.

Inquiries are invited from interested organisations.

Magnetic Film

Reeves Soundcraft Corporation are the world's leading supplier of magnetic recording film for motion picture work. Films using Soundcraft tape include "Ben Hur," "Around the World in 80 Days," "The King and I." Many T.V. productions have also been produced on Soundcraft film.

Range includes fully coated 16 mm., $17\frac{1}{2}$ mm. and 35 mm., and Soundcraft 35 mm. striped film. All are available on a Tri-Acetate or Dupont Mylar base.

Graphite and Abrasive tapes

Soundcraft are also one of the world's principle producers of graphite coated, double coated, and abrasive tapes. These are available in various widths. Details on application.

Demonstration Room

In the demonstration room the high quality and clarity of Soundcraft tapes will be demonstrated at regular intervals. Demonstrations will be of mono and 4-track stereophonic recordings, and will include tape recordings issued by Music on Tape Ltd. using Soundcraft tape.

U.K. sole concessionaires: Soundcraft Magnetics Ltd., Haddenham, Bucks.

S.T.C.

Standard Telephones & Cables Ltd.,
29-30, Glasshouse Yard,
Aldersgate Street,
London, E.C.1.
CLerkenwell 4511.

Booth 50

Standard Telephones and Cables Limited, who are the leading manufacturers in the United Kingdom of studio grade microphones, will be exhibiting their complete range of instruments:—

4021-J. A moving coil microphone, designed for high quality studio work and particularly suitable for acoustical measurements. Acoustic baffle available to give high frequency directional properties.

4032-G. A very robust microphone, with pressel switch fitted in the handle. Used by commentators and interviewers on radio and television. An all-weather instrument with full marine and tropical protection. Windshield available.

4033-A. This model incorporates two elements, i.e., moving coil and ribbon. By means of a switch at the rear, these elements may be used separately or in combination to give a cardioid response. For stand or boom mounting.

4035-D. A fully tropicalised microphone for general purpose use. When fitted with the 4001-A windshield the wind noise is effectively reduced by approximately 15 db.

4037-A and C. Light and unobtrusive omni-directional microphones, ideal for television interview work, etc. Can also be stand mounted. A windshield is available.

4038-A. A ribbon instrument which is accepted as one of the world's best microphones. It is widely used by the British Broadcasting Corporation and other leading broadcasting authorities. The frequency response is substantially flat from 30-15,000 c/s. It has excellent transient response and extremely low (non-linear) distortion.

4104-A. This is a noise-cancelling microphone for use by broadcast commentators where the highest quality and signal to noise ratio is required.

4105-A. A small, moving coil microphone with a cardioid characteristic. For use in high quality sound reinforcement systems where a high degree of intelligibility and a good feed back margin are required.

4106-A. A wide range cardioid microphone similar in performance to the 4033-A. Designed for broadcasting and recording use. It employs a new plastic diaphragm which is highly resistant to damage.

4108. A high quality electrostatic microphone for studio use. It has an extended frequency response and an accurately maintained cardioid directional response. A special power supply unit with connecting cable is available.

Accessories. A range of accessories and cables for use with S.T.C. microphones will also be shown.

Amplifiers. A newly developed pre-amplifier, type SRPA-1A, having variable tone controls will be included. This feeds low power to a transmission line at 600 ohms or to the 45 or 150 watts power amplifiers produced by S.T.C.

STUZZI

Stuzzi Radiotechnischer Betrieb,
30, Stattermayergasse, Vienna 15,
Austria

Booth 56
Demonstration
Room 114

Type of Equipment : Tape Recorders, Dictating Machines, Tuners, Radios

The Stuzzi Company in Vienna are by way of being pioneers in certain Tape Recording fields and we have worked with them for a number of years. By now some of the Stuzzi products are either partly or wholly made in our own factory in England. In the following we give details of the equipment on show and the countries of manufacture are as follows: Stuzzi Memocord, Stuzzi Tricorder and Stuzzi Stereocord are made in Austria. The Stuzzi Model 201 uses an Austrian Tape Deck but is otherwise made in England. The Stuzzi Junior 4M and the Stuzzi Tape Tuner are wholly made in England.

Some of the accessories for the Memocord are also made here.

- The Stuzzi Memocord.** The world's smallest Tape Recorder in the commercial field. For speech only it is reel driven, average speed 1.3in. per second, frequency range 400 to 4,000 cycles, playing time 1 hour on 4 tracks, size 4½ in. x 3½ in. x 1½ in., weight 11 ozs! Facilities for external Mics. speakers, earphones, transcription leads, etc., and remote control. A Mic. and small speaker are built in. Output power 20mW. Price 25 gns. in presentation case.
- The Stuzzi Tricorder.** Already well known in the Tape Recording world this machine was the first to use 15/16 in. per second satisfactorily including Piano Recordings!! The specification includes: 3 speeds, i.e., 15/16 in., 1½ in., 3½ in. Monitor on record, built in mixer, push buttons with electric pause, variable superimposition, remote control, projector control facilities, etc. It is being demonstrated with the Dictamat attachment which starts the mechanism from sound, i.e., a microphone or even from a telephone adaptor, and stops a few moments after the sound ceases.
- The Stuzzi 201.** This is a new machine entirely. Highlights are: 2 speeds, i.e., 7½ in. and 3½ in., 4 tracks, frequency range 40-14 Kcs., Wow and flutter approximately 0.15% (Papst Motor), counter, superimposition, 9 in. x 5 in. High Flux speaker, etc. Price approximately 45 gns. including microphone and tape.
- Stereocord.** Also new it is a two-track Stereo machine, full specification not available at the time of going to press.
- The Stuzzi Junior 4M.** This popularly priced tape recorder offers the 4 track system, superimposition, straight through amplifier, etc., and is constructed with the B.S.R. Tape Deck. The amplifier is on the latest type die stamped circuit. 26 gns. including microphone and tape.
- The Polycord Junior 4M.** This is the export version of the above.
- The Stuzzi Tuner.** This is a transistorised self contained A.M. tuner for local reception and the stronger foreign stations. Coverage: 190-550 m and 1,500 m pretuned on long waves. The printed circuit contains an H.F. amplifier and diode detector and ferrite rod aerial, etc. There is electrical bandspread and a sensitivity control. £5 9s. 6d. including tax.
- The Minerva AM/FM radio.** Very suitable for Hi-Fi recording or where AM conditions are difficult. Fully transistorised, MW, LW and FM. Price 29½ gns. including tax.

U.K. Distributors: Recording Devices Ltd., 44, Southern Row, Kensington, London, W.10.

TANDBERG

Tandbergs Radiofabrikk A/S,
Kjelsasveien 16, Oslo, Norway

Tape Recorders and Radio Receiver

Booth 24

Demonstration
Room 255

The Tandberg range available in the U.K. consists of the following four models:—

Tandberg Series 6 Stereo Tape Deck (4-track)

This compact unit (15½ in. x 12 in. x 6½ in.) in its handsome Teak case, achieved world-wide fame during 1961. Every firm demonstrating by tape at the New York Hi-Fi Show, who was not a tape recorder manufacturer, used a Tandberg 6. Specially designed for highest quality, 4-track performance when used with the finest amplifiers and speakers, it incorporates a 3-head system and 2-Record and 2-Playback amplifiers, mixing facilities, monitoring off the tape, and "Sound-on-Sound" are special features. Cross-talk rejection 60db. Noise level 55db down. Price 110 gns.

Tandberg Series 6 Stereo Tape Deck (2-track)

This 2-track model 6 was produced "By Special Request" of 2-track enthusiasts (January, 1962). Contrary to the usual practice of producing a 4-track recorder by "hotting-up" an old 2-track model, Tandberg have taken an outstanding 4-track design, with its exacting specification, particularly in respect of Signal to Noise, and fitted 2-track heads. As may be expected, the results are most excellent although the quoted specification differs only slightly from the 4-track model except as regards tape playing time. This deck is most highly recommended where tape economy and the reproduction of 4-track stereo tapes is not a consideration. Cross-talk 70db. Noise level 58db down. Price 110 gns.

Tandberg 3B Monaural 2-track Portable Tape Recorder

Very simple in operation and completely without gimmicks or fancy work. Just an honest-to-goodness monaural half-track recorder, with 3 watts output and Goodmans Speaker. It has an excellent specification, which it can measure up to "With its hands tied behind its back." The handsome magohany cabinet is designed for a permanent installation, yet it is truly portable when placed in its handsome carrying case. Modest in dimensions (15 in. x 11½ in. x 6½ in.) and weighing only 27 lb. with case, its performance far exceeds its size. Noise level 55db down. Price (including case) 76 gns.

Tandberg Huldre 6-22 Radio Receiver and Stereo Amplifier

Housed in a handsome natural teak cabinet designed for use with Tandberg 6 Stereo Tape Deck. In Norway high quality F.M., and long range A.M. performances of programme quality are essential. Hi-Fi equipment, as we know it, is rare and this is not surprising if Table Radios of Hulda quality are available.

This Receiver has an exceptional F.M. performance via two audio amplifiers and special speakers, also Long, Medium, Trawler, and S.W. Bands on A.M. It will reproduce Stereo or Monaural tapes or records (when connected to suitable players) and, in addition, it has unusual features, e.g., plays tape or gram. in one room simultaneously with radio in another. Also acts as intercom. (or baby alarm) on left channel during radio on right channel. Price 100 gns. (including P.T. and surcharge).

U.K. distributors: Tandberg G. B. Elstone Electronics, Ltd., Edward Street, Templar Street, Leeds, 1. Phone 35111.

TANNOY

Tannoy Products Ltd.,

West Norwood,

London, S.E.27.

GIPsy Hill 1131

Booth 39

Demonstration
Room 204

High Fidelity Systems

For more than 30 years the Tannoy Organisation has been one of the few offering a complete range of High Quality Audio Equipment for domestic and professional use. The policy of perfection, rather than price consideration, remains unaltered and, as always, all products are designed and manufactured entirely within the Tannoy Group, thus enabling the most stringent quality control to be exercised at all times.

The Tannoy Range of High Quality Microphones

For more than 25 years Tannoy have been manufacturing high quality microphones of all types, and this vast accumulation of development and manufacturing experience is behind the new range introduced this year. It comprises a single element cardioid, a miniature bi-directional ribbon and the "Slendalyne" moving coil pressure operated omni-directional microphone. All units have a frequency range of 25—14,000 c.p.s., high sensitivity, and are of rugged construction. Their performance recommends them to both the professional user and serious amateur.

The Tannoy Variluctance Phono Cartridge, Mark II, is well established as a standard with many companies manufacturing television and broadcasting studio equipment, and has recently been selected for use in quantity by the B.B.C.

The Tannoy Vari-Twin Stereo Cartridge, Mark II, is designed for the reproduction of stereophonic records in conjunction with equipment of the highest grade. The frequency response extends beyond 16 k/cs and channel separation is in excess of 20 db.

The Tannoy 12 in., 15 in., and III LZ Monitor Dual Concentrics. These dual systems continue to set the standard for high quality loudspeakers. The adoption of these units as listening standards by broadcasting, television, and recording companies throughout the world, is an indication of their supremacy.

Tannoy Loudspeaker Enclosures. The Guy R. Fountain Autograph Enclosure provides both front and rear horn loading for the 15 in. Dual Concentric unit. It makes use of the exclusive Tannoy expanding source principle and gives reproduction of the highest quality where space is not an important consideration.

The G.R.F. Enclosure has many of the advantages of the Autograph, but is of smaller size, thus increasing its appeal. This enclosure provides horn loading and is fitted with a 15 in. Dual Concentric, being used by many leading British record manufacturers and television companies as a quality standard.

The introduction this year of a rectangular free-standing version still further increases the versatility of this unit.

The York and Canterbury are dual ported, bass reflex, enclosures, of simple design, suitable for home construction and give excellent results.

The Chatsworth Enclosure is a critically damped infinite baffle, suitable for either 12 in. Monitor or the III LZ Monitor, it is available either as a corner cabinet or a rectangular free-standing cabinet.

The III LZ Enclosure is designed specifically for the new III LZ Monitor Unit. It is sufficiently small to be placed on a shelf or small table, but nevertheless, provides outstanding reproduction over the entire audio frequency range, extending to well below 40 cycles in the bass.

TELEFUNKEN

Telefunken G. M. B. H.,
Hanover Linden, Göttinger Chaussee 76,
West Germany

Booth 62
Demonstration
Room 242

Tape Recorders

Telefunken have the enviable distinction of having originated tape recording; now, as for many years past they supply their equipment to Europe's major broadcasting stations. They are world renowned for fine design and quality and in this year's show present an entirely new series for the enthusiastic beginner or the studio professional.

The new range consist of:

Telefunken Magnetophon 95

An exceptionally versatile and simply operated recorder with special facilities for trick recording and effects.

Three Tape Speeds: $7\frac{1}{2}$, $3\frac{3}{4}$ and $1\frac{7}{8}$ i.p.s.

Frequency Response: 30-18,000 c.p.s. at $7\frac{1}{2}$ i.p.s. 30-16,000 c.p.s. at $3\frac{3}{4}$ i.p.s. 30-9,000 c.p.s. at $1\frac{7}{8}$ i.p.s.

Playing Time: 8 hours at $1\frac{7}{8}$ i.p.s. on 7 in. DP Tape.

Twin-track to International Standards. Maximum spool size 7 in. Automatic tape end stop on recording and playback. Automatic extra-sensitive braking and tape tension control system ensures long life for tapes and heads. Separate controls for recording and playback. Tone control. Price 59 gns. (excl. microphone).

Telefunken Magnetophon 96

Same basic style and technical specifications as Magnetophon 95, plus the exciting advantages of Four-Track Recording. Playing time over 16 hours on 7 in. DP tape. Multiple transcription from one track to another. Facilities for playback of pre-recorded stereo tape through additional amplifier or radio.

Price 69 gns. (excl. microphone).

Telefunken Magnetophon 97

This stereo tape-recorder provides not only the outstanding facilities of the four-track system with its many possibilities for transcribing and trick-effects, but also the twin-channel stereo four-track technique for recording and playback. Speeds, frequency response, and spool size are the same as the Magnetophon 95. Extra speaker in lid for stereo playback. Playing time 16 hours monaural, and 8 hours stereo operation at $1\frac{7}{8}$ i.p.s. on 7 in. DP tape.

Magnetophon 85KL

This well-established model will also be on show. Tape speeds $7\frac{1}{2}$ i.p.s. and $3\frac{3}{4}$ i.p.s.; frequency response 30-20,000 c.p.s. \pm 3dB at 30-15,000 c.p.s. 6-watt push-pull power stage. Separate Bass and Treble controls.

Price 79 gns. (excluding microphone).

Telefunken Magnetophon M24 Semi-professional Recorder available in 4 versions from 169 gns. to 192 gns., is on show together with a range of Telefunken Studio Recording Equipment.

U.K. Agent: Welmec Corporation Limited, 147/148, Strand, London, W.C.2; TEM 3357.

TEPPAZ

Teppaz S.A.,
170, Boulevard de la Croix Russe.
Lyon, France.

Booth 45
Demonstration
Room 222

Sound Reproduction Equipment

Oscar Stereo

Full stereo portable record player mains operated; 4-speed turntable; double amplifiers; 3 watts output each channel; 7 in. speaker and tweeter in each detachable "Spatio Dynamic" baffle lid. Retail price (U.K. only), 39 gns. inc. tax.

Oscar Record Player

Mains operated; 4-speed turntable; 3 watts output; valves; 2 (UCL82, UY85); bass and treble controls; 7 in. "Spatio Dynamic" speaker in detachable lid. Size $13\frac{1}{2}$ in. x 11 in. x $6\frac{1}{4}$ in. Weight, 10 lbs. Finish: Grey or Beige leatherette. Retail price (U.K. only), $19\frac{1}{2}$ gns., inc. tax.

Presence Record Player

Mains operated; 4-speed turntable; 3 watts output; valves: 3 (EBF80, EL84, EZ80); bass and treble controls; 7 in. "Spatio Dynamic" speaker in detachable lid. Size 14 in. x 11 in. x $6\frac{1}{4}$ in. Weight, 11 lbs. Finish: Pigskin, Parchment, Black or Green. Retail price (U.K. only), 24 gns., inc. tax.

Octave Record Player

Mains operated; 4-speed turntable; 4 watts output; valves 3 (EF86, EL84, EZ80); independent bass and treble controls; 2-7 in. "Spatio Dynamic" speakers in detachable lid; coaxial socket for stereo operation. Fitted with stereo pick-up. Size: 13 in. x 10 in. x 6 in. Weight: 13 lbs. Finish: Pigskin, Grey, Tweed or Blue leatherette. Retail price (U.K. only), 36 gns., inc. tax.

448 Stereo Record Player

The complete portable stereo record producer; 4-speed turntable; double push pull amplifier; 6 watts output each channel; valves 6 (4 x ECL82, 2 x EF86); independent bass and treble controls and balance control; 2-7 in. speakers and a tweeter in each detachable "Spatio Dynamic" baffle lid. Size: $18\frac{1}{4}$ in. x 13 in. x 10 in. Weight: 22 lbs. Finish: Pigskin or Blue. Retail price (U.K. only), 72 gns., inc. tax.

Also ECO portable playing units in carrying cases; and ECO turntable units for mains, battery and stereo, and high fidelity amplifiers and speaker cabinets.

Sole U.K. distributors: Selecta Gramophones Ltd., Southwark Bridge Road, London, S.E.

T.D.B.

Thompson, Diamond & Butcher Ltd.,
Tramway Avenue,
Stratford, London, E.15.
MARYland 5588

**Lounge
Trade
Room 335**

Wholesale Distributors of Audio Equipment

Thompson, Diamond & Butcher Ltd., the first wholesalers to take space in their own right at the International Audio Festival and Fair, welcome all Trade friends visiting the exhibition. In room 335 they put at their disposal a comfortable, quiet lounge in which to rest and talk. Having connections with the gramophone, records, radio and television industries practically since their inception, T.D.B. have had a special department to handle the Hi-Fi side. All leading makes are available, including amplifiers and tuners by Acoustical, Chapman, Grampian, Leak, Lowther, Rogers, W.B., speakers by Acoustical, Goodmans, Leak, Lowther, Philips, Rogers, W.B., Wharfedale, gramophone units, etc., by Connoisseur, Philips, Garrard, Goldring, Styli, cartridges, pickups and replacement accessories by Acos, B. & O., Decca, E.M.I., Ortofon, S.M.E., Shure, tape decks by Brenell, Ferrograph, Telefunken, Truvox, microphones by B. & O., Grampian, Shure, Reslo.

Large stocks of all popular Hi-Fi items are carried in the new T.D.B. headquarters at Stratford. From here four deliveries to the West End of London are made every day and goods for other centres despatched the same day. Urgent orders being sent by passenger train.

All the other services expected from an efficient distributor such as calls by knowledgeable representatives, provision of a comprehensive trade catalogue, telephone order service, etc., are all second to none from Thompson, Diamond & Butcher, a firm within the Rank Organisation.

TRUVOX

Truvox Ltd.,
Neasden Lane, N.W.10.
Dol 8011.

Booth 44
Demonstration
Room 336

Tape Recording Equipment.

Truvox features tape units in the "Series 80."

Vindicating our insistence on quality, the "Series 80" has proved an outstanding success; without increasing our prices, we have improved substantially the range and facilities of our products.

Our recorders, equipped with auto-stop, trick switch, recording lead, full and empty reels of tape and microphone, offer outstanding value at their price, discreet appearance and excellent performance.

Here, however, **Truvox** demonstrate the remarkable range of Six Tape Units in the "Series 80." The audio enthusiast, who wishes to add tape facilities to his equipment does not always require a complete recorder. With this in mind, we designed two Tape Units, twin and four track, comprising Deck, pre-amp. and record amplifier, push-pull erase/bias oscillator and self-contained mains power supply, all mounted in an attractive plinth and ready for easy connection to existing apparatus.

For Education Authorities, who require an accurate recording Meter and Jack sockets on the front of the unit, we designed a special model, again in twin track and four track versions. Continental or phono sockets can be fitted to special order. These units are being used by professional people, and offer outstanding performance (we nearly said incomparable).

Finally, and in time for the Audio Festival, we introduced our Stereo Tape Unit. Impossible to describe in these few words the variety of facilities provided by this remarkable machine—we hope to welcome you at our demonstration to give you some idea. Suffice it to say that you **could** (if you wanted) record on Track 1, transfer it to Track 3, then back again without any audible loss of quality. Full mixing facilities are operative during recording and re-recording. Record level indication is by meter for either or both channels. Twin and quarter track versions available. Full technical specification and advice from our Booth, Demonstration Room or Sales Office.

Recorders: R82—Twin track 55 gns. R84—Four track 59 gns. Fitted with auto-stop, trick switch and supplied with microphone, 7" full an empty reels of tape and record lead.

Tape Units: PD82—Standard twin track, £42. PD84—Standard Four track, £46. PD83—Professional twin track, £48 10s. PD85—Professional four track, £52 10s. PD86—Stereo. Quarter track, £63. PD87—Stereo. Twin track, £63. Fitted with auto-stop, trick switch, supplied with record lead and empty spool.

Decks: D82—Twin track heads, 25 gns. D84—Four track heads and track/stereo switch, 28 gns. D86—3 heads, Quarter track, 32 gns. D87—3 heads, Twin track, 32 gns. Auto-stop 57/6d. extra. Trick Switch 8/- extra.

VITAVOX

Vitavox Ltd.,
Westmoreland Road,
London, N.W.9.
COLindale 8671.

Booth 25
Demonstration
Room 337

Loudspeaker Systems, Loudspeakers, Microphones.

Vitavox Limited have, for more than a quarter of a century, specialised in the design and manufacture of loudspeakers and microphones of the highest quality. Many cinemas all over the world are equipped with Vitavox loudspeakers. There is scarcely a ship in the Royal Navy that does not contain Vitavox loudspeakers and microphones, and it would be invidious to pick out individual names from the large number of other military and industrial organisations and entertainment projects using Vitavox equipment. The quality, reliability and "know-how" that stems from the experience gained in designing and manufacturing such equipment is reflected in the wide range of industrial and domestic loudspeakers and loudspeaker systems made by Vitavox and available to the enthusiast who demands true high fidelity.

Vitavox booth displays a wide range of products from small hand microphones used for high quality speech, from small high frequency tweeters up to the "Hallmark" and "Bitone" loudspeaker systems for both monophonic and stereophonic reproduction. Included in the display are Balance Control Units, Dividing Networks for dual channel systems, High Frequency Horns, General Purpose Pressure Units, the superb Type S1 High Frequency Pressure Unit and a wide range of cone-type loudspeakers, including the famous DU120 Duplex Co-Axial Full Range unit.

In the Demonstration Room No. 337 can be heard the Vitavox Klipschorn—the ultimate in loudspeaker systems, as well as the "Hallmark" loudspeaker system which provides exceptionally high quality of both monophonic and stereophonic recordings. Technical enquiries can be dealt with and literature obtained from Room No. 339.

VORTEXION

Vortexion Ltd.,
257-263, The Broadway, Wimbledon,
London, S.W.19
LIB 2814

Booth 73
Demonstration
Room 145

Audio Equipment

The Vortexion C.B.L. recorder is the latest stereo version of the twin C (recorder) using "B" type monitoring with mixing of inputs, stacked heads and over 6 watts total output. All the usual features of the "B" recorder are retained, including metering of bias and signal plus the ability to record the signal from one track to the other together with additional signals from the mixed inputs. The separate 30/50 ohm microphone inputs allow for the microphones to be placed at any distance apart according to the result required. The right-hand channel may be switched off entirely when only single-channel working is desired.

A new type tape recording and playback mixer with extremely low distortion and having monitoring and playback facilities together with metering of adjustable bias and signal. By throwing a switch the signal before recording may be compared with the signal after recording and since separate sockets are provided for the erase outlet, the record outlet and the playback input can be used to collect a signal from one deck or projector and record it on to another, together with the mixed inputs. These inputs with separate tropical controls are for 30-50 ohm microphone, P.U., radio or Auxiliary and Echo.

The recording amplifier has less than .1% distortion and together with the push-pull erase and bias oscillator and metering valve may be switched off when not recording.

It can be supplied for alternative head impedances to match the heads of magnetic projectors or alternative tape decks. The output from either before record or after record is 1 to 2 volts from separate cathode followers in each case.

The response is better than 3db 20 cps to 15,000 at 7½ in. with first-class record-playback heads.

A stereo version of this unit will be available with facilities for recording the signal from one track to the other with additions from the mixed inputs.

FOUR CHANNEL ELECTRONIC MIXER

This is a studio quality electronic mixer suitable for any climate. The controls are hermetically sealed, and great care and selection of components to make certain reliable low noise operation, and individual screens prevent break-through. The built-in power transformer is screened and potted, and all the microphone transformers are individually potted in selected heavy gauge Mumetal boxes. Front or rear inputs and outputs may be obtained to order. The normal output is .5 volt, 1 mv 600 ohms also available.

WAVERLEY RECORDS

Geo. Jeffrey Ltd.,
23, Earl Grey Street,
Edinburgh 3.
Edinburgh FOU 8389.

Booth 51
Demonstration
Room 221

Gramophone Records.

Waverley Records, a young and relatively small record company, has two major aims to fulfil. The first, to present Scottish artists playing Scottish music, and complying with this policy are the records of Scottish Dance Music, Gaelic and Scottish Songs and Pipe Music, which have proved so popular.

The second aim of the company is to record artists and material essentially connected with Scotland, although not necessarily Scottish. Into this category fall the records of The Scottish National Orchestra, The Edinburgh Quartet, the inspiring live performances of The Edinburgh Military Tattoos, the witty Roy Guest in the now famous "Howff" on Edinburgh's Royal Mile, and, of course, not forgetting Waverley's first issue "A Festival of Edinburgh."

There is a wealth of recording talent in Scotland, and it is Waverley's intention to seek it out and present it to the record-buying public both at home and abroad.

Future plans are ambitious, and with the opening of new and modern studios this summer, both the executive and technical staff look forward with excitement to realising these ambitions.

During our 20-minute programmes being presented in Demonstration Room 221, excerpts from various Waverley discs will be played. As an added attraction, coloured views will be screened to illustrate the recordings chosen.

WHARFEDALE

Wharfedale Wireless Works Ltd.,
Idle, Bradford, Yorkshire.
Idle 1235-1236.

Booth 38
Demonstration
Room 334

*Loudspeakers, Enclosures, Transformers, Volume Controls
and Accessories.*

Many of our loudspeakers have undergone change in recent months and the latest addition to our range of cabinet models is the Slimline 2. This is a two speaker system which takes up little space and is reasonable in cost, and uses Polystyrene diaphragms.

In our range of speaker units the W12/RS and RS/12/DD introduced last year have been well received and this prompted us to modify the Super 12 to include the roll surround and double diaphragm. Similar modifications are now being made to the W10/FSB and Golden/FSB. The new designations of these units will be the Super 10/RS/DD and Golden 10/RS/DD. All are fitted with aluminium speech coil, which together with the special tweeter diaphragm gives an excellent balance to the improved bass response of the roll surround. The latter enables the units to be used in small enclosures and yet give adequate bass response. Constructional details of recommended cabinets are available.

A comprehensive range of these products is on show at our booth No. 38 and demonstrations of the Slimline and our other cabinet models, including the now well established Airedale speaker, can be heard in our demonstration room No. 334.

WHITELEY

Whiteley Electrical Radio Co. Ltd.,
Victoria Street, Mansfield, Notts
Mansfield 1762

Booth 33
Demonstration
Room 322

Loudspeakers, Amplifiers, V.H.F. Tuners, Ready to Assemble Cabinets.

W. B. Stentorian High Fidelity Products will be displayed and demonstrated. These products are manufactured by the organisation with over thirty-five years' experience in high quality sound reinforcement equipment.

The comprehensive range of STENTORIAN loudspeakers includes units varying in size from 1½ in. in diameter to 18 in. diameter and these units are available with a variety of cone construction, speech coil impedance and magnet strength to suit all requirements. Following the success and acceptance of the 8 in. and 10 in. units fitted with 16,000 gauss magnets, a complementary 12 in. unit has been designed. This unit is fitted with a specially designed cone and suspension and has an aluminium voice coil. A selection of these loudspeakers is being demonstrated in examples from the wide range of ready-to-assemble cabinets.

The ready-to-assemble cabinets are designed for use with STENTORIAN Loudspeakers. These cabinets are available in sapele mahogany or walnut finish and when assembled form attractive items of furniture. The cabinets are easily assembled, the only tools required being a screwdriver.

The requirements of stereophonic reproduction are catered for by the normal floor cabinets and by the SENIOR and JUNIOR COLUMN Enclosures and by the CLUMBER Compact Loudspeaker System. This latter unit is available complete in a cabinet and may be mounted horizontally or vertically, and is ideal where space is limited.

To enable users of W.B.12 amplifiers to convert to stereophonic systems a stereo control unit has been introduced which can be used with either two W.B.12 MAIN AMPLIFIERS or the W.B.8S STEREO AMPLIFIER. The W.B.12 AMPLIFIER and tone controls and the W.B.8 AMPLIFIER are, of course, still available together with the Mk. II V.H.F. tuner and an alternative switched tuner with present controls.

WYNDSOR

WyndSOR Recording Co. Limited
WyndSOR Works, 2, Bellevue Road,
Friern Barnet, N.11
Enterprise 2226/7

Booth 32
Demonstration
Room 261

Tape Recording Equipment

WYNDSOR Recording Company again comes to the International Audio Festival and Fair on a wave of success. This Company's history, as one of the first manufacturers of domestic tape recorders some 12 years ago, is currently enhanced by the recent completion of what is probably the largest export order ever received by an English manufacturer of tape recorders.

Never content to rest on laurels the WyndSOR design and development team have now created the WyndSOR "International," one of the most interesting new tape recorders at this year's Festival and Fair. It fills a need often expressed but never before satisfied: a complete tape recorder unit to the requirements of many professional users and the most fastidious enthusiasts.

Representatives from many countries have already expressed great interest in the WyndSOR "International" (which has been designed to operate at specified voltages throughout the world) and are coming to the Fair to see it for the first time.

What makes the WyndSOR "International" so exciting is its conception: a domestic tape recorder designed as closely as possible to professional requirements. The deck is arranged to work in the vertical plane, so that the operator can use the "International" as an adjunct to his main purpose whilst taking up a minimum of his working area. And the unusual feature of having the speaker (8 in. round with aluminium voice-coil) facing away from the operator, facilitates, say, a lecturer operating the tape recorder with the sound directed towards his audience. Or it stands easily on a shelf or rack with the sound diffusing from the rear. Convection ventilation has been closely considered and is highly efficient, due in no small measure to the vertical layout.

The WyndSOR "International" has separate high and low impedance inputs, and independent outputs for stereo playback, high impedance and extension speaker. A recording level meter is incorporated. The "International's" technical specification is impressive, but true. There is carrying capacity for the ribbon microphone (inclusive in the price) and several reels of tape.

It is easy to see how WyndSOR has become the name it has. It is even easier to hear (in Demonstration Room 261 on the second floor, for instance). "Hearing is believing" could very well be the WyndSOR motto.

ZONATAPE

Zonal Film (Magnetic Coatings) Ltd.,
Zonal House, Westfields Road, Acton, W.3
ACOrn 6841 (10 lines)

Magnetic Tapes

Remarkable success has been achieved in the 12 months since we added ZONATAPE recording tape to our range of magnetic film and striping facilities.

Each grade of ZONATAPE is easily identified by the coloured spool and all are packed in distinctive, hard-wearing boxes.

ZONATAPE

Acetate Grade 500: Clear spools. All sizes 3 in. to 10½ in. High quality diacetate base for users subject to a tight budget.

Standard Grade 600: Red spools. All sizes. High grade PVC base.

Extra Play Grade 700: Green spools. All sizes.

Double Play Grade 800: Blue spools 5 in. and 7 in.

Professional Grades available on NAB or 7 in. plastic spools.

Grade 900: PVC and Polyester. Standard and Long Play. Special 1½ thou. polyester low print professional tape.

Professional recordings made on ZONATAPE can be heard in our Demonstration Room No. 236.

Booth 42
Demonstration
Room 236

Vortexion



*quality
equipment*

The Vortexion C.B.L. Recorder is the latest stereo version of the twin C (recorder) using "B" type monitoring with mixing of inputs, stacked heads and over 6 watts total output. All the usual features of the "B" recorder are retained including metering of bias and signal plus the ability to record the signal from one track to the other together with additional signals from the mixed inputs. The separate 30/50 ohm microphone inputs allow for the microphones to be placed at any distance apart according to the result required. The right hand channel may be switched off entirely when only single channel working is desired.

The Vortexion Super/30/50 Watt Amplifier is an extremely versatile unit capable of delivering 50 watts at 30 cps to 20,000 cps at .2% distortion. One model has tone controls and 4 inputs which may be any combination of microphone (low impedance), guitars or P.U. inputs. The outputs are for 4-7, 5-15 and 250 ohms or 100 volt line.

Other items of our manufacture are:—

WVA Recorder

WVB Recorder

Erase Fader units for recorders

2 way 30/50 ohm in and out stud type Mixers

3 way Mixers and Peak Programme meter

4 way Mixers

12 way Mixers

2 x 5 way Stereo Mixers

4 way Mixer with 10 watt output and tone controls

Record and Playback Mixer

VORTEXION LIMITED

257-263 The Broadway, Wimbledon, London, S.W.19.

Telephones: LIBerty 2814 and 6242-3. Telegrams: "Vortexion, Wimble, London."

THE BUTOBA

TRANSISTOR BATTERY/MAINS TAPE RECORDER

ONLY THE BUTOBA
HAS ALL THESE FEATURES



MODEL MT 5

66 GNS. including connecting
lead and empty spool

Experts are unanimous in acclaiming the
Butoba as the finest machine of its kind on
sale today.

- 1 5in. tape, giving up to 4 hours playing time.
- 2 High fidelity frequency range.
- 3 7in. x 5in. speaker and 1.2 watts output.
- 4 Adjustable treble control on recording and play back.
- 5 2 speeds.
- 6 Monitoring of both radio or mike recordings.
- 7 High quality steel deck, life lasting ball bearings and dynamically balanced 5in. flywheel all give lowest wow level and flutter.
- 8 High sensitivity level.
- 9 Extremely low noise level. No more than on expensive mains machines.
- 10 Light in weight—12lb. complete with batteries. Economic battery life—up to 100 hours.
- 11 Mains converter for home use.
- 12 Prompt service facilities.

SEE IT ON BOOTH 40

HEAR IT IN DEMONSTRATION ROOM 118

Advance details of the Butoba MT5 and new Butoba models to be released at the Show, available from:

DENHAM & MORLEY LTD.

DENMORE HOUSE, 173-175 CLEVELAND STREET, LONDON, W.1

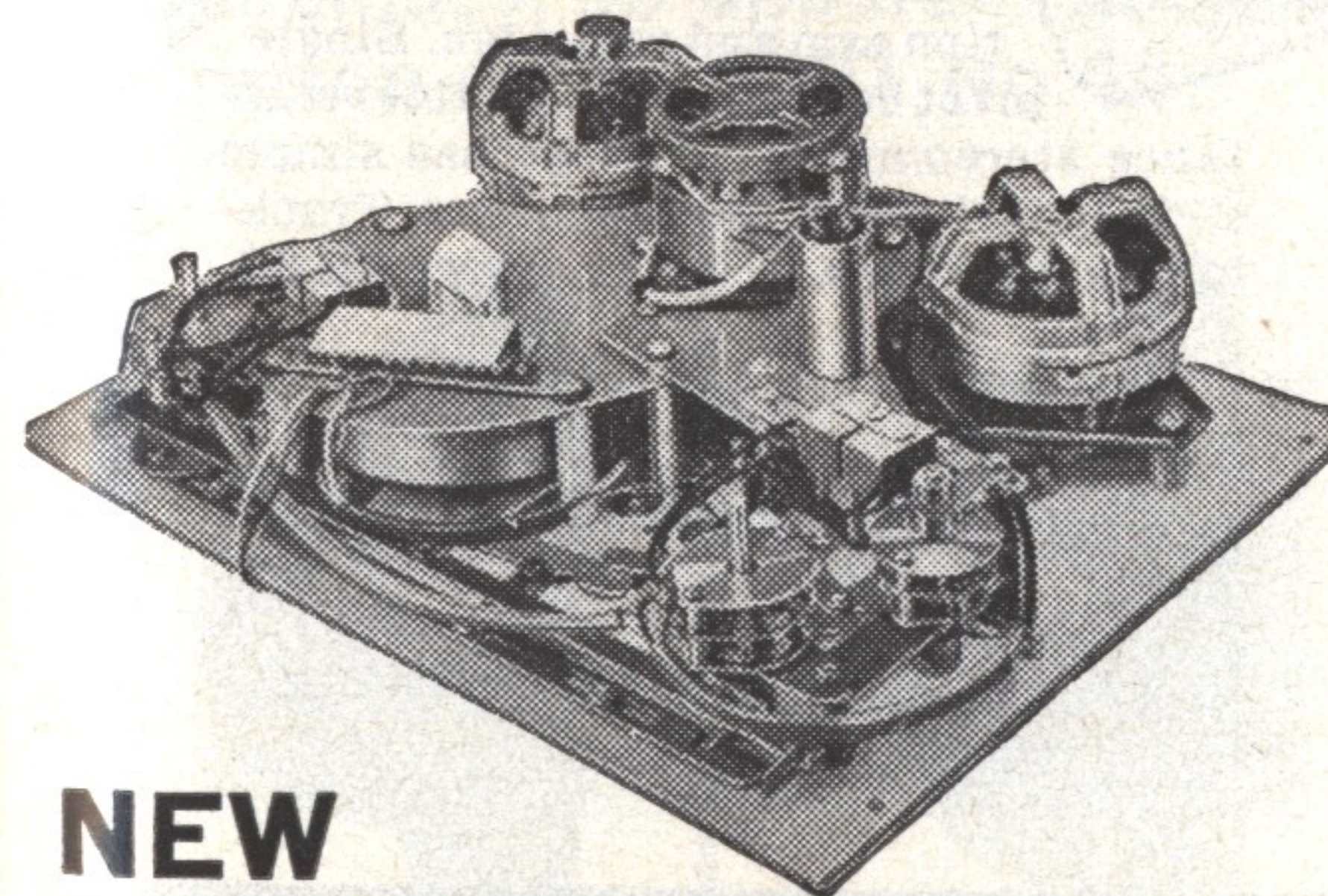
Telephone: EUSton 3656-7

STAND No. 70 DEMONSTRATION ROOM No. 259

**THE
BEST
OF BOTH
WORLDS**

Brenell Mk. 5 Deck

4 recording speeds $1\frac{1}{2}$, $3\frac{1}{2}$, $7\frac{1}{2}$ and 15 ips. Permits use of $8\frac{1}{2}$ in. reels (3,600ft. of D.P. tape at $1\frac{1}{2}$ ips., plays for over 12 hours): 3 independent motors. Interlocked controls. Pause control. Digital rev. counter. Fast rewind (1,200ft. in 45 secs.). Provision for extra heads. **28 GNS.**



NEW

Brenell Mk. 510 Deck

A recent introduction is the modified Mk. 5 Deck which will accommodate $10\frac{1}{2}$ in. N.A.B. and standard spools. All other features remain as before. It is available in either Hammered Gold or Hammered Grey finish for use on 200/250V 50c/s mains supplies only. The additional cost is **7 GNS.**

Brenell

Sole Manufacturers:

BRENELL ENGINEERING CO. LTD., 1a Doughty Street, London, W.C.1.

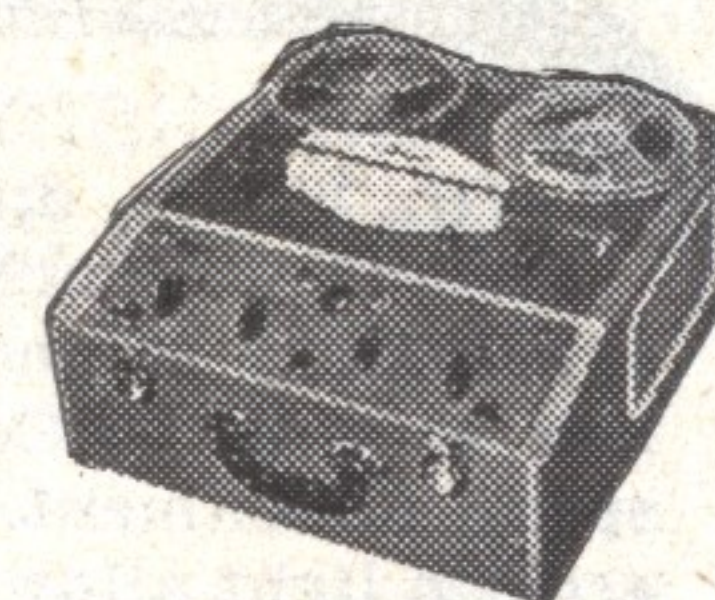
Telephone: HOLborn 7356 (3 lines).

That is what you can expect when you buy a Brenell tape deck or recorder—top quality performance and versatility at a reasonable price. The Mark 5 deck at 28 gns., the Mark 5 recorder at 64 gns. or the 3 Star Stereo at 89 gns., are all unbeatable in their class. Mere illustrations can only show the functional appearance of these machines, but a practical demonstration will reveal the realism and beauty of recorded sound obtainable from a Brenell recorder. Ask your specialist dealer for a demonstration and you will hear what we mean.

All Brenell tape decks and recorders are fitted with an hysteresis synchronous capstan motor with an outer rotor and a large statically and dynamically balanced flywheel. This drive system is widely regarded as the most efficient for use in tape recorders and "Wow and Flutter" are reduced to below .1% at $7\frac{1}{2}$ ips.

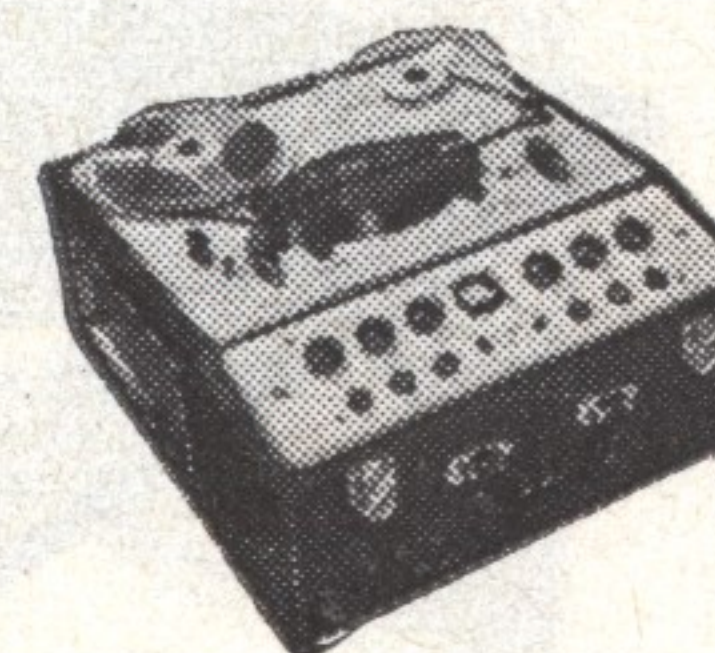
Brenell Mk. 5 Recorder

The professional choice. Has all the remarkable performance features of the Mk. 5 deck, plus monitoring facilities, complete record / playback amplifier with power unit, coloured signal lights, selective frequency correction at $3\frac{1}{2}$, $7\frac{1}{2}$ and 15 ips. **64 GNS.**



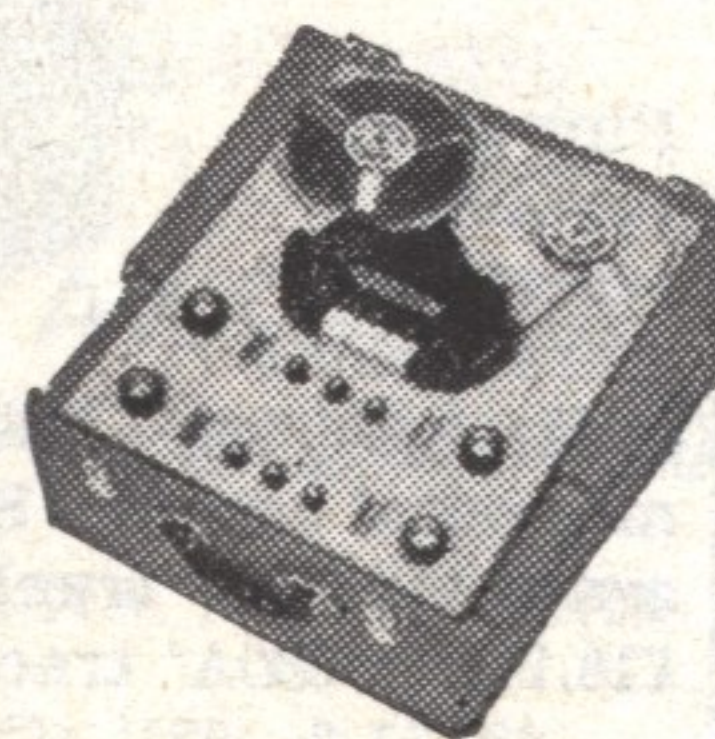
Brenell Mk. 5 Type 'M'

A development of the Mk. 5 giving facilities for mixing, superimposing and tape monitoring. Two separate amplifiers are provided for recording and replay and an accurate Recording Level meter ensures recordings of unvarying quality. **88 GNS.**



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3 speeds. Stacked heads. Records and replays stereo. Extended frequency range. For monaural work, half track erasure is used. Exceedingly low cross talk of -60 db. Plays directly from pick-up — Stereo or Monaural. Two recording level indicators. Two internal speakers. **89 GNS.** With two microphones. **95 GNS.**





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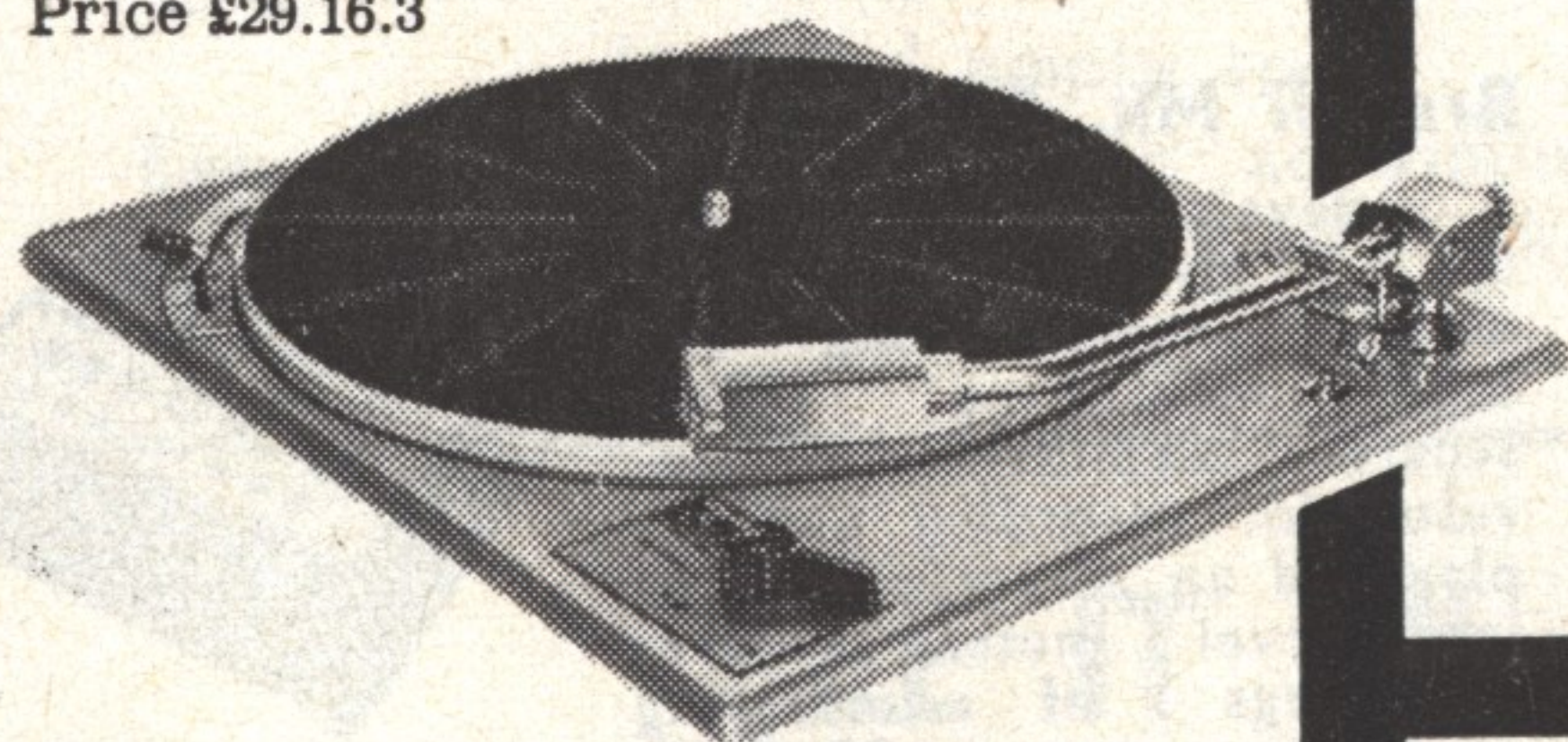
BOOTH 53

Dem. Room 215

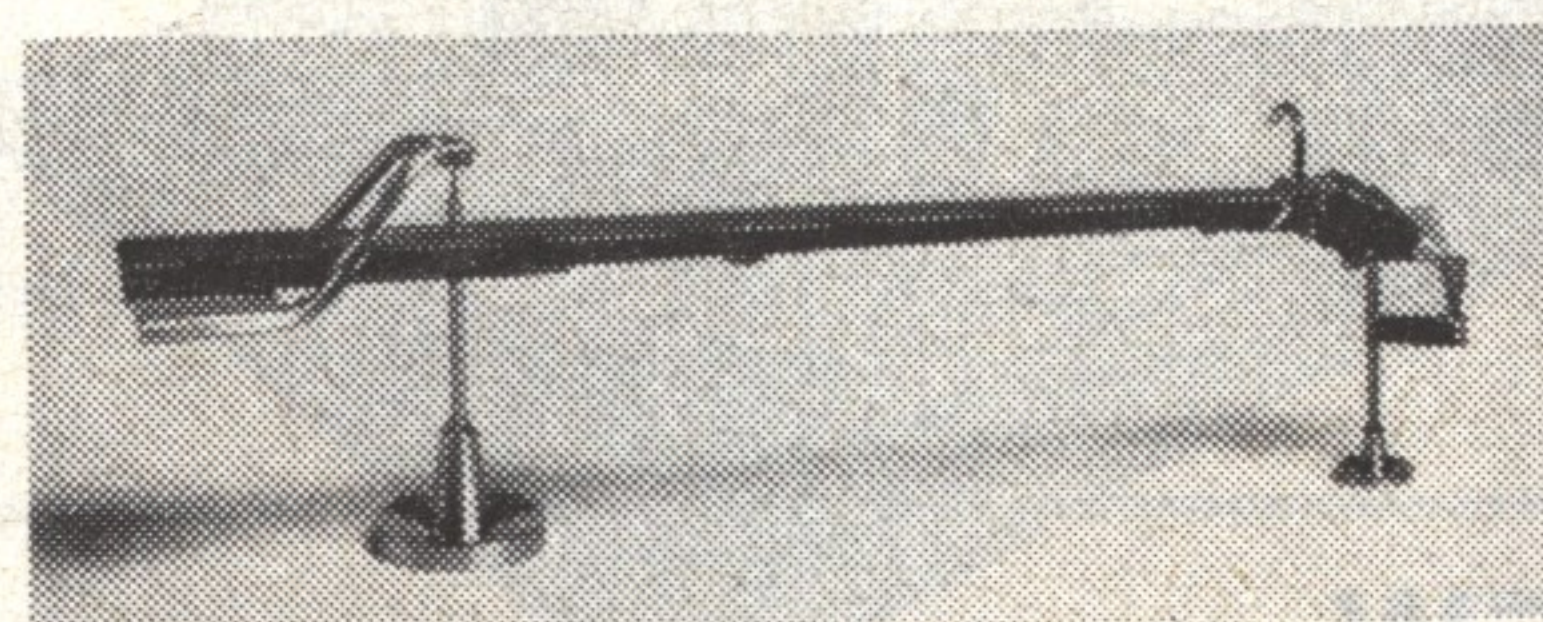
GL. 58
Continuously
variable speed
control. Wow and
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0.5%. Transcription
arm wired for stereo
or mono. Unique groove
selection device . . .
Price £18.4.5.



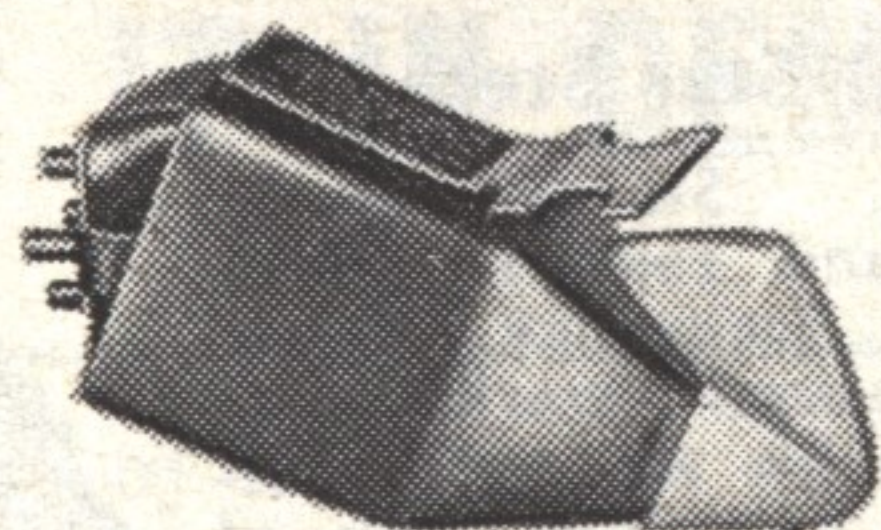
GL. 70. 8lb. die cast turntable,
accurately machine finished and
dynamically balanced. Wow and flutter
less than 0.2%. Continuously variable
speed adjustment. L.70 transcription
arm, in light alloy with nylon bearings.
Extremely low tracking error. . . .
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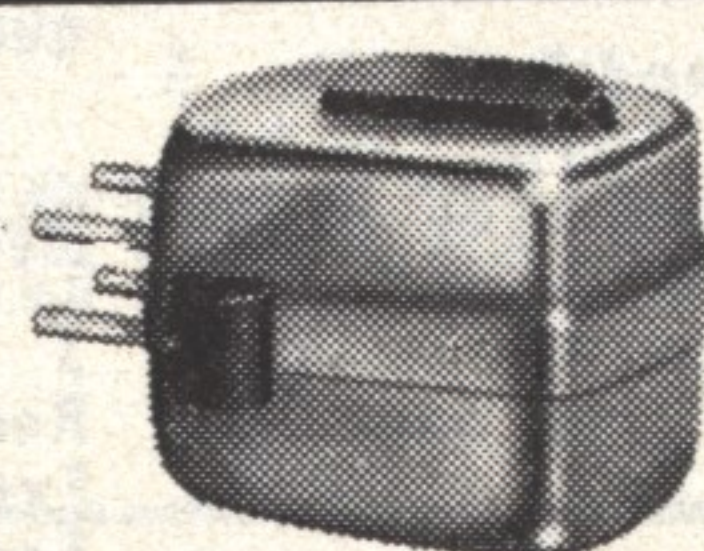
Pickering Model 198 Uni-
poise integrated transcrip-
tion arm and cartridge. Single
pivot bearing. The variable reluc-
tance stereo/mono cartridge has simple
slide-in stylus changing facilities. Track-
ing weight 2 gms. . . . Price £58.8.8.



Pickering
variable
reluctance
stereo/mono

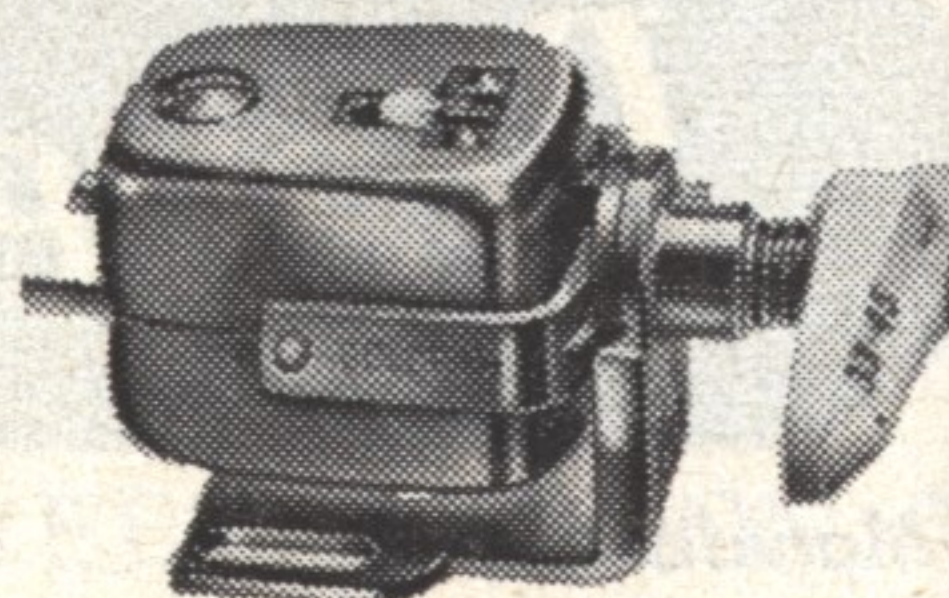


cartridges '380', '380A' and '381'. Sealed
mu-metal capsule. Simple slide-in stylus
assembly. '380' tracking 4 gms. . . . Price
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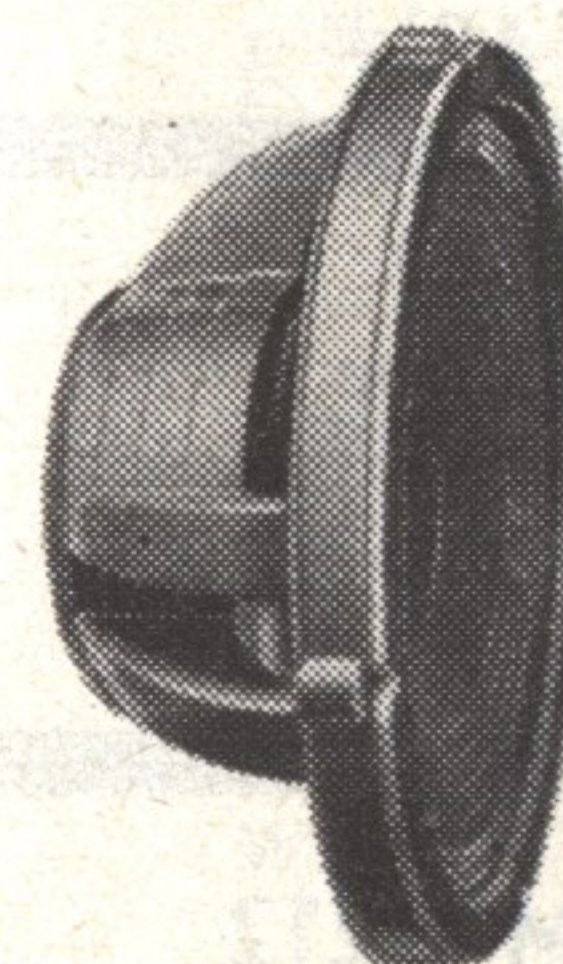
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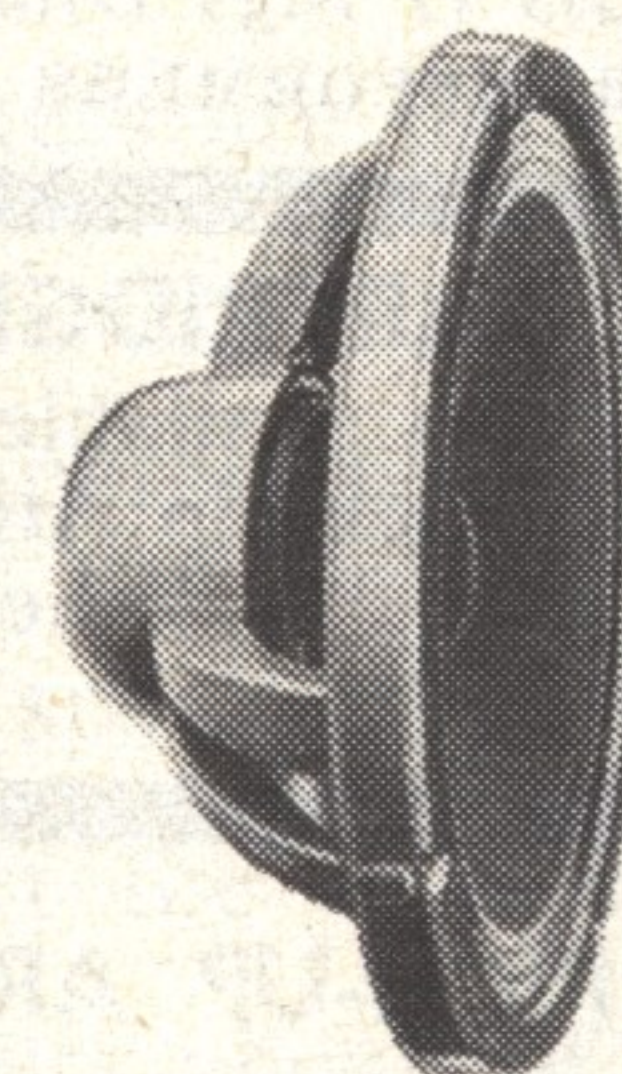


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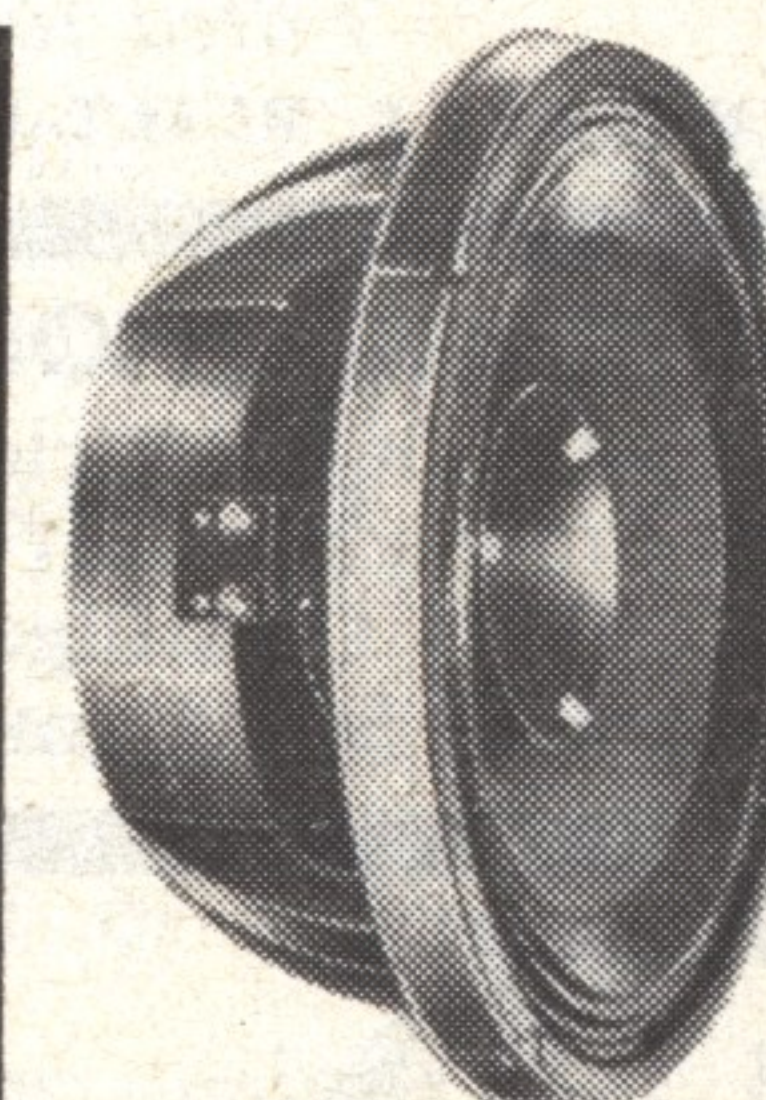


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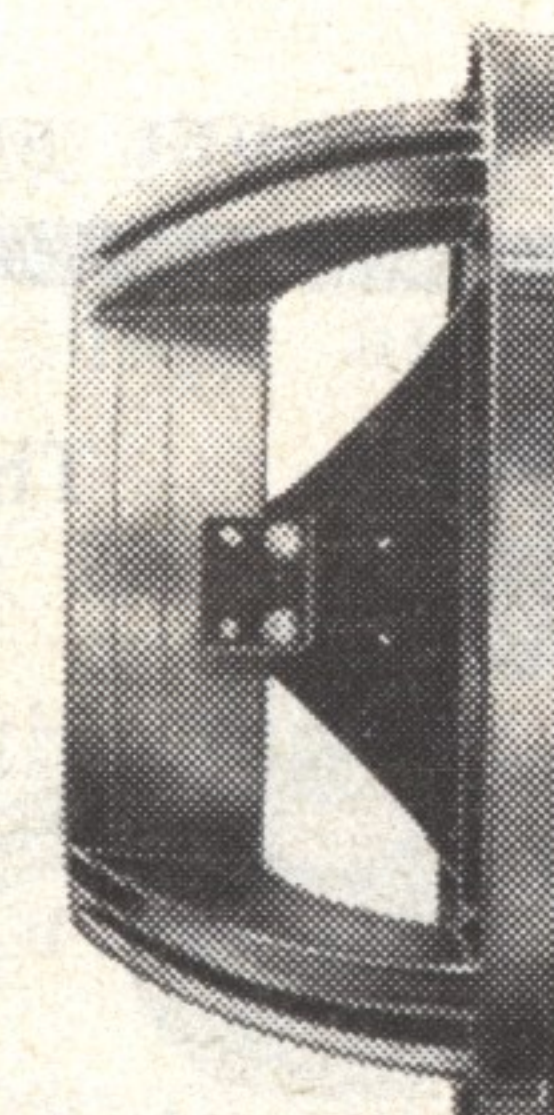


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MODEL SPU-G/T (STEREO) CARTRIDGE

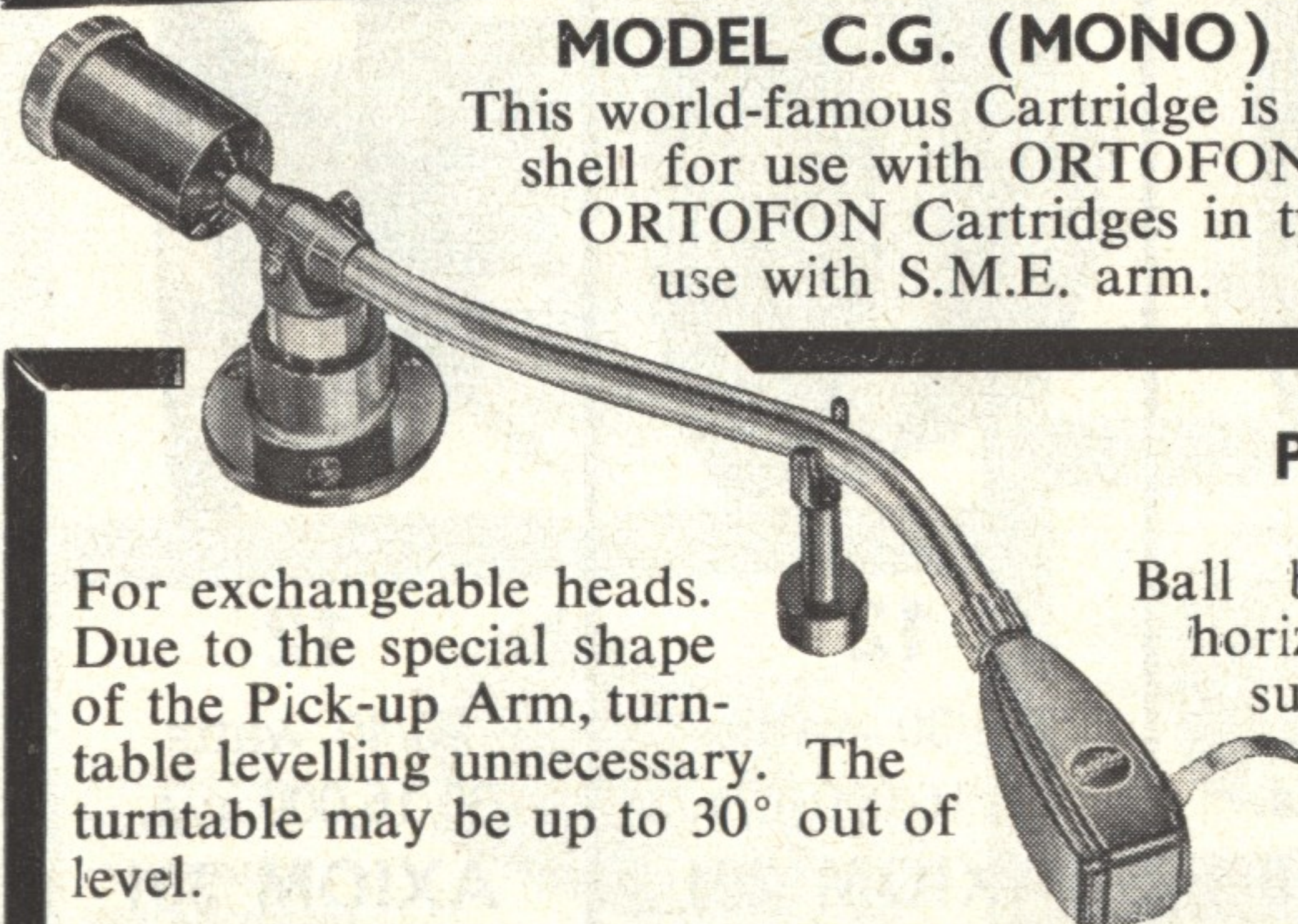
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Fitted low mass (1 mg) Diamond Stylus

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MODEL C.G. (MONO) CARTRIDGE

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PICK-UP ARM SMG-212

For exchangeable heads. Due to the special shape of the Pick-up Arm, turntable levelling unnecessary. The turntable may be up to 30° out of level.

Ball bearings are applied for both horizontal and vertical action, ensuring trouble free performance, even at the lowest possible stylus force. Height over mounting plate is adjustable.

Ortofon

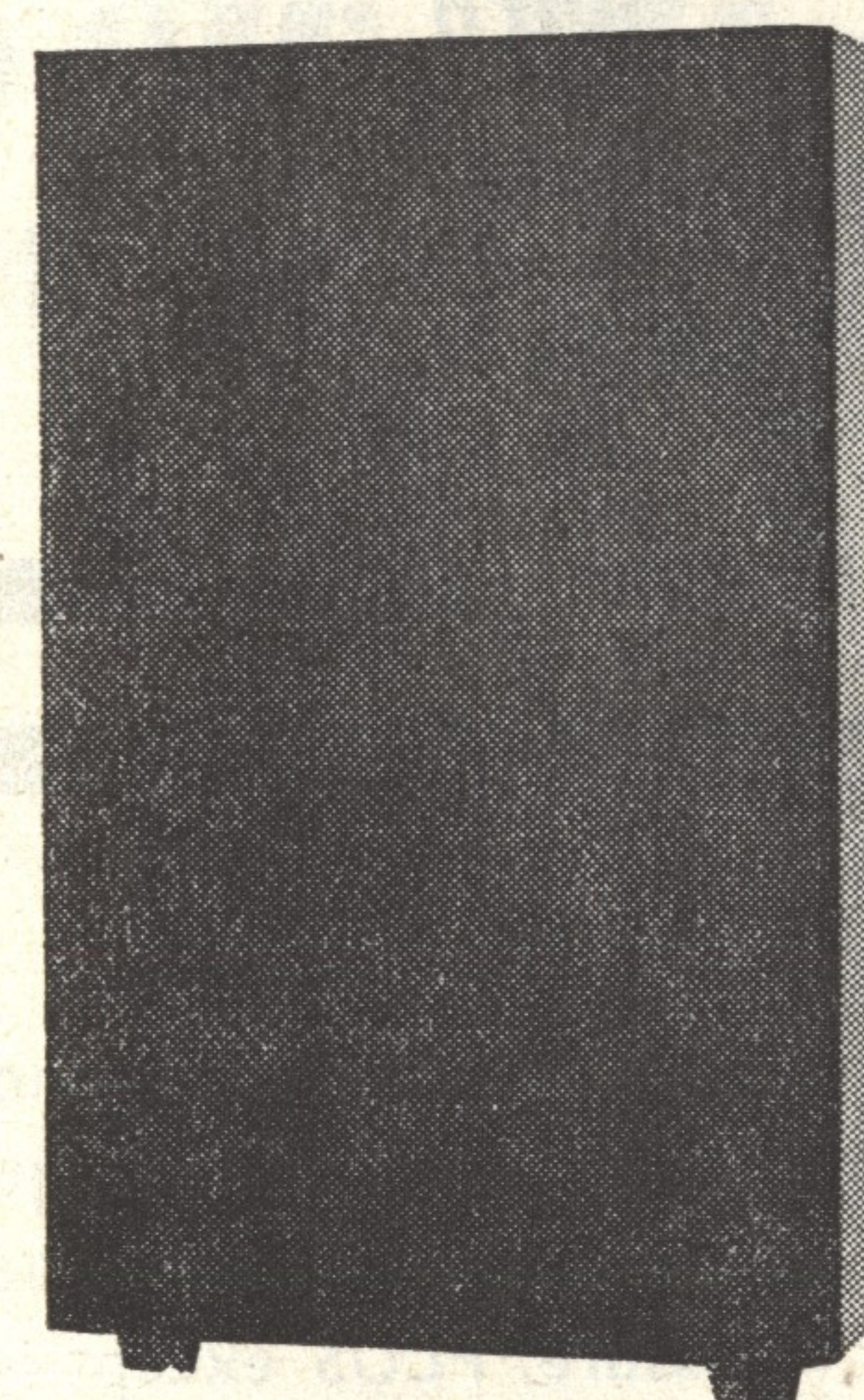
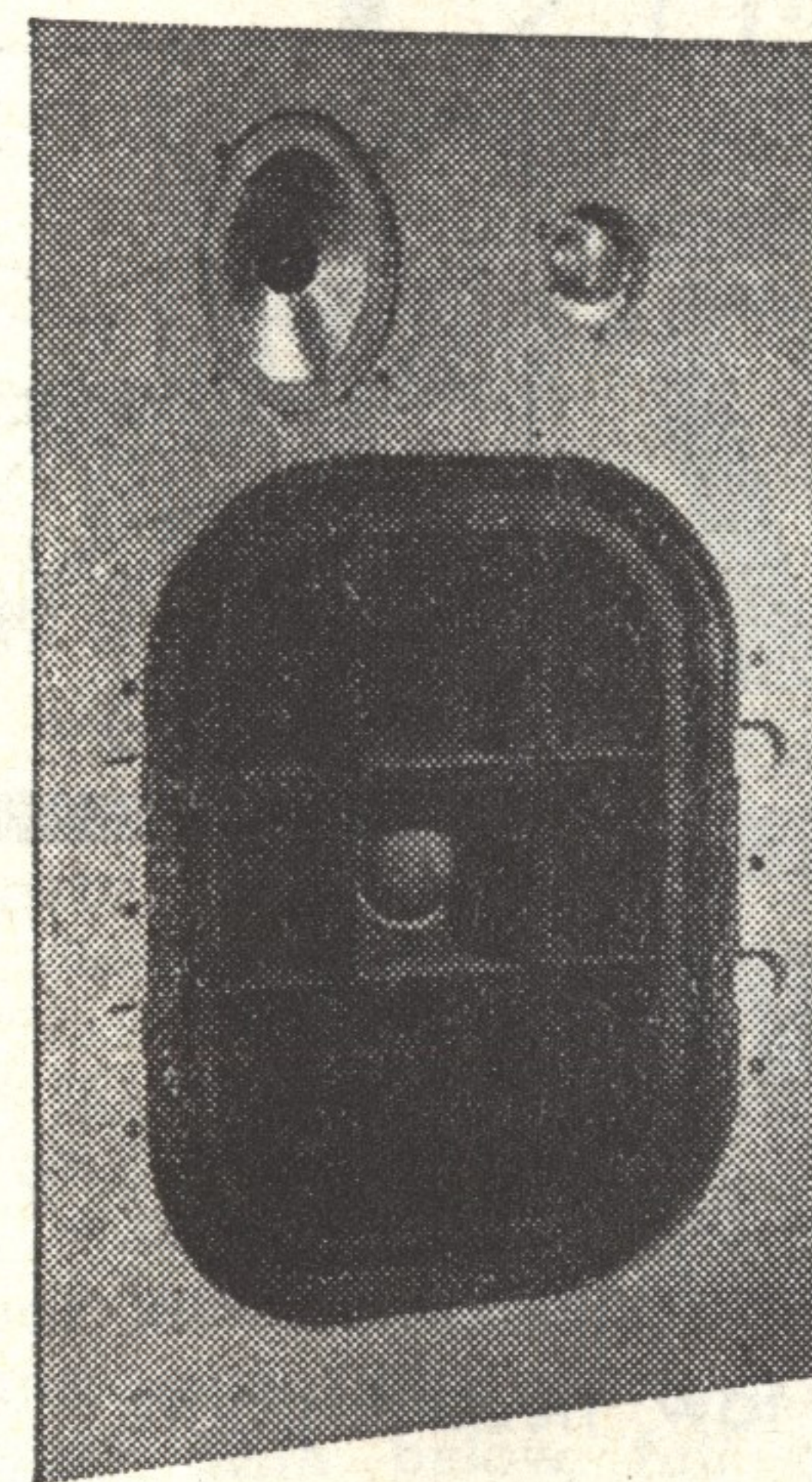
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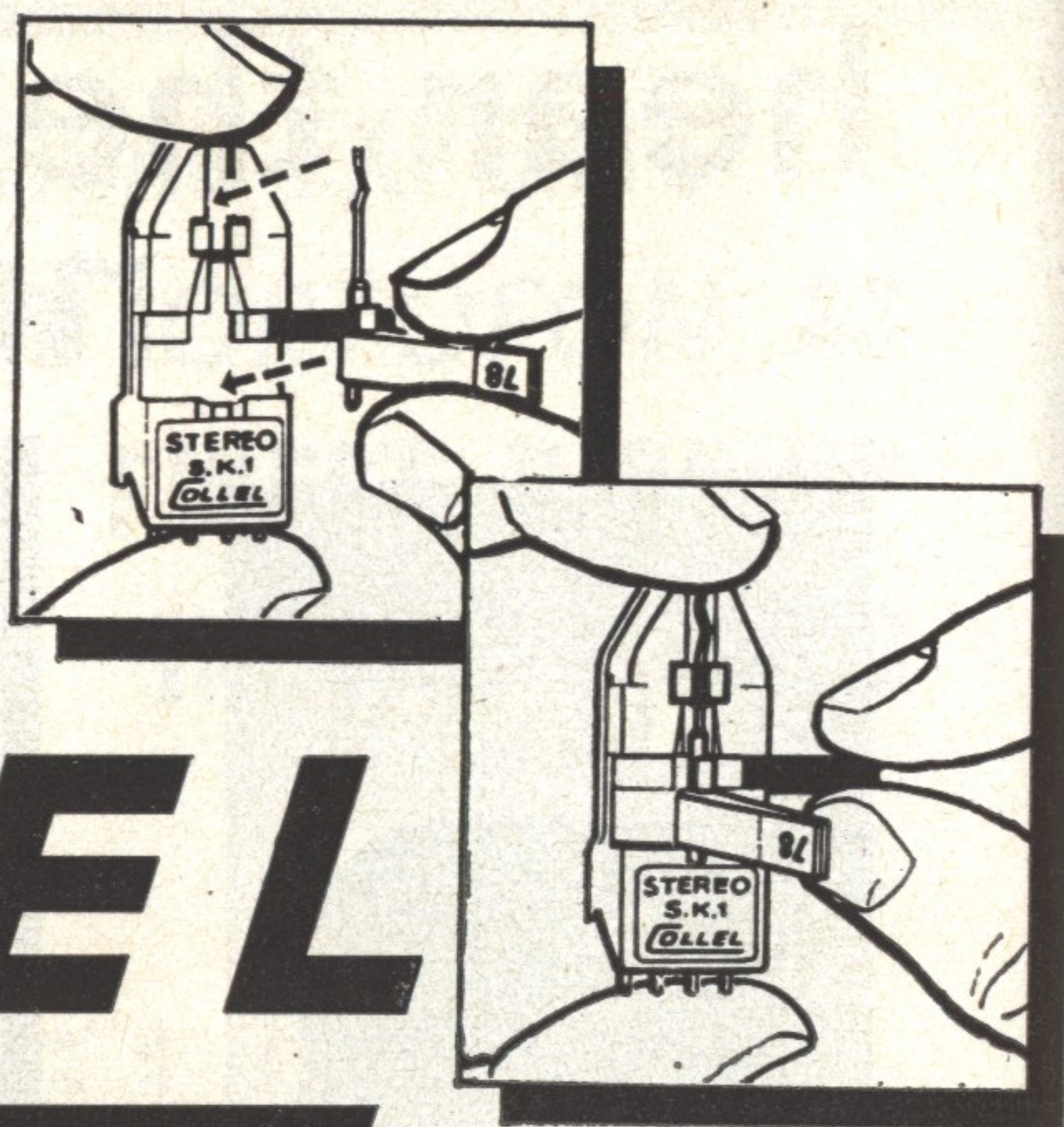
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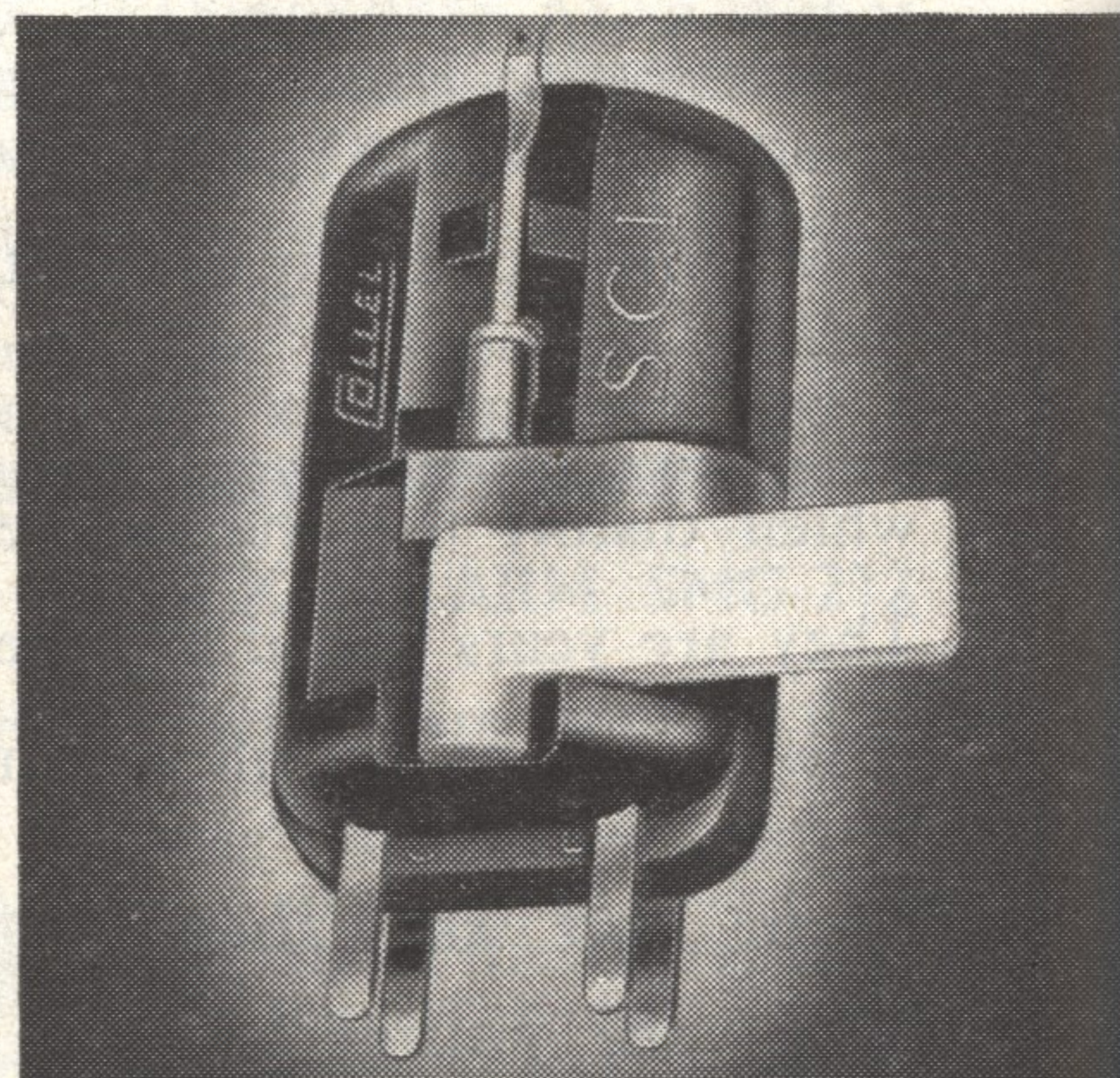


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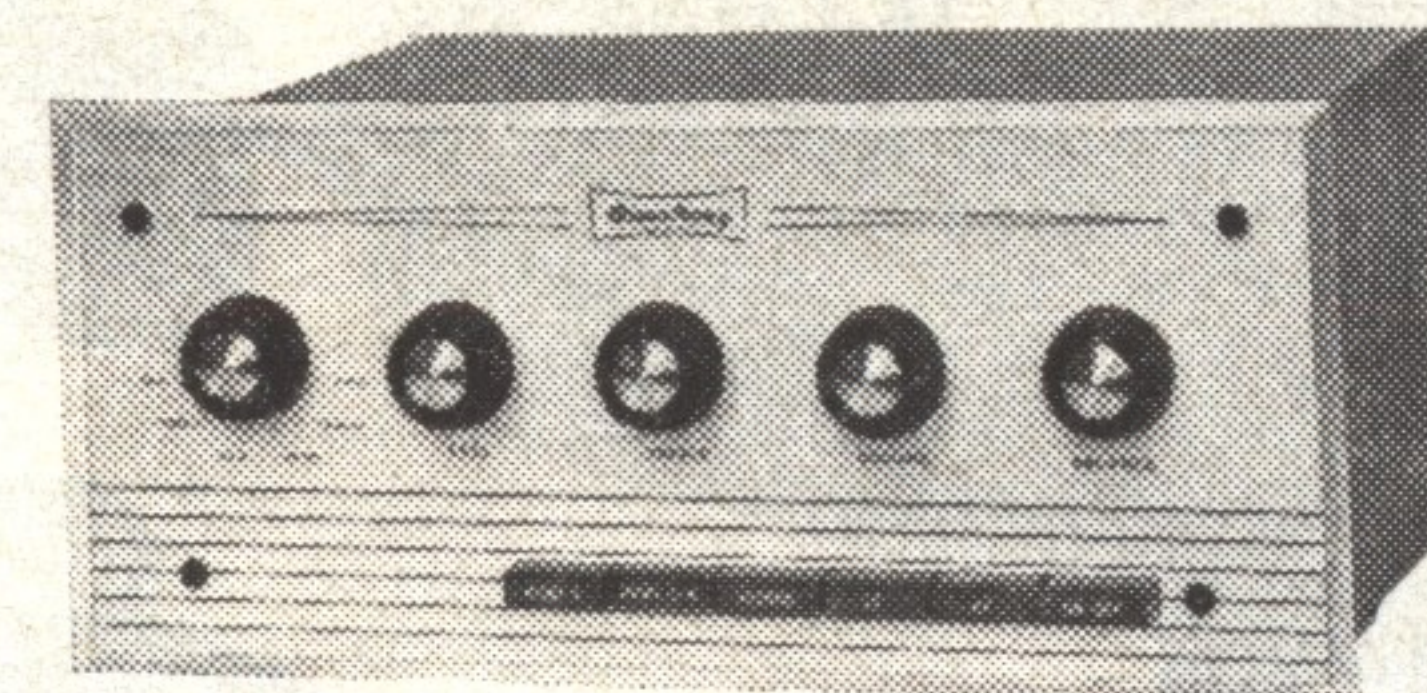
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A New Hi-Fi Stereo Amplifier

PCU 25 STEREO PRE-AMPLIFIER

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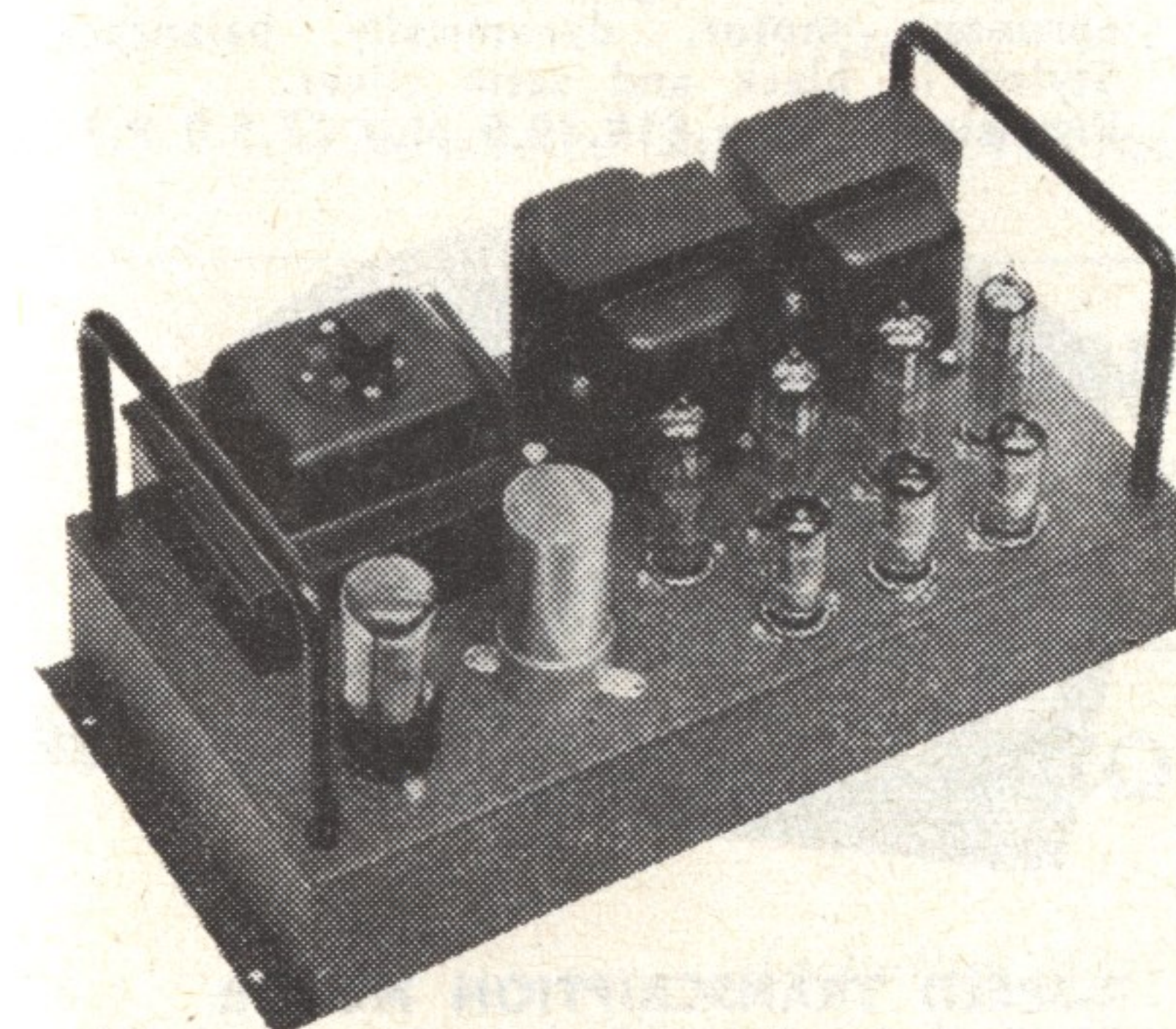
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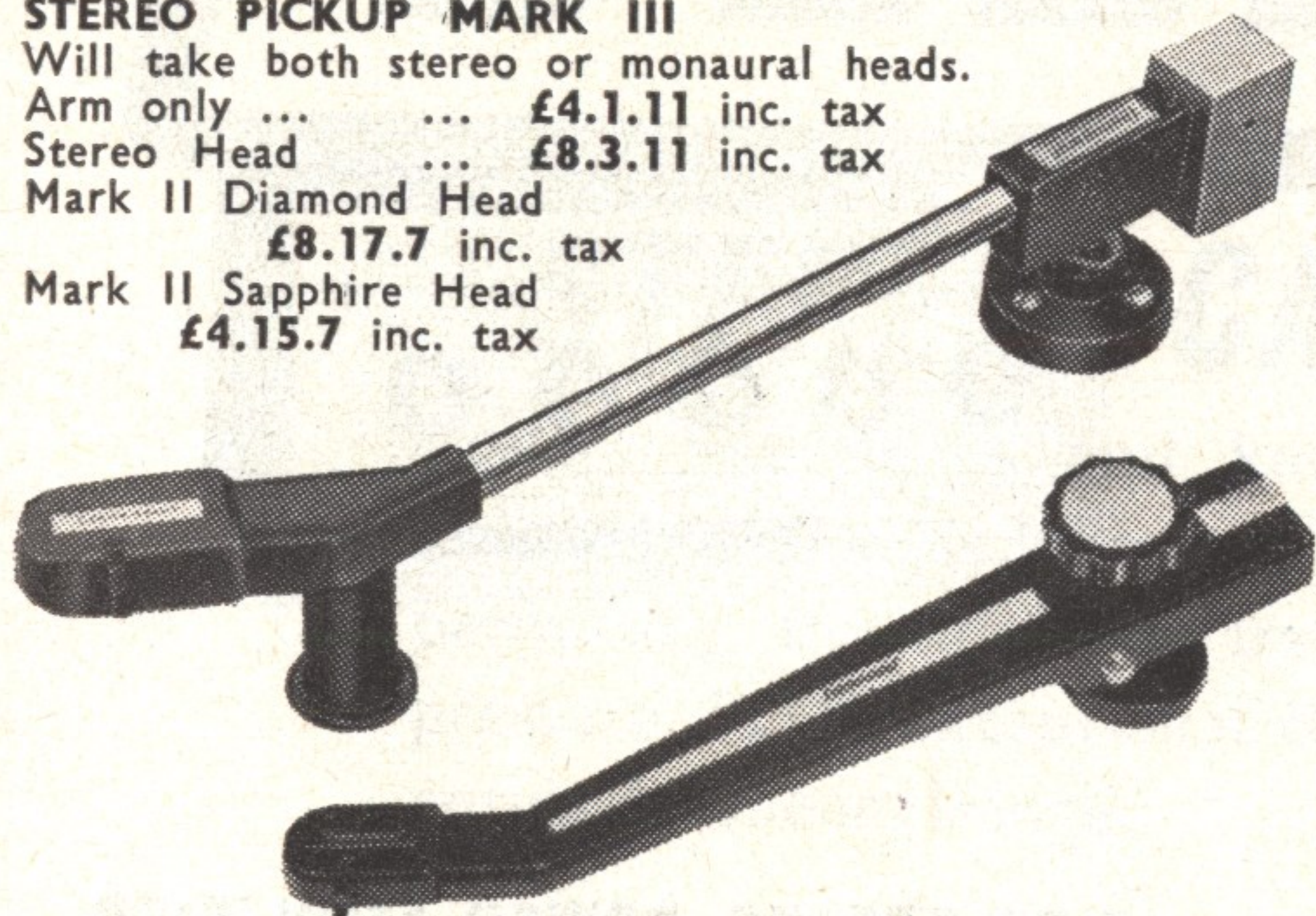
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For 33½, 45 & 78 r.p.m.

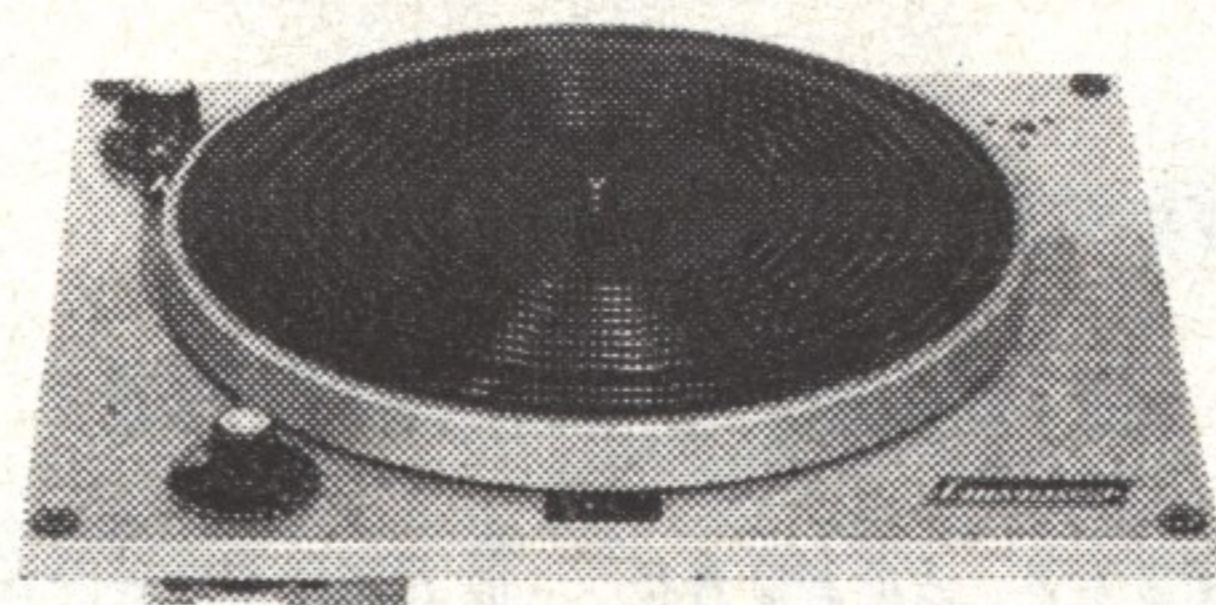
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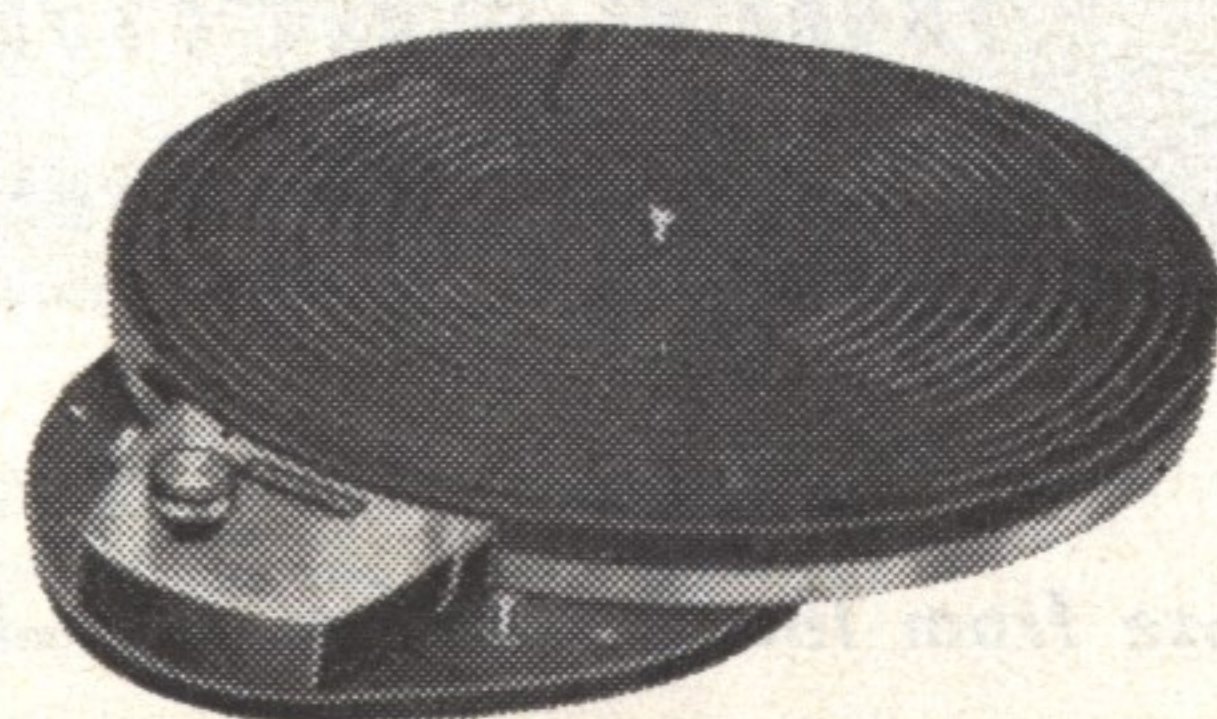
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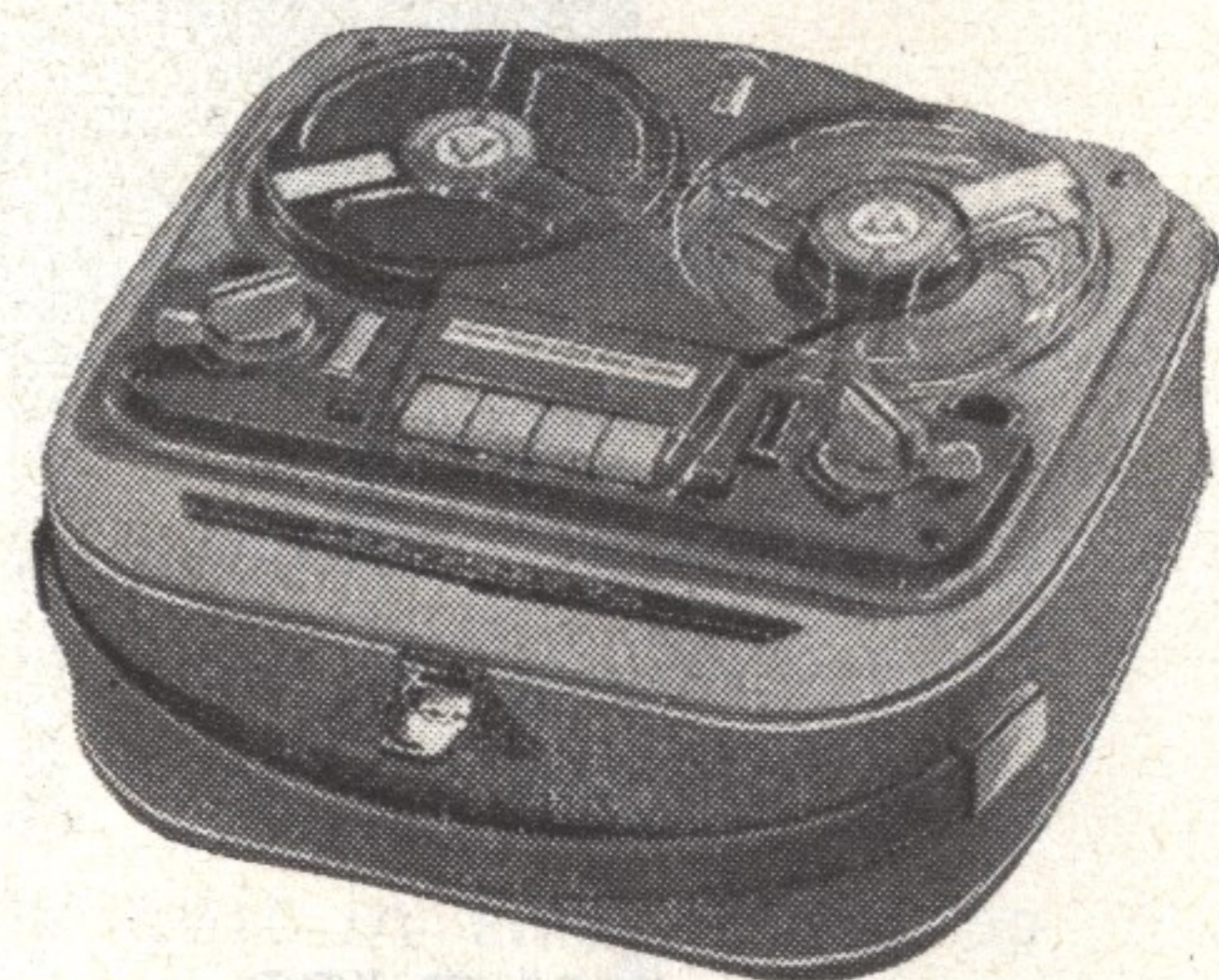


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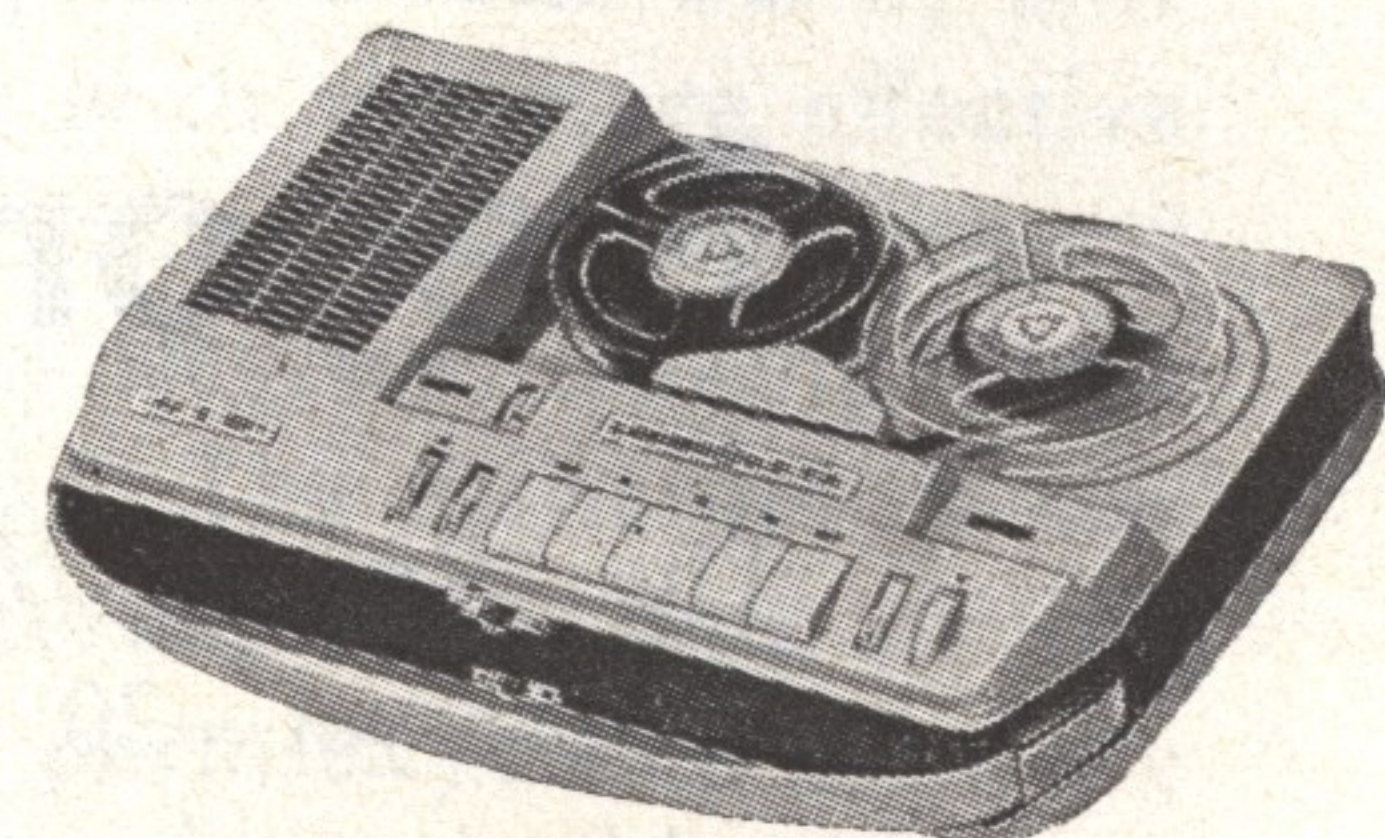
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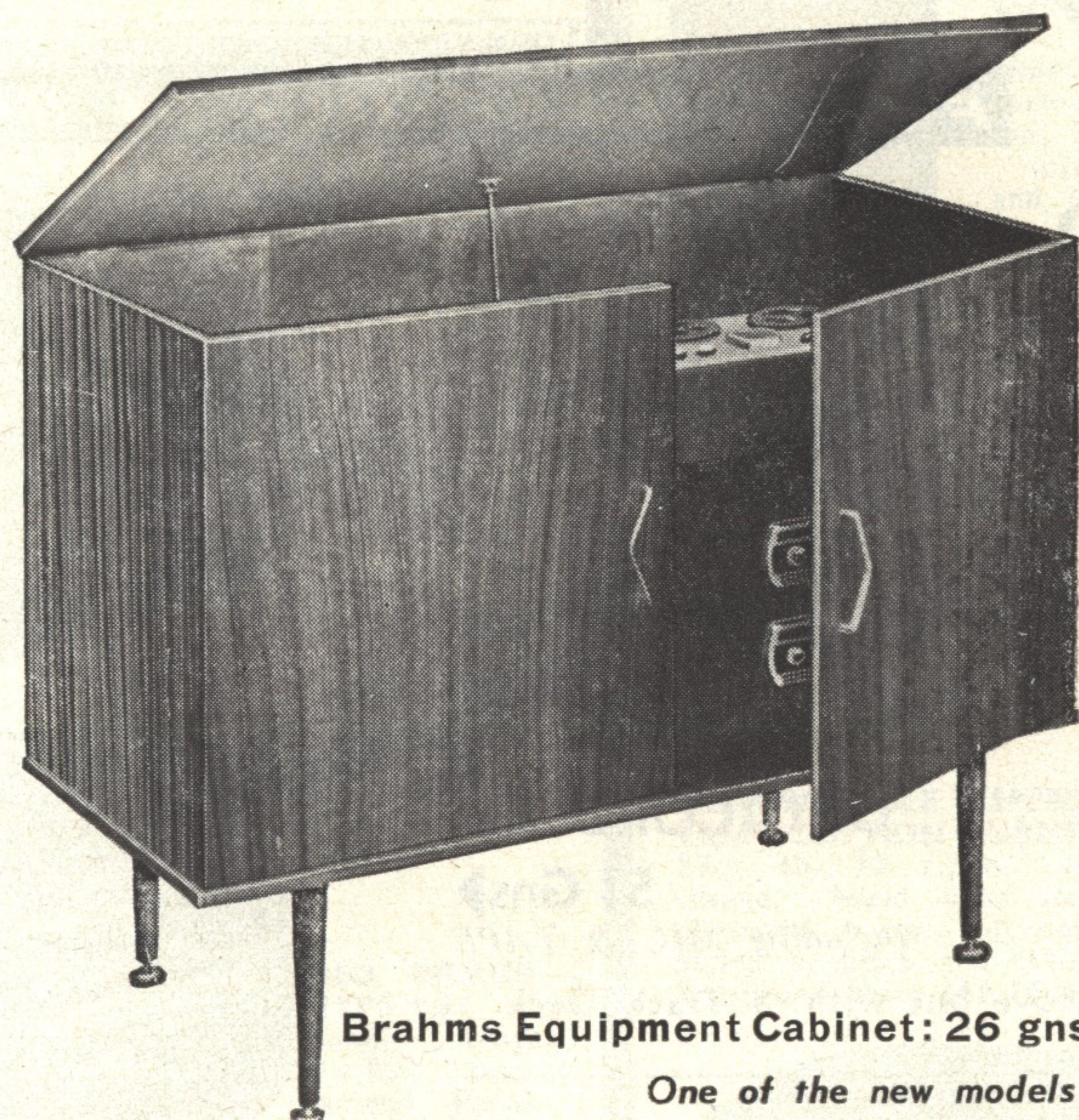
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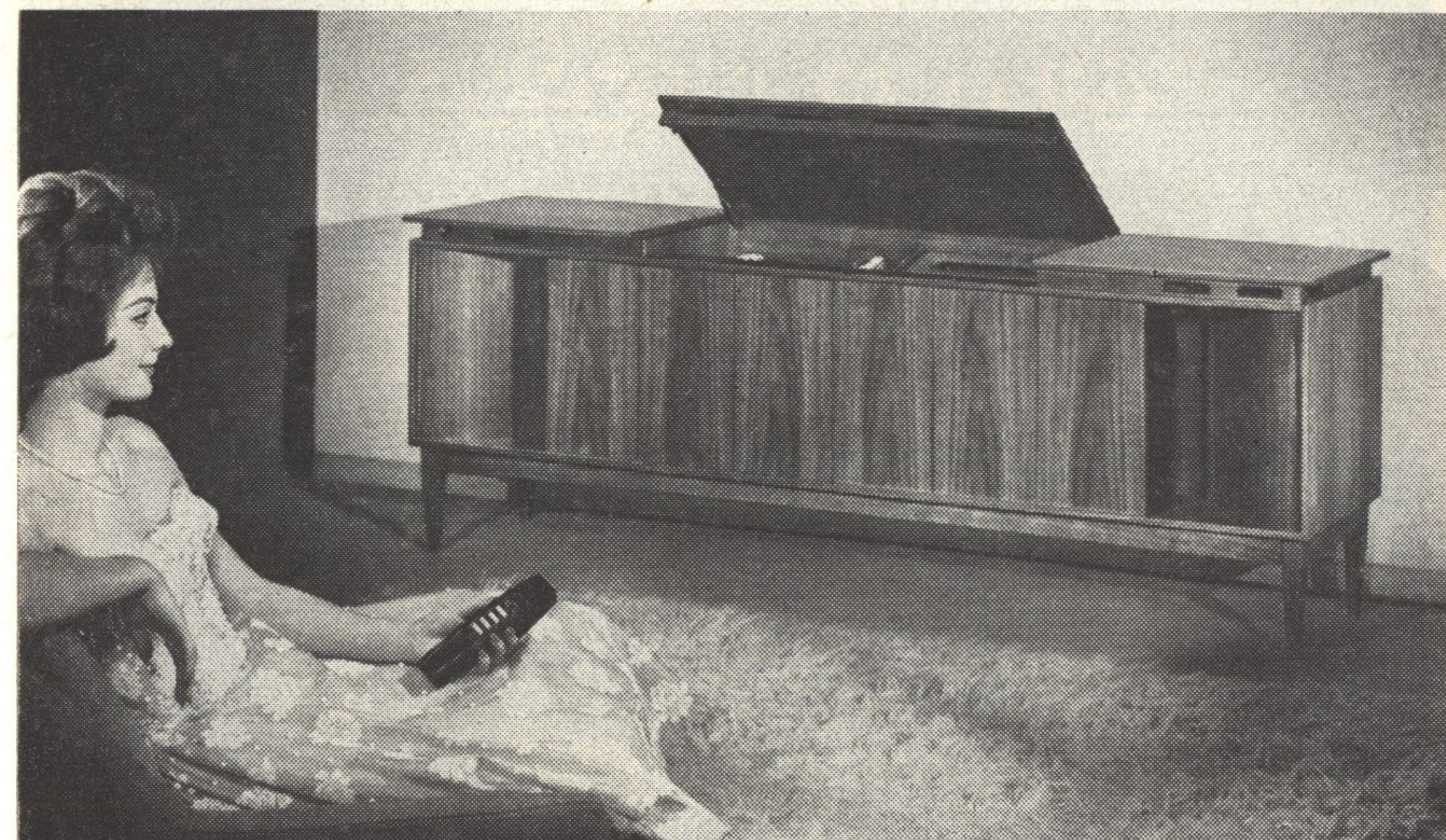
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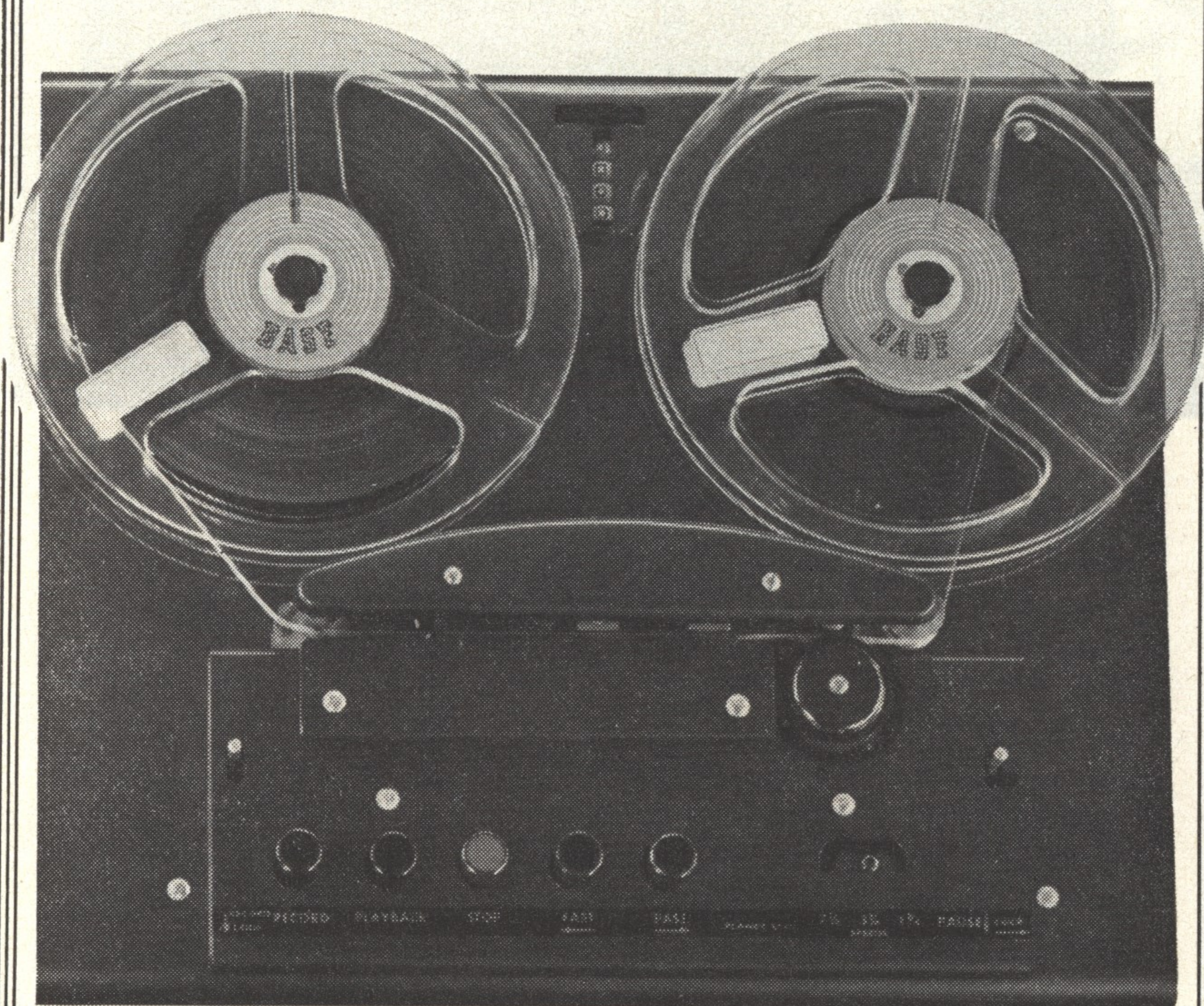
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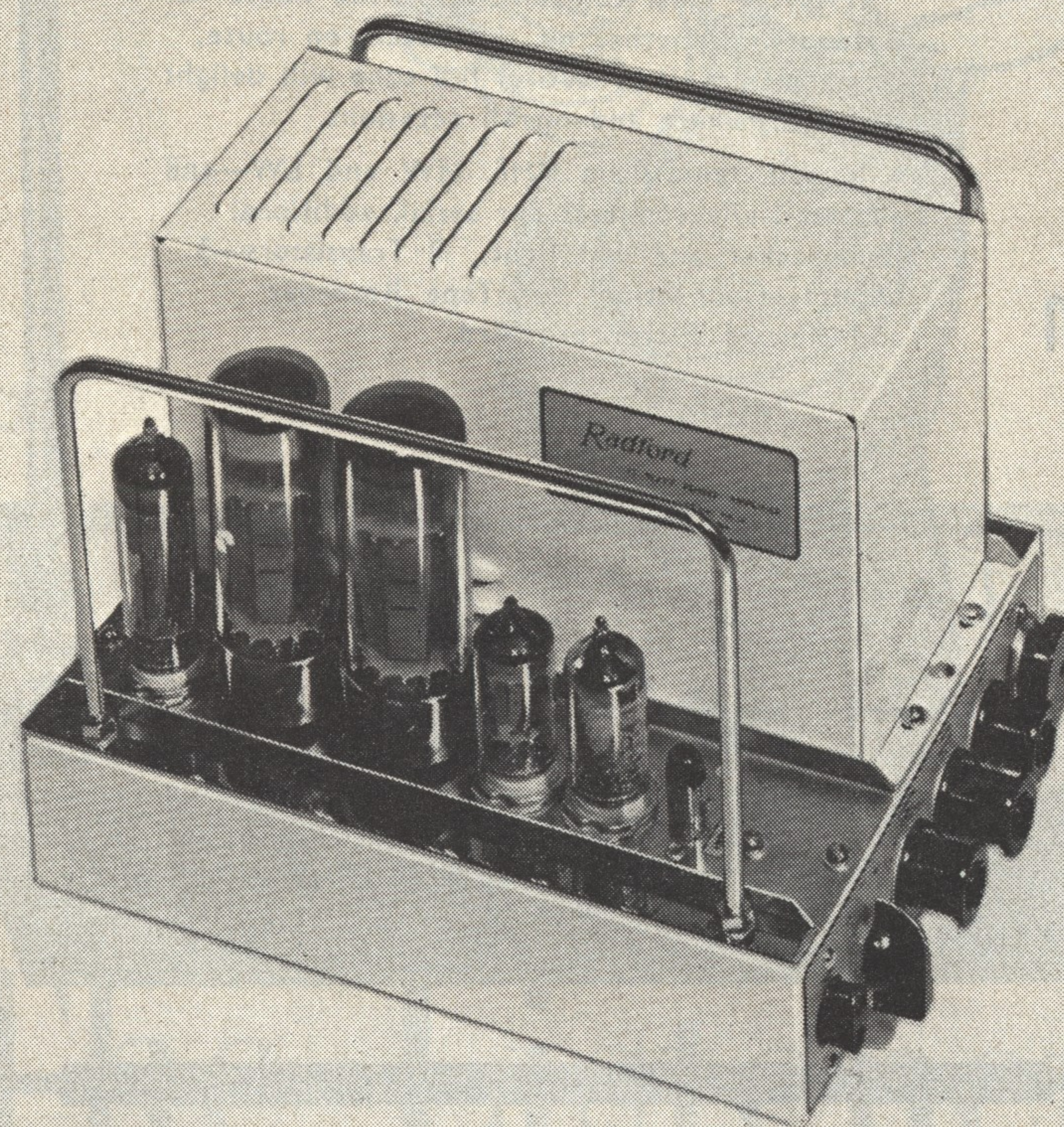
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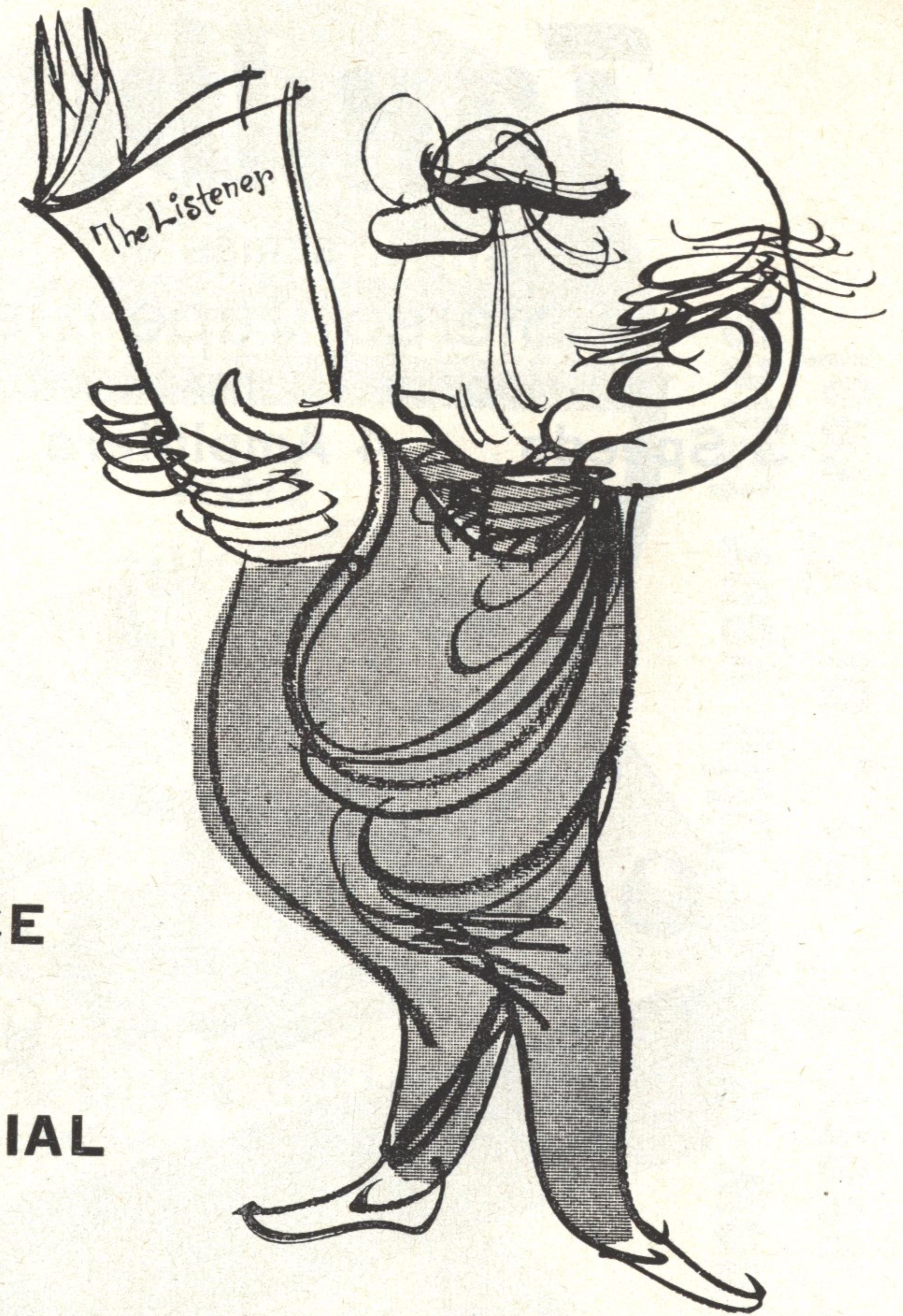
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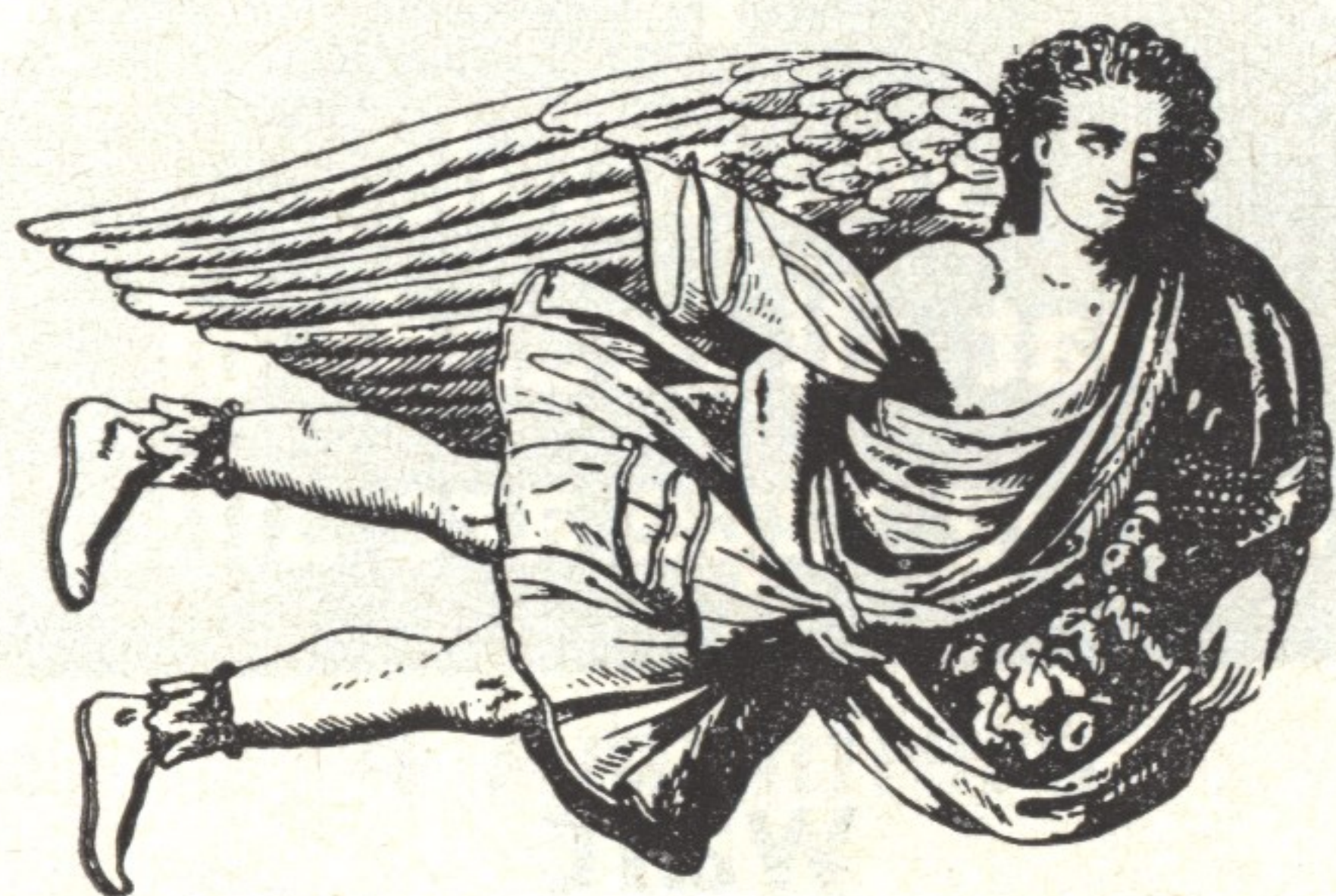
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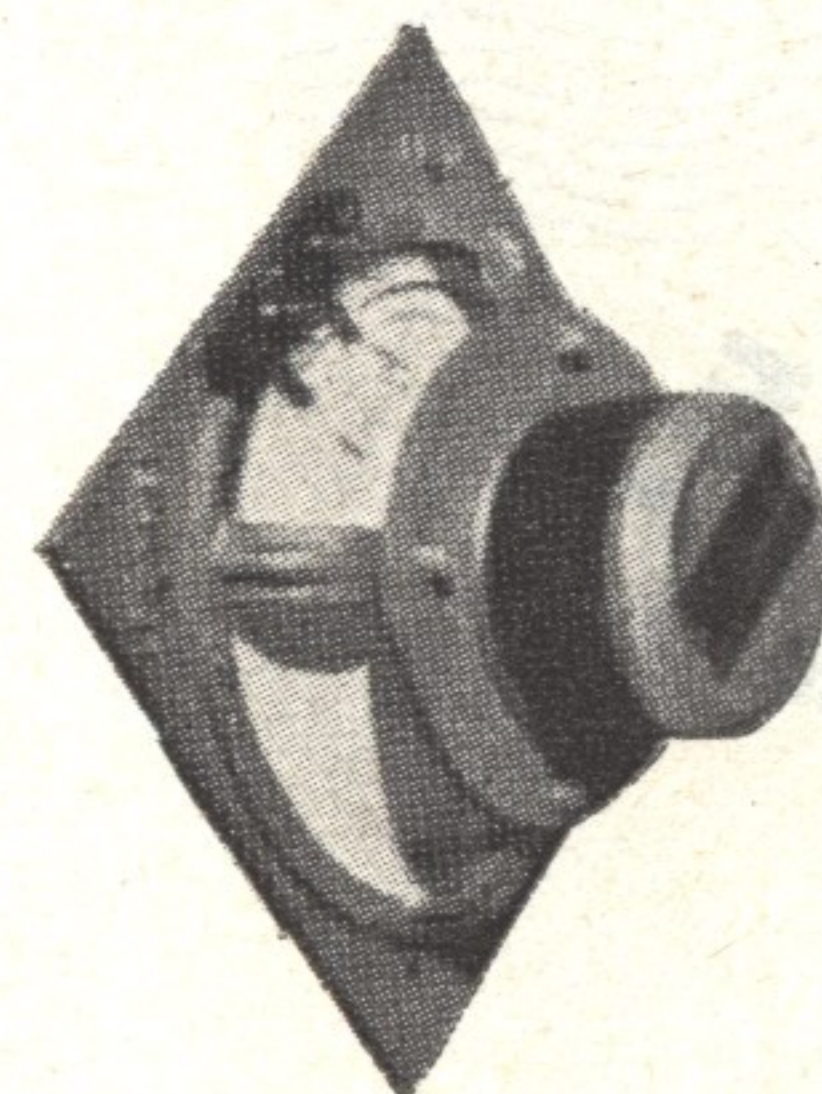
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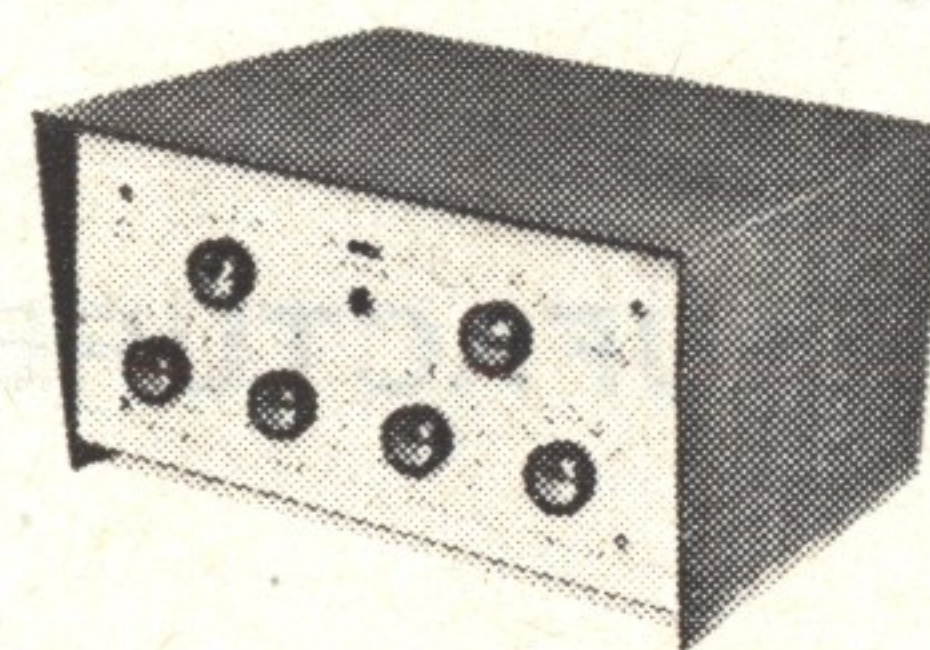
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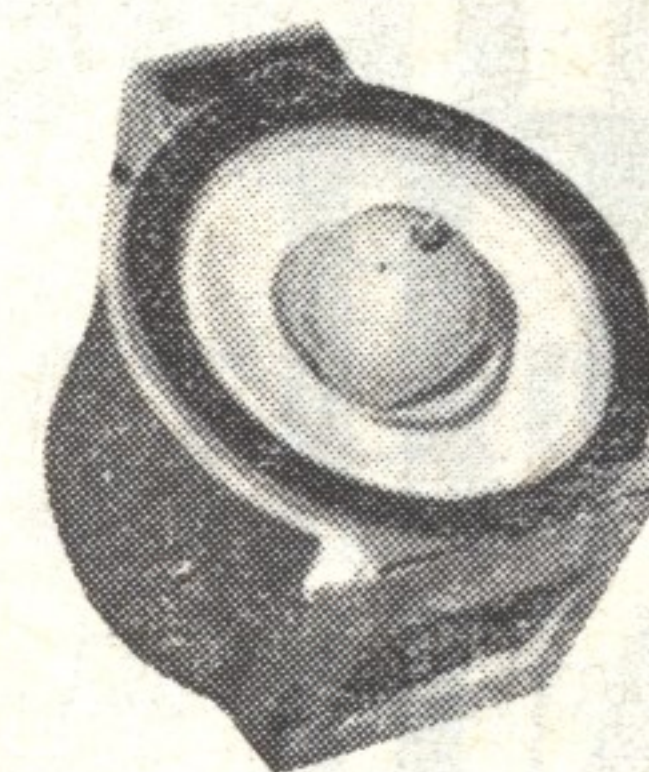
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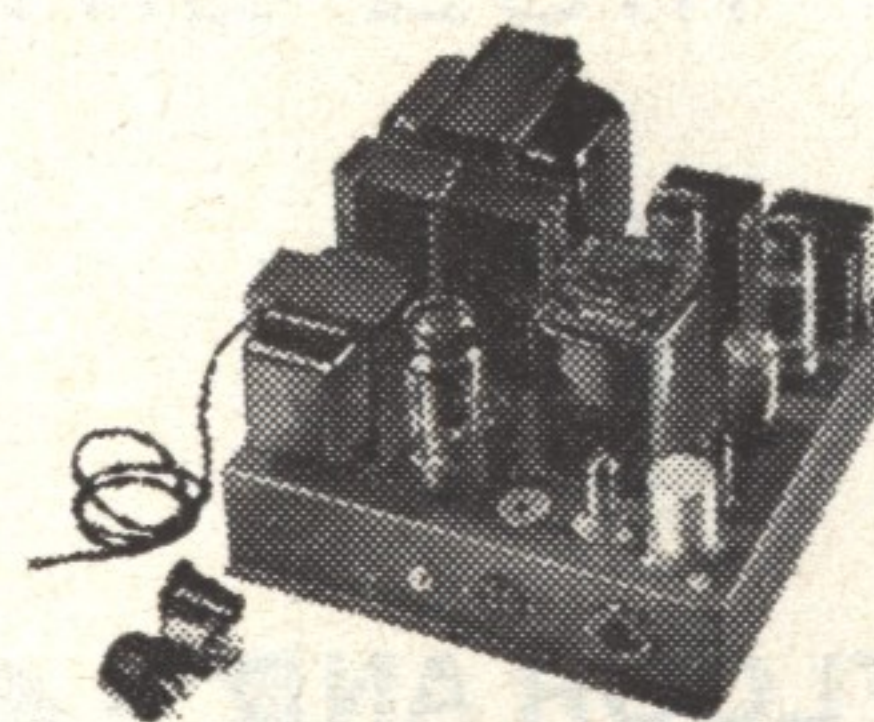
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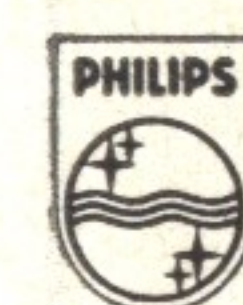
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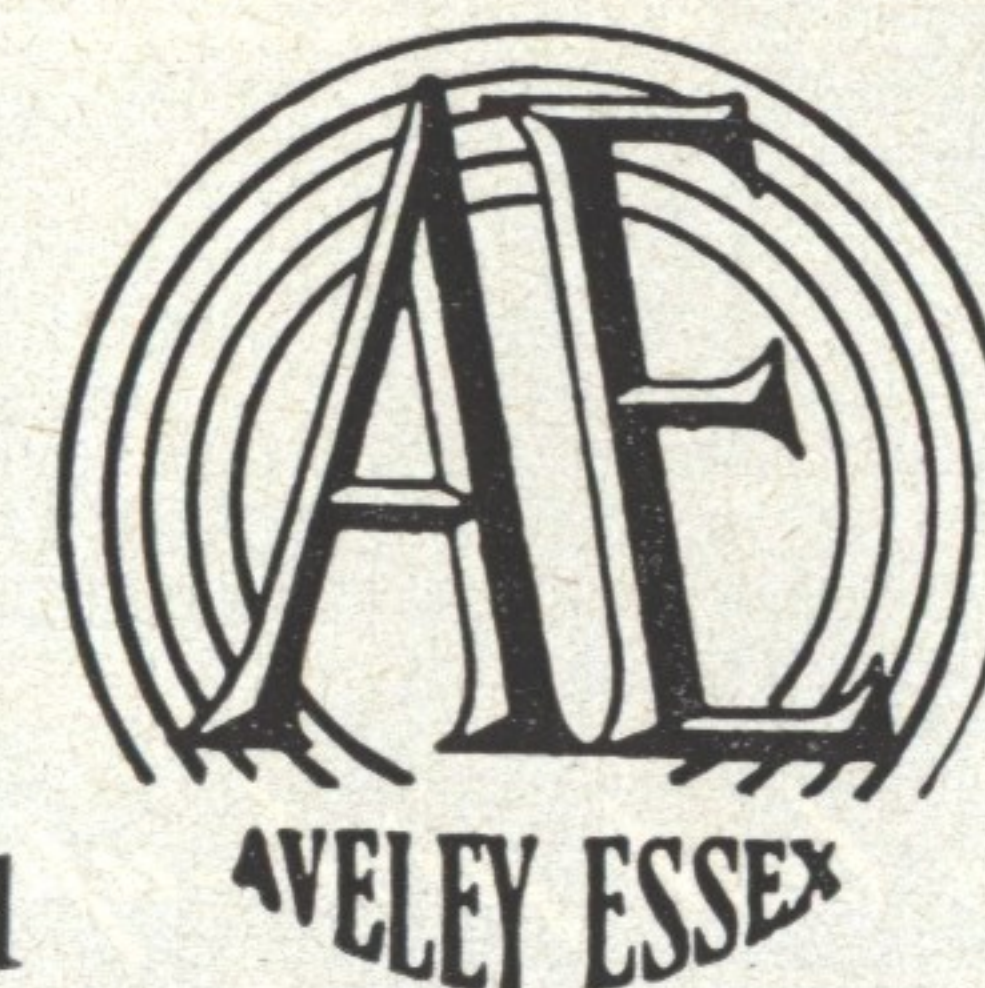
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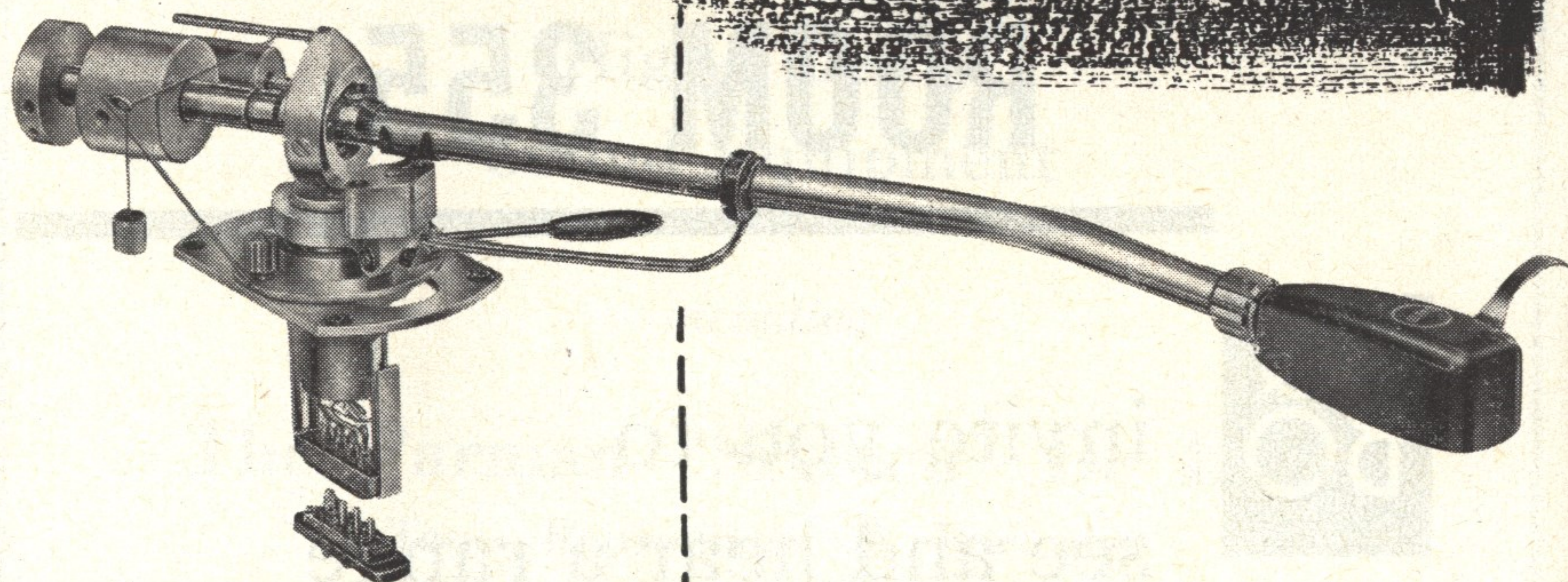
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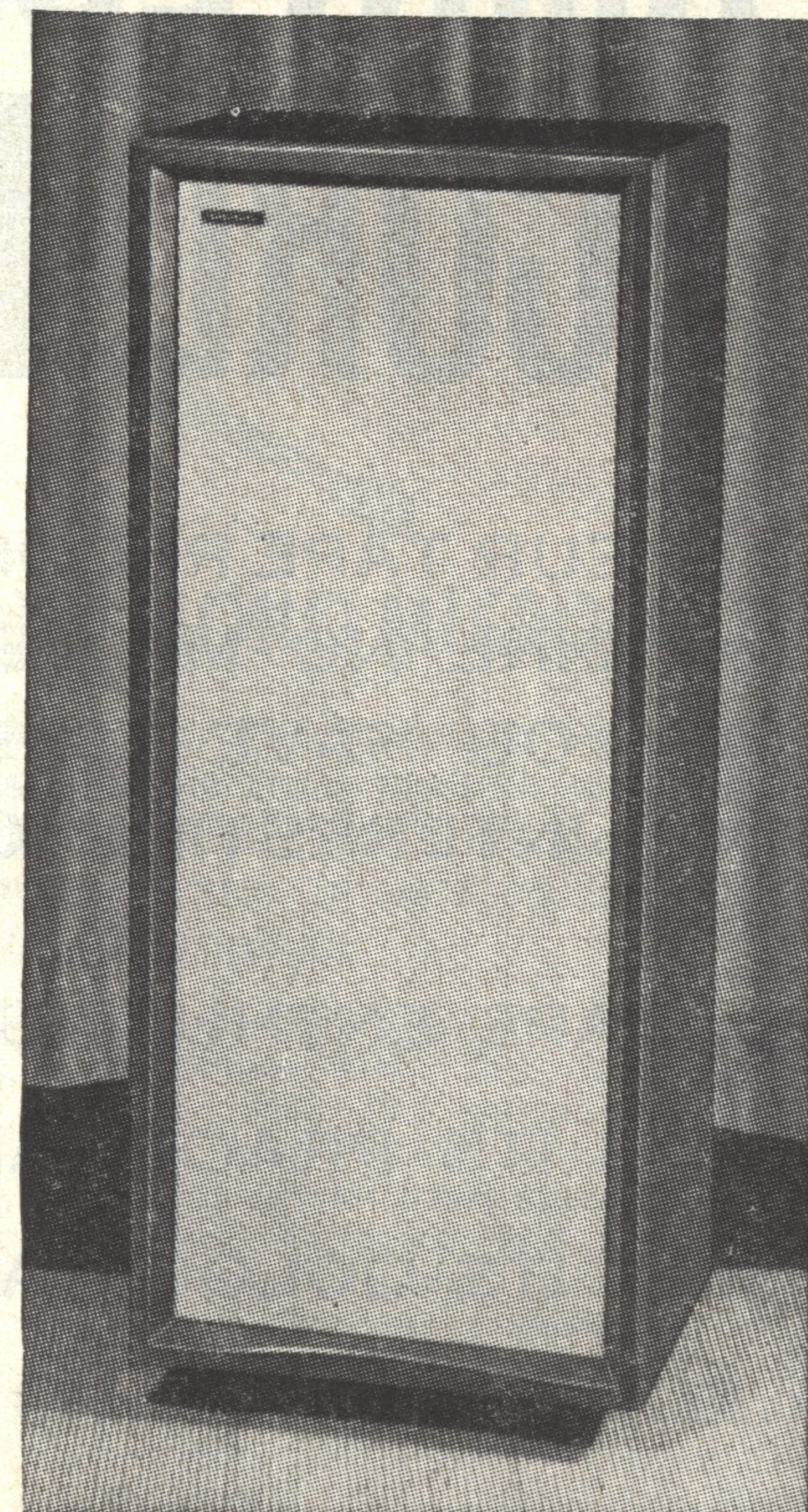
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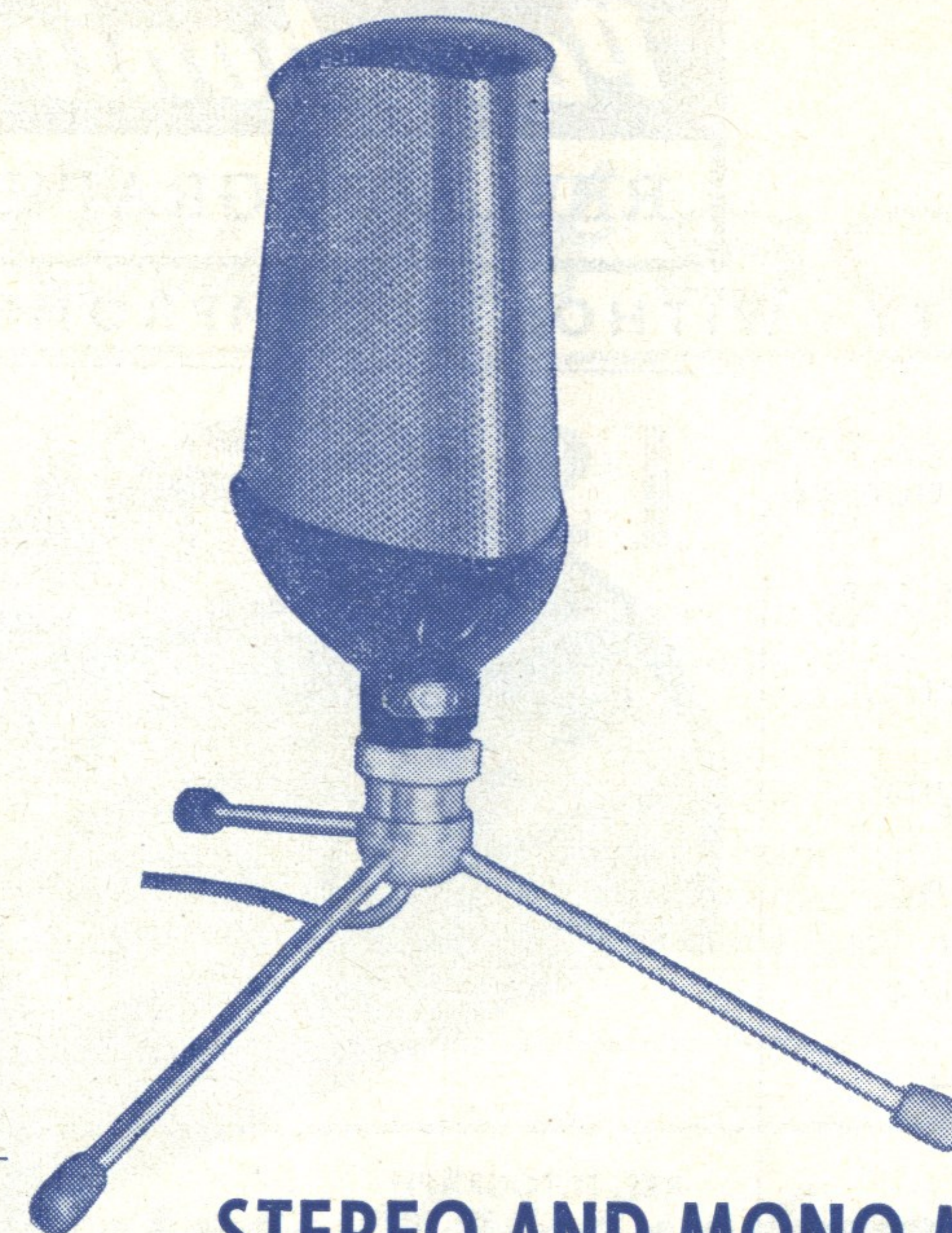
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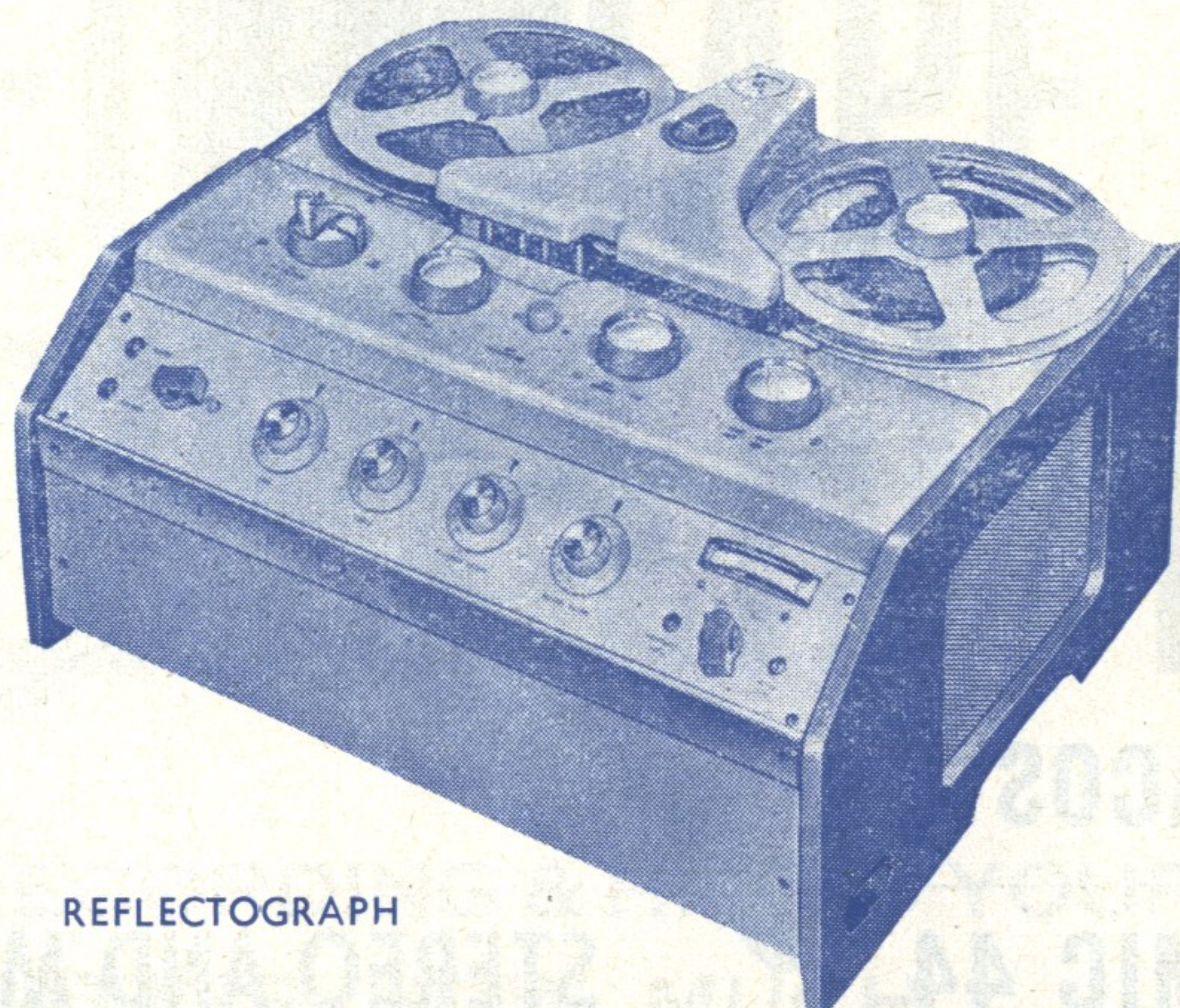
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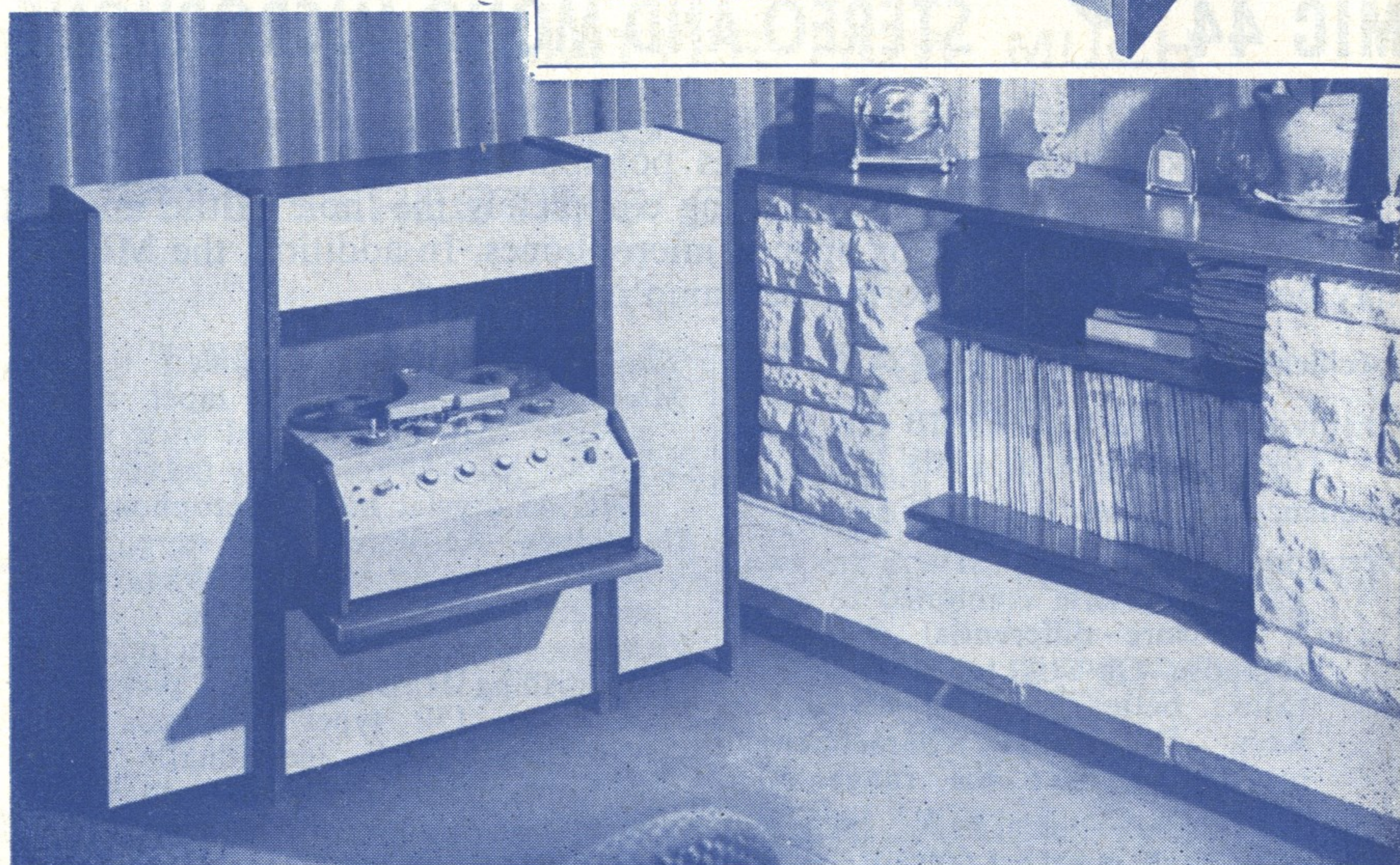
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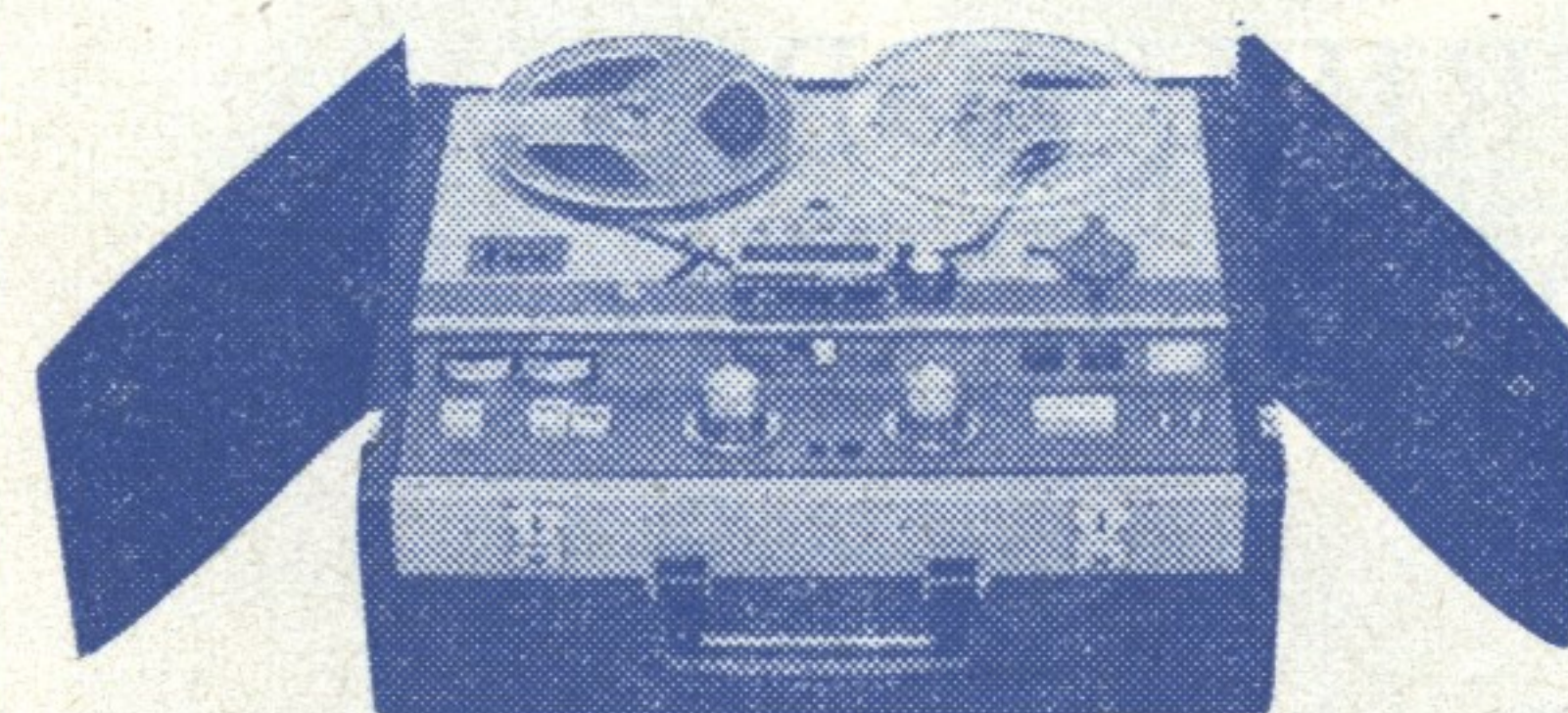
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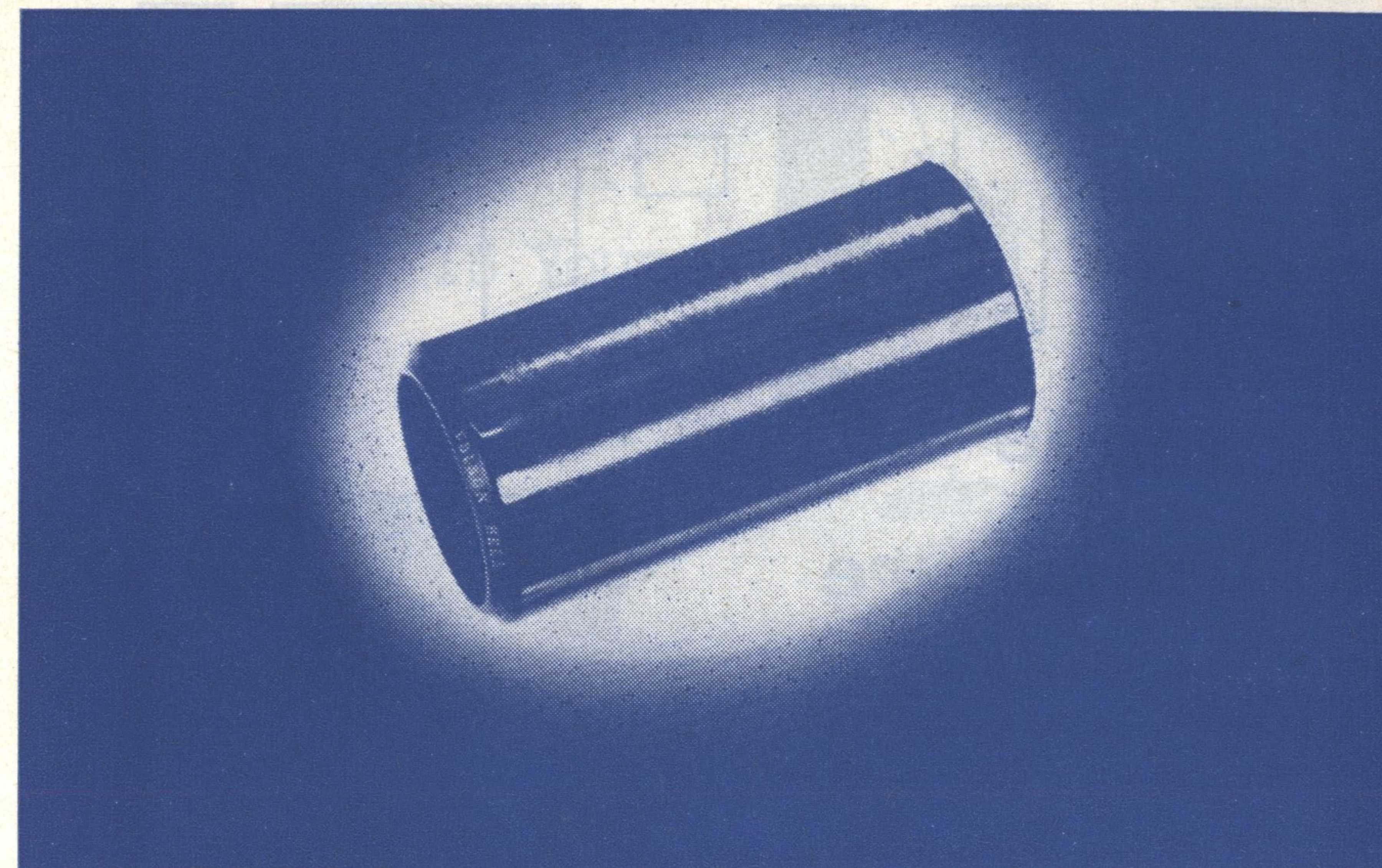
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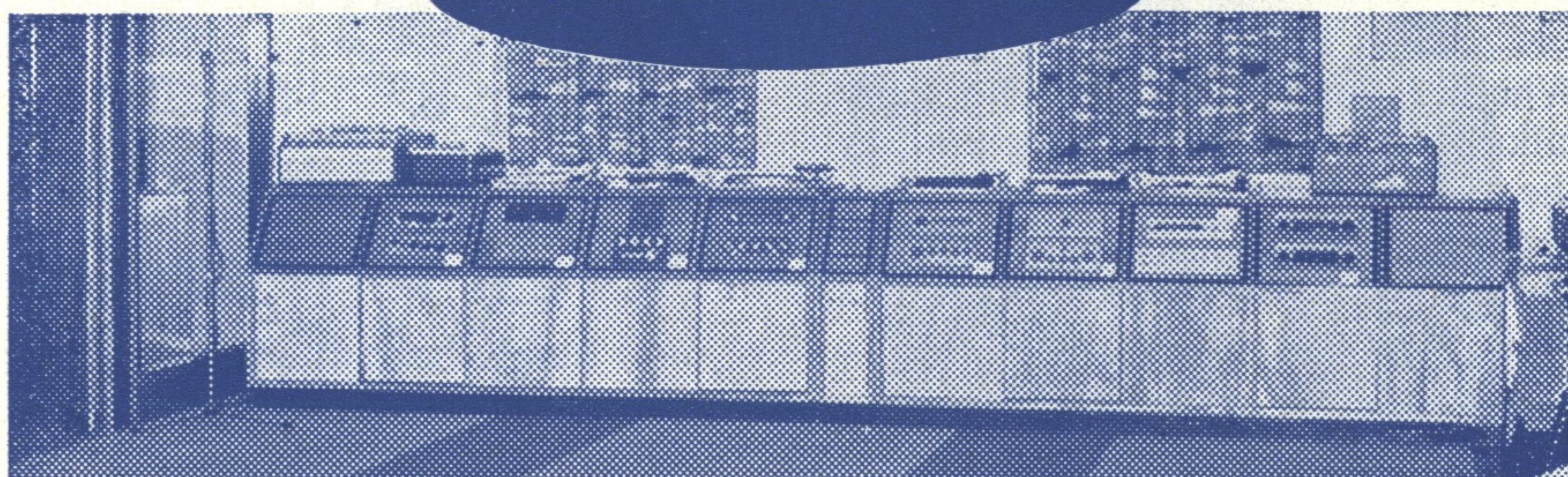
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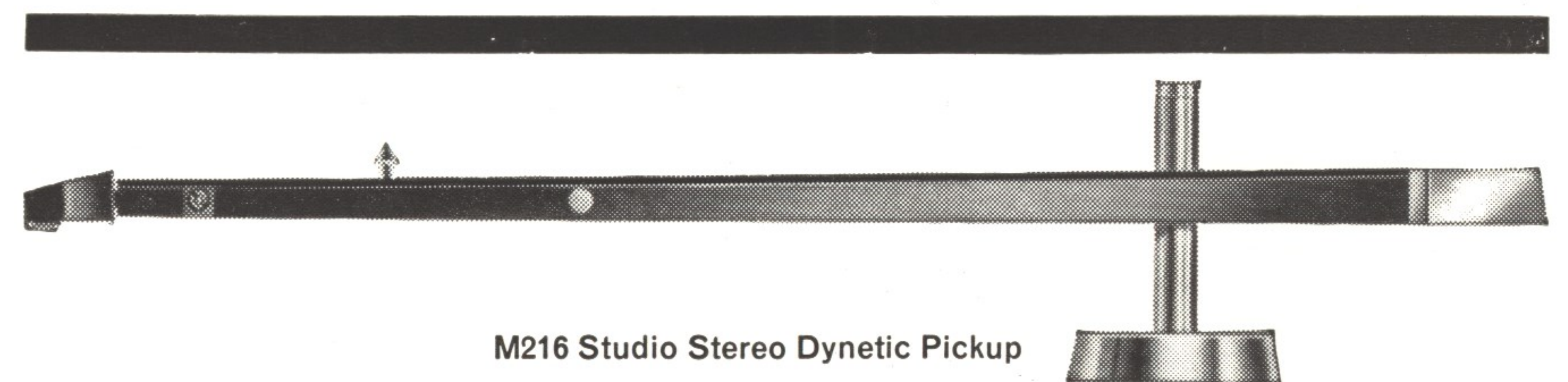
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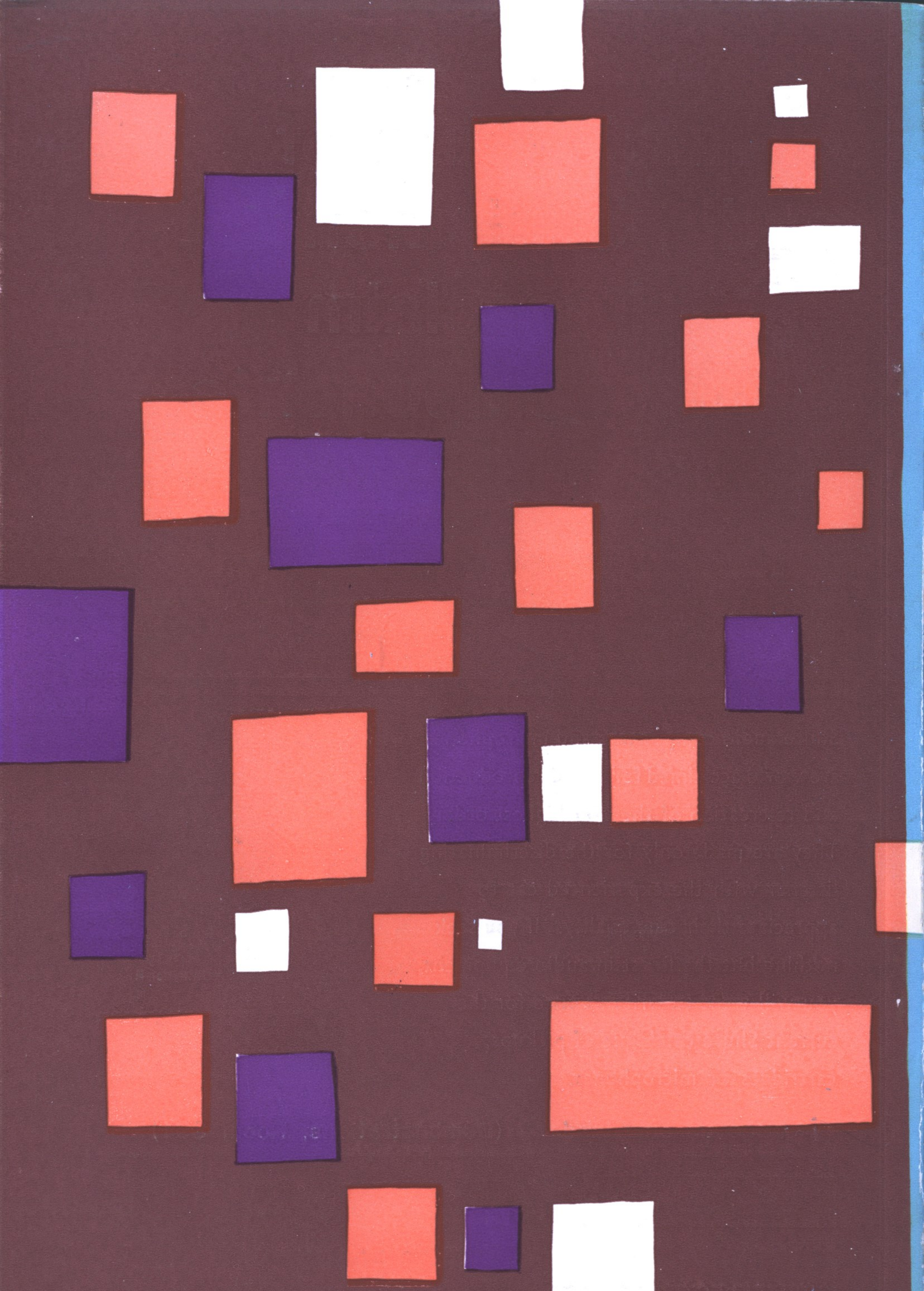
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