

APPARATUS FOR
REPRODUCTION OF
35-mm SOUND FILM

PHILIPS



Universal cinema amplifier cabinet type 2834

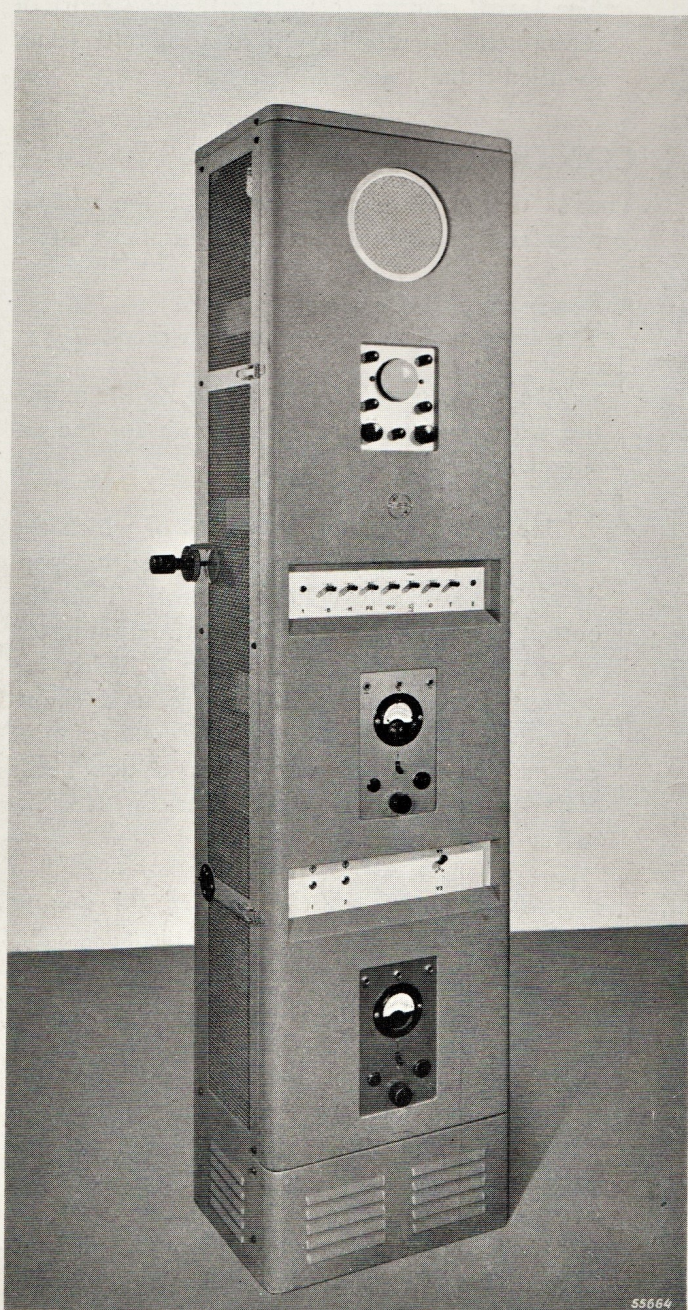


Fig. 1.

This apparatus is housed in a strong metal cabinet (see fig. 1) so dimensioned that it can easily be set up against the front wall of the projection room, between the projectors.

It is designed on the "all-in-one" principle, all electrical parts for sound reproduction, between the photocell cable and the speaker cable, being incorporated in a single apparatus, making it readily surveyable, easy to operate and, moreover, greatly simplifying the projection-room wiring.

The amplifying units, supply units for the exciter lamps and the electronic-ray oscillograph are all provided with plug contacts, so that they can easily be taken out of the cabinet for servicing without a single wire having to be disconnected. The beautiful grey frosted enamel finish and the simple, indirectly lighted control panels give the whole an attractive appearance.

DESIGNS

The cabinet type 2834 is always fitted with two amplifiers. These are interchangeable and, as two types of amplifiers with different output capacity can be supplied, the apparatus can easily be adapted to different-sized auditoriums.

There are two designs, differing little in outward appearance but each having its own special features. These designs are the following:

1. "De Luxe" universal amplifier cabinet, type 2834/21

In this design either the upper amplifier with upper supply unit or the lower amplifier with

lower supply unit can be switched on as desired, thus always providing for 100% reserve both for amplifier and for exciter lamp supply unit, so that in case of a breakdown the whole can be switched over to a complete emergency set without interruption.

2. "Stereofonic" universal amplifier cabinet, type 2834/31

In addition to the above advantages of the "De Luxe" cabinet, this offers the possibility of reproducing stereophonic and push-pull films, so-called "dual-track" films.

CONTROLS (figs 2 and 3)

Thanks to the clear arrangement of the various controls and switches operation is simplicity itself.

1. Power amplifier controls

The front plates of the amplifiers carry:

a. *The mains switch*, for switching on the amplifier with corresponding supply unit for the exciter lamps.

b. *The volume control*, by means of which the output of the amplifier can be adjusted independently of the master volume control. Thus the output of one amplifier can be accurately adjusted to equal that of the other, which is highly important when both amplifiers are used simultaneously, as is the case with the "Stereofonic" design. As such an adjustment very seldom needs correcting, the potentiometer is fitted with screwdriver adjustment.

c. *Switches for raising the level of the bass or the high notes.*

In order to adapt the sound reproduction to the acoustics of the auditorium, so-called acoustic-correction filters have been built in. With the switches turned right back anti-clockwise the frequency response curve is practically straight between 50 and 10,000 c/s. With the switches in the middle position the level of the bass notes at 50 c/s and that of the high notes at 10,000 c/s is raised about 3 dB, while with the switches turned fully clockwise the level is raised about 5 dB (fig. 4). These switches, too, are adjustable with a screwdriver.

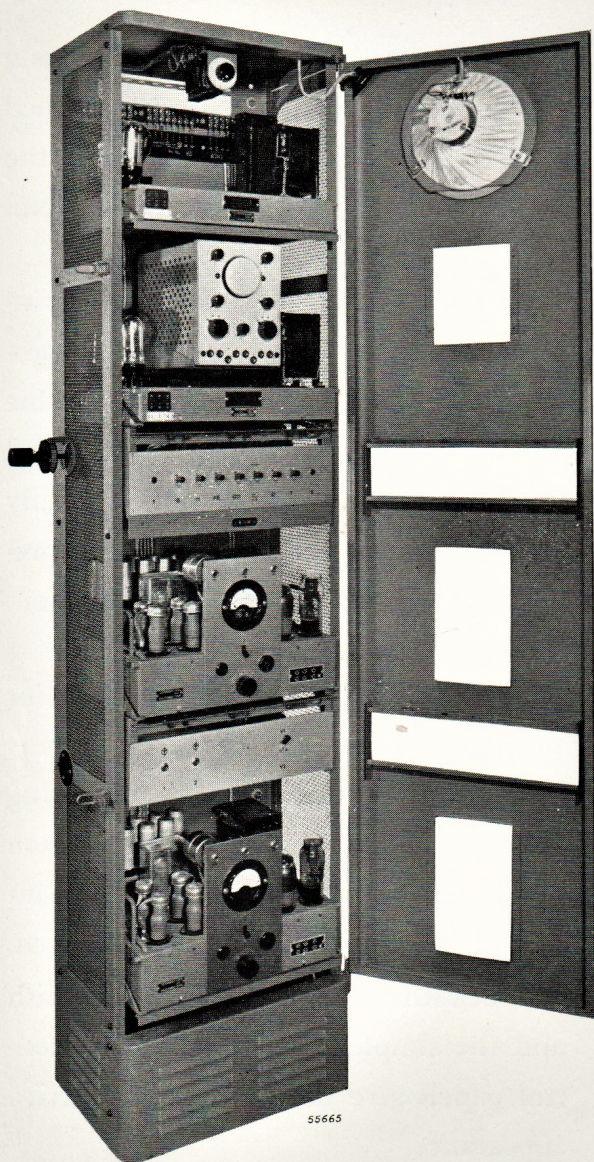


Fig. 2

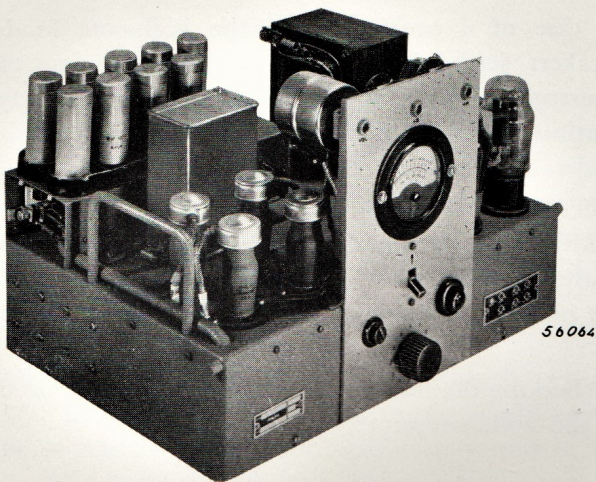


Fig. 3

2. Amplifier cabinet controls

Among these are to be distinguished:

a. Master volume control/picture and sound change-over switch

By turning the milled knob the volume in the auditorium can be regulated in 21 stages of 2 dB. By pressing in or pulling out this knob the supply for the exciter lamps and thus the sound is switched over from one projector to the other. At the same time the current supply for two automatic light cut-off relays, which can be mounted in the projectors, is switched over, thus ensuring absolute synchronization in the change-over of picture and sound.

The shaft of this volume control/change-over switch is extended on the right-hand side of the cabinet, so that the volume can be regulated and picture and sound changed over from each projector.

b. Monitor speaker volume control

When the master volume control is turned, the sound volume in the projection room is increased or decreased to the same extent as in the auditorium. By means of a separate volume control the sound-volume of the monitor speaker can be regulated to the desired level in 11 stages.

c. Master switch panel

From left to right this panel carries the following switches, all of which are set in the horizontal position for normal film reproduction:

Film-correction switch for attenuating the bass notes, thus suppressing boominess and improving intelligibility (see fig. 5).

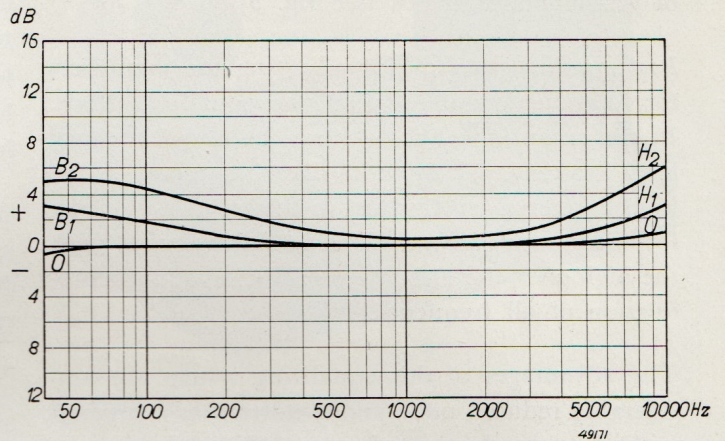


Fig. 4

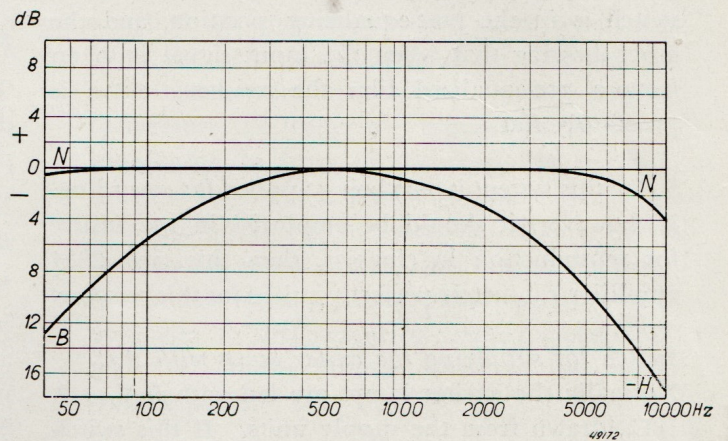


Fig. 5

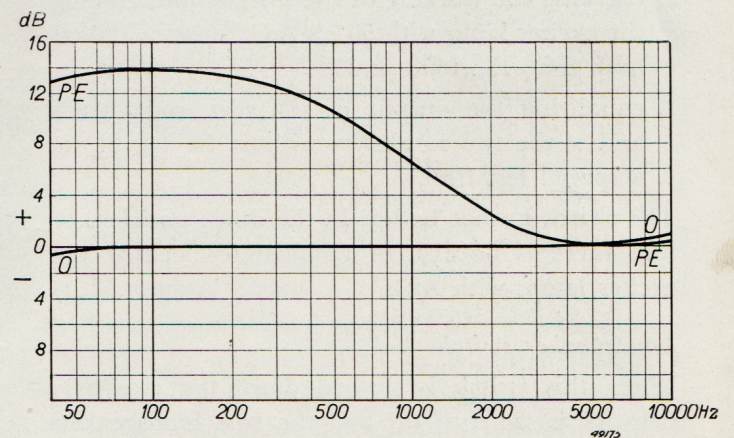


Fig. 6

Film-correction switch for attenuating the high notes when running bad sound copies with a high noise level. This also serves a good purpose in suppressing needle-scratching in the reproduction of gramophone records (see fig. 5):

Post-equalizing switch for adjusting the amplifiers for reproduction of so-called "pre-equalized" films. In the *recording* of these films the bass frequency level is attenuated about 14 dB with respect to the high frequency level, whilst in the *reproduction* the low frequencies are amplified 14 dB compared with the high ones, the ultimate result being equal reproduction of all frequencies.

The advantages of this equalizing system are considerably reduced noise and distortion as compared with the reproduction of normal films.

Fig. 6 gives two frequency response curves, one with a constant input signal of the amplifiers when the switch is in the post-equalizing position, and the other showing that when the input signal is taken from a pre-equalized film the resulting curve is practically flat.

So far this system is only being applied for recording. If, however, it should be employed in the future for reproduction in cinemas, then this type 2834 amplifier cabinet is perfectly suited for this purpose.

Switch for supplying the exciter lamp with A.C.

Normally the exciter lamps are fed with 5 V, 4 A D.C., drawn from the supply units. If this switch is pushed down the lamps are supplied with A.C. This can be used for:

1. checking the working of the installation: feeding the exciter lamp with 50 c/s A.C. causes a 100 c/s hum from the loudspeakers;
2. equalizing the output of the two sound-heads and of the two amplifiers without having to use a special test film.

The switch cannot be left in the down position, so that there is no risk of accidentally feeding the exciter lamps with A.C.

Loudspeaker switch

When this switch is pushed down the cross-over network is switched off and the bass loudspeakers are switched on for the whole frequency range.

In case of a breakdown in the high-note loudspeakers it is therefore no longer necessary to interrupt the performance, for it can be immediately continued simply by pressing this switch down.

When the same switch is pushed up the auditorium loudspeakers are switched off and replaced by two load resistances. The monitor speaker, however, is left on. This position can be used for:

1. checking the installation without it being noticed in the auditorium;
2. measuring the frequency characteristics of the amplifiers.

The switch cannot be left in the up position, so that there is no risk of the loudspeakers being accidentally switched off.

Film/pick-up switch

The horizontal position is for normal film reproduction, while the down position is for gramophone pick-up.

Remote control switch

Normally the sound is regulated from the projection room by means of the master volume control and the film-correction switches for high and bass notes. However, an auditorium control box type 8562/00 (see fig. 7) can be supplied for regulating the volume and controlling the film-correction filters from the auditorium. For operating this remote control the switch is pushed down.

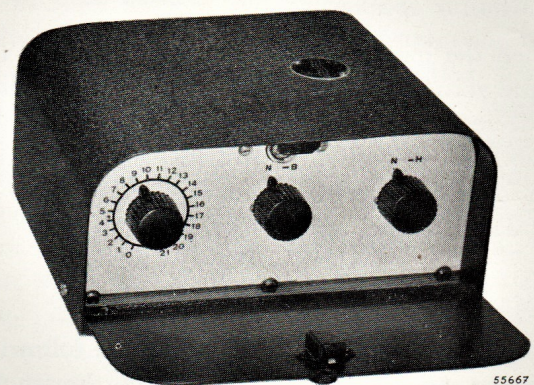


Fig. 7

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d. *Input switch panel*

From left to right one sees on this panel:

the photocell voltage regulators, which are adjustable with a screwdriver and by means of which the photocell voltage of both soundheads can be separately regulated, so that it is possible in this way to equalize the output of the two machines by utilizing A.C. feed for the exciter lamps;

the reserve switch, by means of which, in the "De Luxe" design, either the upper amplifier can be switched on with the upper supply unit or the lower amplifier with the lower supply unit, as required.

In the "Stereofonic" design, beside this switch there is another selection switch for normal, stereophonic or push-pull reproduction.

SIGNALLING AND TESTING DEVICES

1. **Monitor speaker**

In the top of the door of the amplifier cabinet is a monitor speaker. This is a permanent dynamic speaker giving excellent reproduction of the entire frequency range from 50 to 10,000 c/s.

2. **Signal lamps**

Red neon lamps on the front panels of the amplifier units indicate whether these are switched on or not. Signal lamps on the master control panel (left and right) indicate whether the exciter lamp of the left-hand machine or that of the right-hand machine is switched on.

3. **Measuring instrument**

On the front panel of each amplifier unit is a measuring instrument and underneath it a commutator with 9 positions.

The first six positions are for measuring the anode currents of the amplifying valves, in the seventh position the D.C. voltage from the H.T. apparatus for the amplifier is measured, in the eighth position the mains voltage, whilst in the ninth position the meter is circuited as output meter.

For measuring the output the meter has a second linear scale calibrated in dB.

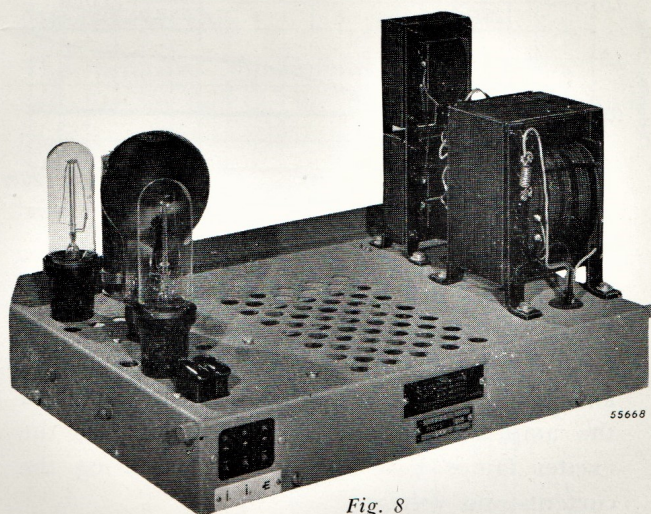


Fig. 8

4. **Built-in load resistances**

Load resistances are built into the amplifier cabinet. With the corresponding switch on the master control panel in the up position the loudspeakers behind the cross-over network are switched off and replaced by these resistances. With the help of a frequency-test film and the built-in measuring instruments it is then possible to measure the frequency response curves of the installation in front of the cross-over network, thus for single-range reproduction.

It is also possible to measure the response curves for two-way reproduction, thus behind the filter, by connecting a separate high-impedance A.C. voltmeter to the measuring contact sockets "B" and "H" in the bottom centre of the master control panel.

5. **Built-in electronic-ray oscillograph**

Several important advantages are offered by the electronic-ray oscillograph built into these amplifier cabinets. Many measurements and adjustments can be made—for instance focusing the sound optical systems—which could never be made with such accuracy without an oscillograph, and this can be done in the projection room itself, thus very much simplifying and making for better service of the installation.

6. **Measuring flexes**

Every installation is supplied with two measuring flexes for connection to an amplifier or supply unit when it has been taken out of the cabinet. This considerably facilitates the measuring up of a unit.

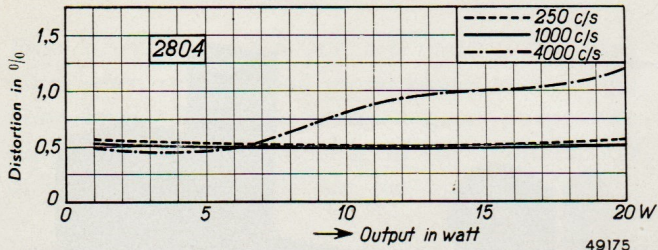


Fig. 9

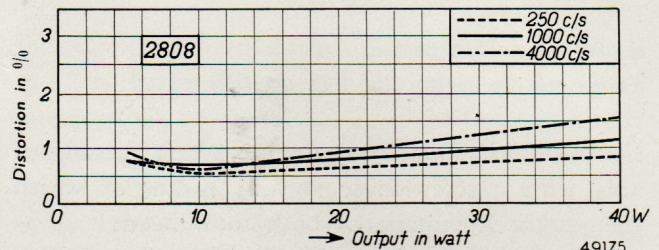


Fig. 10

7. Measuring sockets

In addition to the above mentioned sockets "B" and "H" for measuring the response curves of the amplifiers, also the supply units for the exciter lamps have sockets for measuring the currents and voltages.

QUALITY OF REPRODUCTION

Thanks to the excellent properties of the amplifiers (fig. 3) and the supply units for the exciter lamps (fig. 8), Philips type 2834 amplifier cabinet in conjunction with the appropriate loudspeaker units ensures the optimum of reproduction quality.

Two types of amplifiers can be employed, types 2804 and 2808. The diagrams of both types are practically the same, but in type 2808 higher-powered output valves are used which give more than twice the output of type 2804. For the technical data of these amplifiers see table II.

The distortion factor is very low, as may be seen from figs 9 and 10. Also the hum and hiss are very low with both amplifiers, viz. -63 dB and -70 dB for 20 mV input and maximum output. Thanks to the effective shielding of the wiring and the practically ripple-free feeding of the exciter lamps, the equipment as a whole is just as free of hum and hiss as the separate amplifiers.

The supply units for the exciter lamps deliver a direct current of 4 amp. for a voltage of 5 volt. This current is supplied by a gas-filled rectifying valve, type 367.

Further, in the exciter lamp circuit there are two barretters type 1913 which keep the current practically constant regardless of any fluctuations in the mains voltage, thus dispensing with a hand-operated regulating resistance and an ammeter in the exciter lamp circuit. Special attention has been paid to smoothing, for which an electrolytic condenser battery $4 \times 1300 \mu\text{F}$ is employed.

Two-way reproduction

Needless to say, this amplifier cabinet is equipped for two-way reproduction. The cross-over network (fig. 12) is built in at the bottom of the cabinet. The cross-over frequency lies at about 250 c/s. The network is provided with a plug for attenuating the high notes in three stages of 3 dB each (fig. 11).

The output impedance of the network for the high as well as for the low note channel is 500 ohms. With the loudspeaker set a transformer box is supplied containing matching transformers for connecting the various loudspeaker groups.

"Dual-track" reproduction

In the designing of this amplifier allowance has been made for future developments in recording technique.

Not only is the special "Stereofonic" design available for "dual-track" reproduction, but also the normal "De Luxe" design can easily be rebuilt to a stereophonic design by making only a few modifications. All that is necessary is to replace the input control panel, build in a second cross-over network — for which space and terminals are already available — and add an output transformer in the transformer box of the loudspeaker system.

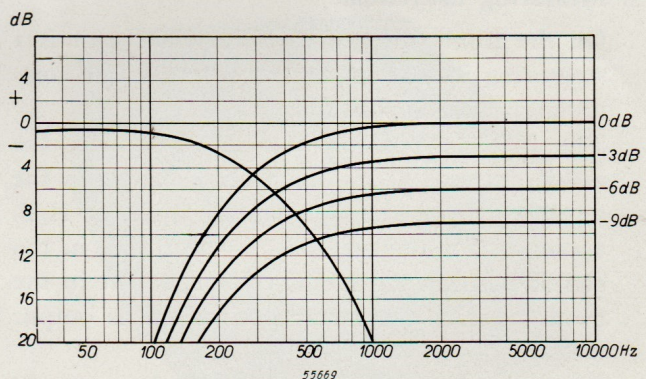


Fig. 11

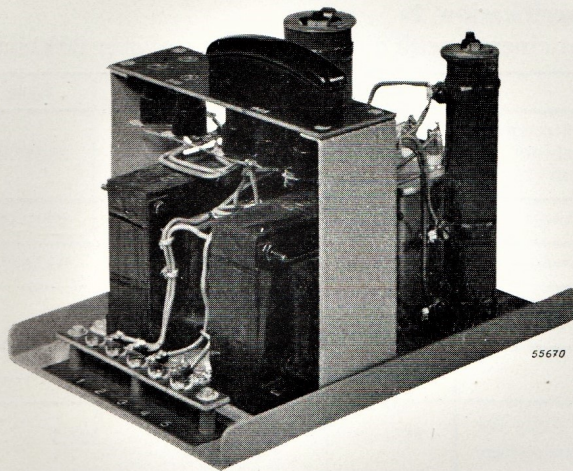


Fig. 12

CONNECTIONS

In the top of the cabinet are three clearly marked terminal strips for connecting (from left to right): the auditorium control box, pick-up, earth line, earth wires of the various units in the projection room, relays for the picture change-over device, high-note loudspeakers for stereophonic reproduction, normal high-note speakers, bass-speakers, exciter lamps and mains voltage.

The photocell cables are led into the cabinet from the sides and connected to a terminal strip behind the input control panel.

Between the back of the cabinet and the projection room wall free space has been left to allow for all cables to be mounted against the wall, thus making them invisible when the cabinet is put into place.

Mains voltage and frequency

The installation is suitable for 110 and 220 V mains, 40–100 c/s.

DIMENSIONS

The principal dimensions of the cabinet are indicated in fig. 13; the dimensions of the auditorium control box in fig. 14.

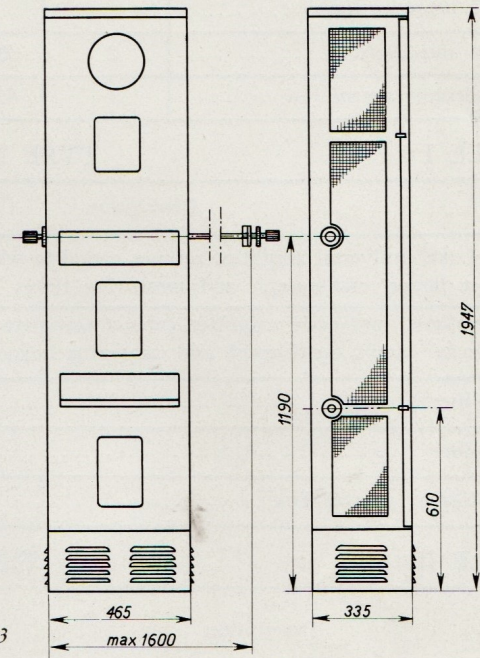


Fig. 13

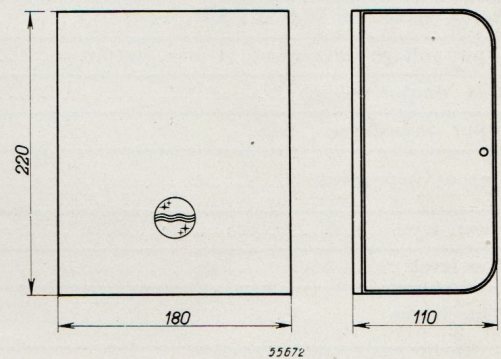


Fig. 14

SPECIFICATIONS OF THE DIFFERENT DESIGNS

Specification 1

For cinemas with a max. of abt. 2000 seats.

Description	Number	Type
"De Luxe" universal amplifier cabinet for normal reproduction	1	2834/21
Power amplifiers	2	2804/00
Auditorium control box	1	8562/00

Specification 1a

For cinemas with a seating capacity of over 2000 seats.

Description	Number	Type
"De Luxe" universal amplifier cabinet for normal reproduction	1	2834/21
Power amplifiers	2	2808/00
Auditorium control box	1	8562/00

Specification 2

For cinemas with a max. of abt. 2000 seats.

Description	Number	Type
"Stereofonic" universal amplifier cabinet for normal and "dual-track" reproduction	1	2834/31
Power amplifiers	2	2804/00
Auditorium control box	1	8562/00

Specification 2a

For cinemas with a seating capacity of over 2000 seats.

Description	Number	Type
"Stereofonic" universal amplifier cabinet for normal and "dual-track" reproduction	1	2834/31
Power amplifiers	2	2808/00
Auditorium control box	1	8562/00

TABLE I TYPE NUMBERS AND WEIGHTS

Description	Type	Nett-weight	
		lbs.	kg
"De Luxe" universal amplifier cabinet complete with two supply units for exciter lamps, oscillograph and measuring flexes, but without amplifiers	2834/21	266	121.3
"Stereofonic" universal amplifier cabinet complete with two supply units for exciter lamps, oscillograph and measuring flexes, but without amplifiers	2834/31	273	124.0
Amplifier	2804/00	43.5	19.8
Amplifier	2808/00	59.5	27.0
Auditorium control box	8562/00	8.4	3.8

TABLE II TECHNICAL DATA

Description	Cabinet "De Luxe"	Cabinet "Stereofonic"	Electronic-ray Oscillograph	Amplifier	Amplifier
Type	2834/21	2834/31	9581/00	2804/00	2808/00
Input voltage for film at max. output	2 mV	2 mV	—	2 mV	2 mV
Input voltage for pick-up at max. output	50 mV	50 mV	—	50 mV	50 mV
Max. output voltage	—	—	—	100 V	158 V
Input impedance	50,000 Ω	50,000 Ω	—	1.5 MΩ	1.5 MΩ
Output impedance	H 500 Ω B 500 Ω	H 2×500 Ω B 500 Ω	—	500 Ω	500 Ω
Hum level	-63 dB	-63 dB	—	-63 dB	-63 dB
Hiss level	-70 dB	-70 dB	—	-70 dB	-70 dB
Pilot lamps	2×8073D,07 6×6914	2×8073D,07 6×6914	—	1× 9512-110 V	1× 9512-110 V
Fuses	—	—	—	1×0811751	1×0811751 1×0810096 1×4378
Valves	—	—	1× DN 7/2 1× 4673 2× 1876 1× 4690	2× 4699 1× AX 50 4× EF 6	2× EL 51 1× AX 50 4× EF 6
Mains voltage	110 V or 220 V				
Mains frequency	40 c/s-100 c/s				

FOOT AND INCH EQUIVALENTS OF DIMENSIONS IN FIG. 13

mm	ft. and inches	mm	ft. and inches
335	1' 11 ¹ / ₄ "	1190	3' 10 ⁷ / ₈ "
465	1' 6 ³ / ₈ "	1600	5' 3"
610	2'	1947	6' 4 ³ / ₄ "

FOOT AND INCH EQUIVALENTS OF DIMENSIONS IN FIG. 14

mm	ft. and inches
110	4 ³ / ₈ "
180	7 ¹ / ₈ "
220	8 ⁵ / ₈ "