

PHILIPS



Review

PHILIPS

Cinema

OF PHILIPS CINEMA EQUIPMENT

**Presenting
the revolutionary**

FP 20-S

**shutterless 35 mm film projector
with the economical SPP-lamp**

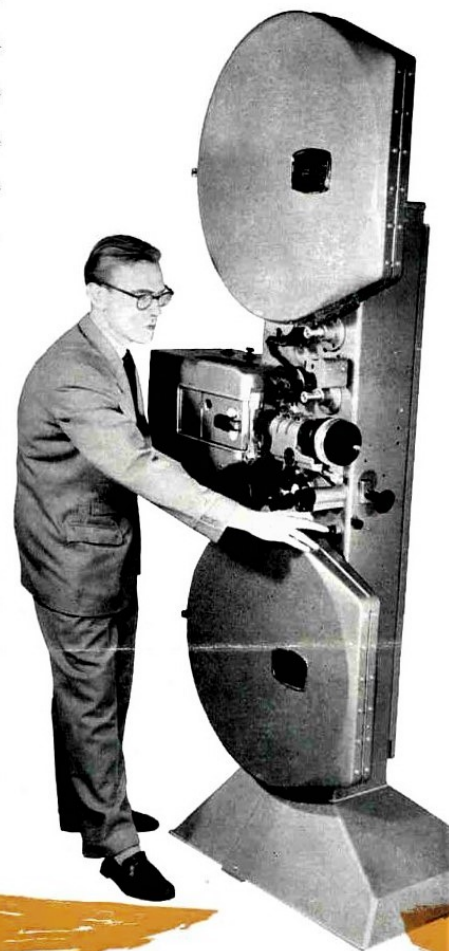
Introducing the SPP 800 gas-discharge lamp, a brand new light-source representing the fruit of years of research, making a shutter superfluous,

so that the highest luminous efficiency is obtained. Operating-costs per Lumen are now lower than with any other light-source in cinema-projection.....

14 HIGH LIGHTS

- Flicker-free projection, even at much higher luminous intensities than normal. 72 light-pulses per second....
- Constant luminous flux, irrespective of the number of operating hours and irrespective of mains voltage fluctuations....
- Perfectly uniform brightness, right into the corners of the screen....
- Ideal colour-rendering....
- Completely safe operation....
- No flue or exhaust system needed....
- Lamp can be replaced without interrupting operation. Automatic lamp exchange precludes interruptions of the performance....
- Light-source requires no adjustment whatsoever....
- Low energy consumption....
- High luminous efficiency....
- Low running costs....
- Ideal for remote control and automatic systems....
- Saves space in projection room....
- Minimal heating of film, hence good definition at all times....

} = greatest economy



Meeting all the wishes of **exhibitor** and **projectionist**....

and the FP20 PROJECTOR

which is not ADAPTED TO but
SPECIALLY CONSTRUCTED FOR the film projection systems of today.

Simple, logical, functional design.

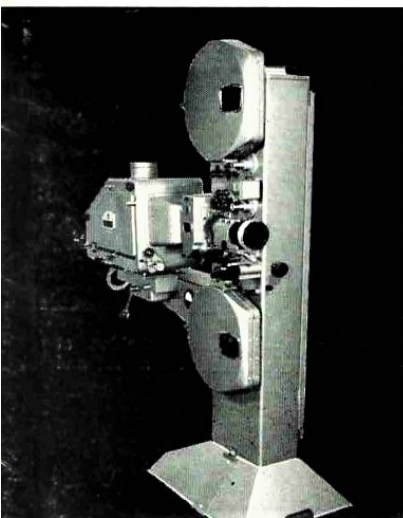
FP 20

- Appreciable light gain thanks to new shutter construction. Single-blade, double-speed shutter of large diameter.
- Efficient film cooling. Ventilation fins in the shutter ensure effective cooling of film and runner plate. Additional water and air cooling superfluous.
- Versions available: optical sound or optical and magnetic sound. Both versions with 2000 ft (600 m) spool boxes or 6000 ft (1800 m) spool boxes. Projectors can easily be modified from one version to another.
- Readily adaptable for "cold light" projection, with the economical Philips SPP 800 lamp.

FP 20-S

- Uninterrupted projection of film lengths up to 6000 ft (1800 m), this projector being normally equipped with 6000 ft spool boxes.
- Projector available in two versions:
a) for optical sound and
b) for optical and magnetic sound.
Version a) can always be readily modified into version b). Both versions can be supplied with slide attachment.
- SPP lamp is automatically switched on as soon as the film has attained its full speed. When the motor is switched off the lamp is also switched off automatically.

See page 2
for more technical data



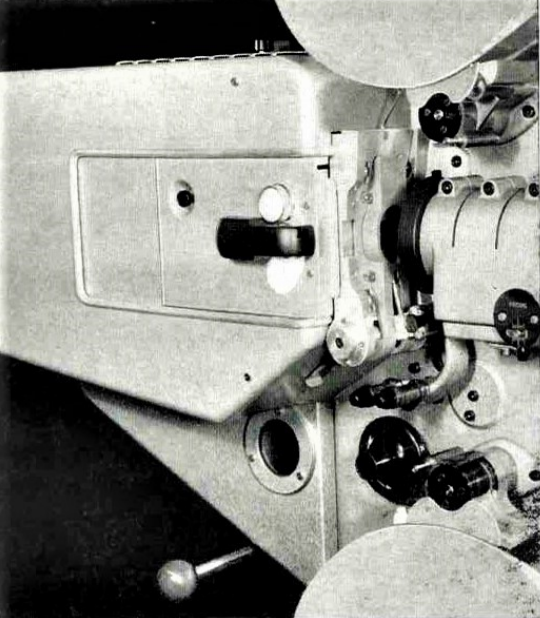


Fig. 1. Detail of projector FP 20 S with the economical Philips SPP-lamp, in the version suitable for films with optical sound up to 6000 ft length.

Alignment

The skeleton of the projector is a steel housing pressed as a single unit of rectangular cross-section. Its front face is accurately plane-aligned, so that components to be subsequently fitted will not require any special alignment to ensure a smooth running of the film.

Simple driving mechanism

Owing to a suitable combination of various transmission systems and a new central framing device, the driving mechanism is extremely simple. For instance, a single chain is used for driving both take-off sprocket and take-up spool. All chains are slow-running on plastic sprockets, which render them practically indestructible and ensures an absolutely silent operation. The central framing device requires no shutter phase correction and eliminates the customary gear transmission.

Simple maintenance

All spindles and shafts are enclosed in sealed ball-bearing housings, requiring no lubrication, and all guide rollers are made of self-lubricating material. Lubrication is thus practically confined to occasionally topping up the oil bath of the Maltese cross. Any risk of oil splashing on the film is precluded. The driving mechanism does not require any sealing and is therefore always readily accessible.

Simple film-threading

The driving system is essentially simplified as compared with former projector types. Firetrap rollers serve also as feed and hold-back sprockets whilst pressure skate and padshoe of the intermittent sprocket constitutes a single unit. The number of manipulations for threading the film is less than ever before.

Superior picture quality and stability

The curved runner plate, which proved so successful in the Philips Multi-Purpose Projector DP 70, has also been applied here. It results in a superior picture stability and in addition prevents buckling of the film and ensures uniform picture definitions throughout the whole width of the screen. The runner plates, made of steel or velvet-covered, can be readily interchanged without any tools. They are reversible, which doubles their useful life. As in other Philips projectors, the lengths of the runner plate and the pressure skates are such that the velocity at which film splices enter or leave the film gate is practically zero. At these critical moments, therefore, splices are subjected to minimum stress, so that the danger of their coming unstuck is greatly reduced. The film is laterally stabilized by four guide rollers of a ceramic material, fitted two by two at the upper and lower part of the running plate. Being spring-loaded, they can be quickly interchanged, whilst it ensures stable guidance even in case of fluctuating film width. The pressure skate can be centrally adjusted with a knob on the front of the projector. A skate pressure indicator facilitates re-adjustment of skate pressure when changing over from steel to velvet-covered runner plates and vice versa.

PROJECTOR FP 20-S

In order to utilize the features of the economical Philips SPP lamp for cinema projection to full advantage a new projector design was considered necessary. Such a projector should obviously be equally well suitable for all current projection techniques and at the same time incorporate every improvement made possible by the latest progress in mechanical engineering. Consequently, Philips had to break with many established conceptions and make an entirely new start in developing a logical design in the form of a compact and complete entity. The extent to which the designers have employed novel principles in building this projector is already apparent from its external appearance.

Masks readily interchangeable

Masks for different aspect ratios are inserted into a slit directly behind the runner plate and automatically snap into the correct position. They are readily interchangeable even during projection.

Magnetic impulse control

Instead of the rotary shutter inevitable in all conventional projectors, a very simple device for synchronizing the action of the Maltese cross with current impulses for the new light source is employed here. A number of slits have been milled in the edge of the flywheel of the Maltese cross drive, by means of which the impulses can be magnetically controlled. Consequently any phase difference between the action of the Maltese cross and the flashing of the lamp is precluded.

New lens holder construction

The lens holder consists of high-precision parallel guiding rigidly mounted on the steel housing, upon which a slide can move, suitable for lenses up to 70.6 mm diameter. A combination of the fine-focusing screw and a pressure spring makes it possible to move the lens completely free of backlash or idling. The slide can be removed from the parallel guiding in a single manipulation. For changing to a different aspect ratio the slide is therefore rapidly interchanged with one carrying another lens. When the projector is installed the lenses are so adjusted in their slides that they can be interchanged without refocusing, apart from readjustment required by the film itself. Initial focusing may be checked by a graduated scale. The pitch of the fine-adjusting screw is the optimum compromise between rapid adjustment and accuracy of fine adjustment. An electric remote-control device for picture focusing is available on request. This enables focusing to be effected at any desired spot in the theatre, where the definition can be better judged than in the projection room.

Mono-knob operation

Starting, change-over and stopping the projector is done with a single switch. When, after starting the motor, the film has reached the proper speed, the lamp is automatically switched on. Together with the motor also the lamp is switched off. This monoknob operation leaves the projectionist free to concentrate his attention on the picture. Furthermore, by quickly flipping the switch up and down, the film can be moved forward in short lengths, which is convenient for finding the starting frames.

Protective device

Obviously, the necessary protective devices have been incorporated, e.g. the automatic film-rupture device. As soon as the film breaks and the upper loop becomes too large, it trips a micro-switch, which is operated at the slightest pressure, and motor and lamp are switched off.

Turret device with 2 lamps provides 100 % light reserve

In spite of its strikingly small size, the lamp housing contains a turret device with 2 lamps. If the lamp being used should break down, the spare lamp immediately and automatically takes

over, so that there is no perceptible interruption in the light or in the projection of the film. Whilst the spare lamp is being used, the projectionist, simply by sliding out the defective lamp and its socket, can replace it by a new one in a few seconds.

With the carbon-arc lamp the operating time of a single projector is necessarily limited. It takes a considerable time before the hot remnants of the carbon rod can be removed and a new one inserted, and only seldom will these rods be completely used up. On the other hand, the working life of the SPP-lamp with its instantaneous stand-by arrangement, is in fact irrelevant as regards reliability. Each lamp is always fully utilized and the projector may remain in action for an indefinite period. The projector FP 20 S is therefore as a rule equipped with spool boxes for 6000 ft of film.

Slide-projection arrangement

By means of a lever the whole lamp turret can be slid backwards. When the projector is fitted with an additional slide-projection unit, it is changed over from film to slide projection by means of the same lever.

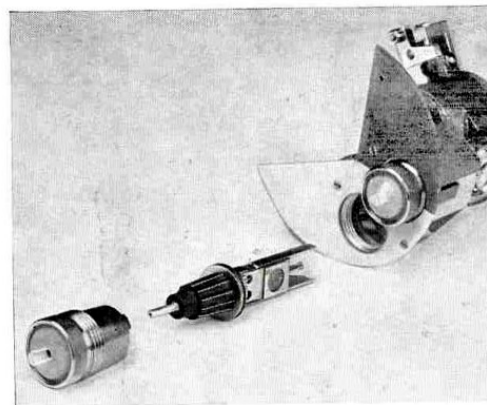


Fig. 2. Lamp turret of the automatic replacement device; holder and contact cap of the "working" lamp have been removed.

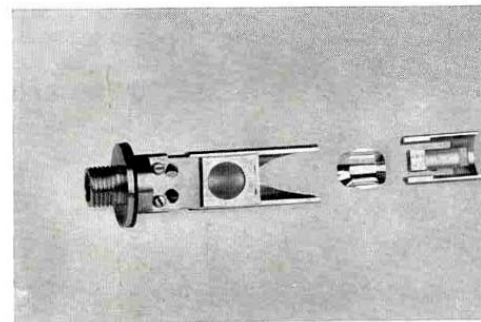


Fig. 3. Component parts of the lampholder, at the right below the cylindrical mirror and mirror holder.

Pulsator

The SPP lamp is fed by a pulsator, which has been designed for feeding both projectors. Like the customary rectifier it may be installed in an adjoining room. Adjustment of the lamp output, which is as a rule only necessary once, is done on the projector.

Thanks to the economical Philips SPP lamp, the running costs of the projector FP 20 S are considerably lower than those of conventional types.

A particular advantage for many small theatres is the fact that this projector, owing to its small lamp housing, takes up very little space in the projection room.

A highly important feature, however, is that the

extremely convenient handling of the SPP lamps and the mono-knob operation of the projector render it extremely suitable to be operated by automatic devices.

A device made available by Philips relieves the projectionist from all routine operations when changing-over from one projector to the other: starting the motor and lighting the lamp, changing-over picture and sound simultaneously, stopping the motor and switching off the lamp of the first projector. By effecting all these operations automatically, a perfect "automatized" change-over of picture and sound is guaranteed.

This device warns the projectionist of the imminent change-over by a bell signal, so that he can pay due attention to the proper starting of the machine and the correct adjustment of skate pressure and focusing.

designed, shutterless projector. Without entering into the constructional details of this projector, the following will give a brief description of the working of the lamp and how it is utilized in the projector.

Since the lamp is small and may be placed without any risk in the immediate vicinity of the picture gate, its optical system can likewise be small (fig. D). It consists of a cylindrical reflector not larger than 11 x 9 mm and two lenses, which form an image of the discharge in the objective lens. This explains the exceptionally high side-to-centre ratio of 95 %.

Every frame of the film receives three flashes (fig. 2) when stationary. Even for a picture brightness of twice the value up to now permitted with carbon-arc or xenon lamps the picture shows no trace of flickering. The film is moved up whilst the lamp is completely dark. A projector equipped with this lamp accordingly does not require a rotary shutter and all light produced is completely utilized for projection, whereas in the conventional carbon-arc and xenon-lamp projectors half of it is cut off by the shutter. The SPP-lamp operated at 800 W produces the same luminous flux on the screen as a HI-arc lamp at a current of 60 A. This is amply sufficient even for the larger cinemas. The screen sizes attainable on a matt-white projection screen with a reflection factor of 0.8, on a screen with an average angle of vision with a reflection factor of 1.8 and on a narrow-angle screen with a reflection factor of 3, with the aid of a projection lens of 1:1.8 are given in the following table. Strongly reflecting screens, e.g. beaded screens, owing to their narrow angle of vision, are obviously unsuitable for large cinemas. This should be kept in mind when consulting the table.

Maximum screen sizes in m for standard luminous intensity

Aspect ratio		Standard 1 : 1.37	Wide screen 1 : 1.85	CinemaScope 1 : 2.34
Matt-white	Q = 0.8	8 X 5.8	8 X 4.3	10.5 X 4.5
average angle of vision	Q = 1.8	12 X 8.8	12 X 6.5	16 X 6.8
narrow angle of vision	Q = 3.0	16 X 11.6	16 X 8.6	20.5 X 8.7

Particular attention should be drawn to the uniform illumination of the screen. Whereas for carbon-arc projection a side-to-centre ratio of 75% and for xenon projection an even lower ratio is considered permissible, the side-to-centre ratio with SPP-projection for both left and right-hand edge is at least 95%. A low side-to-centre ratio is primarily due to an uneven light intensity in the carbon crater and in the xenon arc, since an image of these is directly formed on the film by the optical system. With the SPP-lamp, however, the image of the arc is formed in the objective.

The special qualities of the SPP-lamp greatly facilitate the work of the projectionist. Its operation is confined to switching on and off insofar as this is not automatically effected by the projector. When used, it does not produce any dust or noxious fumes and hence requires no ventilation device. It can readily be operated by any automatic device. It is so small that it can be mounted together with a spare lamp and automatic change-over device in the projector.

The excellent luminous efficiency owing to impulse-feed results in a considerable saving in electric current. This favourably influences the total running costs resulting from current consumption and lamp replacement. As the lamp is moderately priced, total running costs are lower than those for any other light source.

The economical Philips SPP lamp

Up to now the larger cinema projectors were exclusively designed in accordance with the properties of the carbon-arc lamp. The present advanced development of gas-discharge lamps, however, has resulted in types suitable to be used in film projectors. Therefore, after many years of research, Philips have developed a special type of gas-discharge lamp for this purpose. After it has been tested for two years in a 700-seat theatre, nothing further stands against its general introduction into the cinema.

This gas-discharge lamp SPP 800 (fig. A) consists of a quartz tube of 80 mm length and a largest diameter of 5.6 mm, which makes an extremely small lamp. The discharge takes place inside a thin capillary tube with an arc length of about 17 mm. For film projection the lamp is driven by a pulsating direct current of 72 impulses per second or 3 impulses per frame (fig. B). Light is produced only during these current impulses; in the intervals the lamp is dark. This lamp finally fulfils the old dream of the cinema technicians: to be able to produce light only as long as it is necessary for actual projection, thus cutting the losses caused by the rotary shutter.

Operating the SPP lamp is completely without danger as the capillary tube has a volume of only a few mm³. Moreover, when the lamp is not used, the gas pressure within it is below atmospheric pressure, whilst under working conditions it is contained in a fully-sealed holder in which it is surrounded by a flow of cooling water.

The SPP lamp can be loaded up to 800 W. The average life of this inexpensive lamp is 33 working hours under full load. At lower loads however, the working life is considerably extended.

Unlike that of incandescent lamps or carbon-arc lamps, the luminous flux decreases no more than proportionally with the load, so that the luminous efficiency remains equally high. The extremely high current intensity during the impulse peaks at which values ten times the mean value are reached, leads to a continuously uniform spectral energy distribution, permitting excellent projection of colour film. Both according to the way it is produced and to its spectral distribution, the light can be classified as "cold light", so that the film is hardly heated. Ultraviolet radiation is eliminated by an absorption filter contained in the lamp holder.

The luminous flux of each individual lamp remains constant throughout its life (fig. C). Only just before its ultimate breakdown the luminous flux shows a pronounced deterioration. This is a

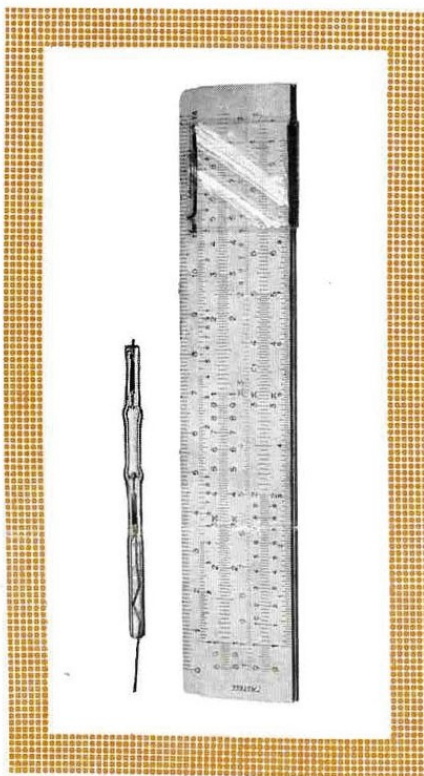


Fig. A. The economical Philips SPP-lamp for cinema projection with impulse feed. Its minute size is shown in comparison with the slide rule.

clear indication for the projectionist that the lamp should be exchanged at a suitable occasion. The difference in luminous flux between the various lamps is only a matter of a few per cent. Consequently, there is no objection to using an old lamp in one projector and a new lamp in the second one under the same load.

The excellent properties of this gas-discharge lamp can only be fully utilized in a specially

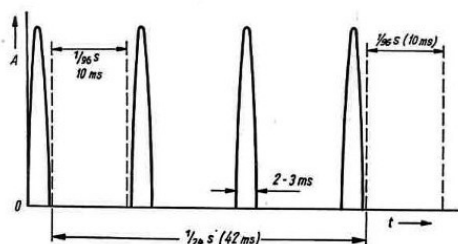


Fig. B. Current intensity of the SPP 800 plotted versus time. The film moves forward during a dark interval; during its stationary period three pulses occur, each with a duration between 2 and 3 ms, dependent upon the load.

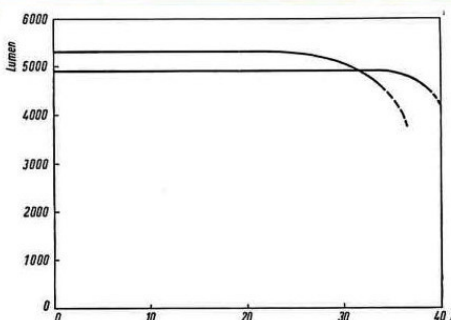


Fig. C. Luminous flux of two SPP lamps during their working life, according to measurements of a realistic life test under the full load of 800 W.

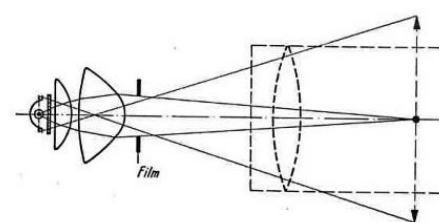
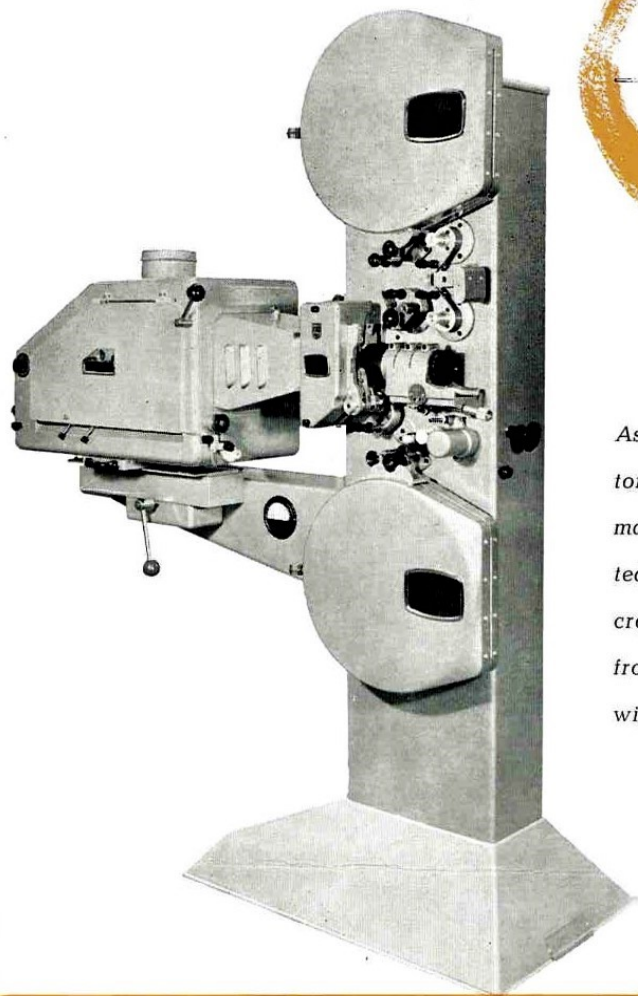


Fig. D. Optical system for film projection with the SPP 800 with the direction of the light rays schematically shown.

The projector FP 20 for carbon-arc projection



As regards general design, driving mechanism and film transport, the carbon-arc projector FP 20 is very similar to the SPP projector FP 20 S. This does not apply to the magnetic synchronization device, instead of which a rotary shutter has been incorporated. This is a single-blade shutter rotating at double the speed of the pin of the Maltese cross, viz. at 2880 r.p.m. Thanks to the large diameter of the blade, its small distance from the picture gate and its high rotation speed, the same high efficiency of 54% as with the Philips Multi-purpose Projector DP 70 has been attained.

The shutter is provided with ventilating blades, blowing a strong flow of air against the film. The film is cooled so efficiently that no additional air-compressor or water-cooling is required even for large lamps. The air-flow is at the same time used for moving a second disc lying parallel to the shutter. This disc blocks the light rays and does not open before the shutter has reached the appropriate speed and produces an adequate air-flow. The projector FP 20 may be fitted, as desired, with spool boxes for a maximum of 2000 ft or 6000 ft of film. The necessary holes provided for fitting these spool boxes as well as those for fitting an additional magnetic sound head and the base plate for the arc lamp are already provided in the steel housing. Any subsequently incorporation of a magnetic sound head, as well as a change-over from small to large spool boxes and even a subsequent replacement of the arc lamp by the gas-discharge lamp of the FP 20 S can thus be readily carried out.

Projector FP 20 with a HI-carbon-arc lamp for current intensities up to 50 A.



NEW "TRANSISTORISED" CINEMA AMPLIFIER (M2)

This very modern and "transistorised" Philips cinema amplifier has been designed for the reproduction of optical sound tracks.

In conjunction with Philips cinema loudspeakers it forms an ideal sound system for halls with a seating capacity of about 1500.

Principal features are:

- Utmost reliability.
- Small dimensions.
- Easy to install.
- Large output power.
- High sensitivity.
- Continuously adjustable frequency response.
- Simple operation.
- Easy maintenance and servicing.
- Tropicproof throughout.

That all these features could be united in an amplifier of such small dimensions is due to the fact that the latest inventions in electronics: transistors and printed circuits, have been applied.

Great reliability

Valves, because of their necessarily limited life, are the weakest points in every amplifier. The pre-amplifying part of the Philips "M2", however, contains no valves at all. It has completely been transistorised and the life of transistors used in pre-amplifying circuits can be compared with that of resistors, which hardly ever cause breakdowns.

For output amplifiers of appreciable power, transistors are less convenient.

The output stage of the Philips "M2" therefore has been equipped with traditional valves of the most reliable and up-to-date types.

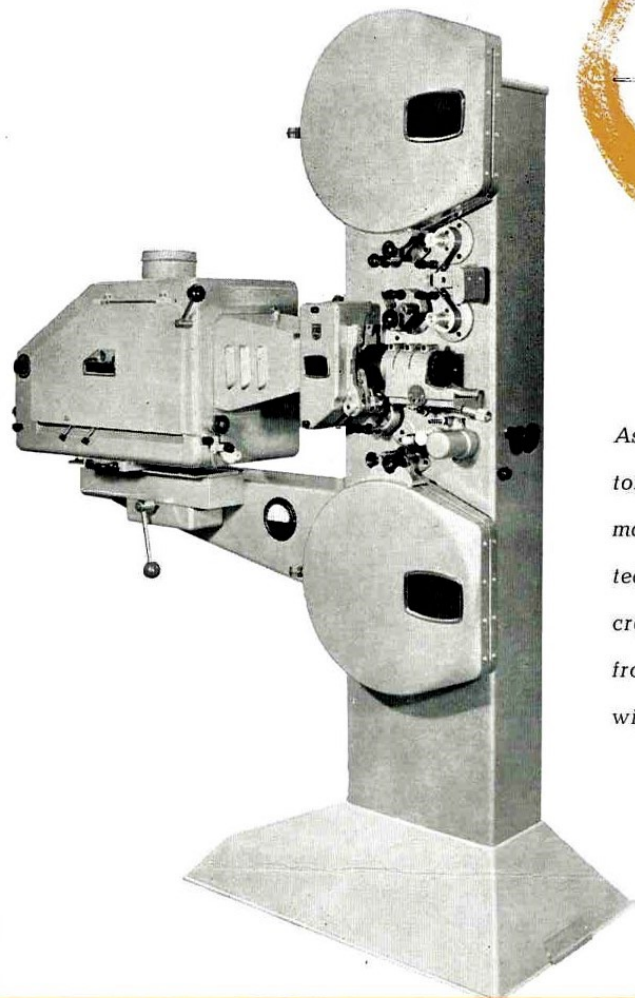
High-frequency exciter lamp supply is built-in.

The pre-amplifier and the output amplifier form one plug-in unit.

Printed circuits (i.e.) copper connecting strips "printed" chemically in mounting plates, instead of the normal wiring between the parts) contribute to a great extent to the reliability of the amplifier. Cable rupture and insulation defects are thereby completely excluded.



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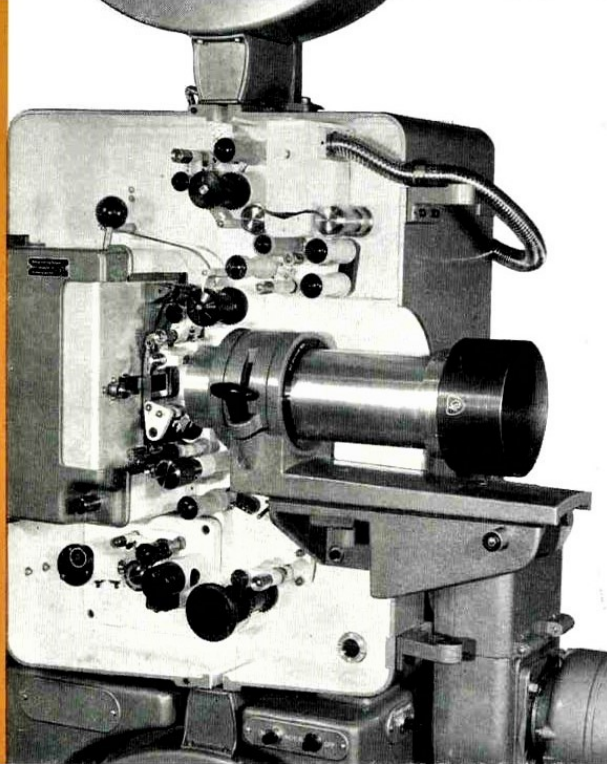
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CONSTRUCTION DETAILS

It will be obvious that for the projection of 70 mm films a 35 mm projector could not just be adapted. A completely new machine had to be built with a very rugged construction, in order to satisfy various special demands.

Driving mechanism

The driving mechanism is very sturdy and at the same time very simple, making it perfectly reliable. The sprockets, the intermittent mechanism, the shutter and the take-up spool are driven by a stout vertical main spindle. This spindle is driven by a horizontal shaft, which also drives the spur-gear oil pump located in the base of the projector housing and hence is always below the oil level. All the gear-wheel transmissions and bearings are richly lubricated via an oil conduit with tappets.

Intermittent mechanism

In principle, the intermittent mechanism of the DP 70 projector equals that of normal 35 mm mechanisms, but it is of much more robust construction. However, to keep the acceleration forces and therefore wear of the mechanism as low as possible, it is of the utmost importance that the Maltese cross and the intermittent sprocket be light. Aluminium was the most obvious material to use, since it is light in weight, but it is also soft and therefore at first sight did not seem suitable for the manufacture of sprockets. After many experiments, a special method was

found for hardening the surface of the aluminium, and a life test proved that aluminium sprockets treated in this way compared very well with chrome-nickel sprockets.

Picture gate

The larger size of the image area entails also a different construction of the picture gate.

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and catalogue material***

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Due to the greater mass of the 70 mm film, the normal construction (a flat runner plate and resilient pressure skates) provides inadequate braking power.

For good definition it is furthermore necessary that the distance between the film in the gate and the projection lens should not vary.

When a flat gate is used, 70 mm film is liable to bend in a transverse direction and this cannot be remedied. For these reasons, the DP 70 projector is equipped with

a curved runner plate. The slight bend in a longitudinal direction gives the film a greater transverse stiffness.

Shutter

The DP 70 projector is equipped with a one-blade conical shutter with a very large diameter. At a film speed of 30 frames/sec the shutter rotates at a speed of 3600 r.p.m. and at a film speed of 24 frames/sec at 2800 r.p.m. This type of shutter has been chosen for the following reasons: The Todd-AO system is intended in the first place for the projection of very large pictures. Loss of light must therefore be avoided as much as possible. The conical shutter can be mounted close behind the mask, so that it intercepts the light beam where it is narrowest. This, in conjunction with the large diameter and the high speed, guarantees the smallest possible angle of interception and the highest efficiency for this type of projector.

Cooling

The high light-intensity and the great heat it generates require powerful and efficient cooling of both the film and the projector. For this reason, the plate on which the pressure strips are mounted is watercooled.

The shutter of the DP 70 projector has been constructed as a powerful fan which sucks in the cold air from the rear of the projector and blows it against the film in the gate.

Lens holder

The Todd-AO system requires a very large optical system. The

CinemaScope films is located at the top of the two rotating sound drums of antimagnetic material. The optical soundhead also forms a single, easily removable, unit. One of the most important characteristics of this soundhead is that in the scanning system a 13.5 times enlarged picture of the sound track is projected on to the scanning slit. This picture is visible through an observation window, so that the position of the sound track with respect to the slit can easily be adjusted by the projectionist.

Light source

The shape of the projector and of the mounting table are such that any light source can be used, provided that its optical properties match the image size.

Parts for modifying the projector.

As, for the time being, it is not to be expected that a given theatre will show only 70 mm films, it is necessary that the projectors can also be made suitable for running 35 mm films.

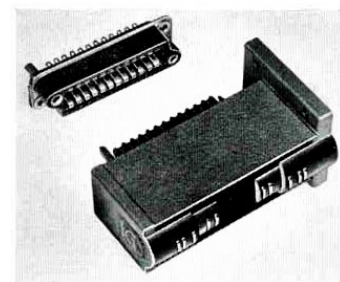
The DP 70 projector is undoubtedly most universal in this respect. Films shot in any of the previously mentioned systems can be shown with this projector.

The modification from 70 mm to 35 mm film projection or vice versa takes only a few minutes. The mask of the gate for 35 mm films can be replaced in a few seconds by that for CinemaScope films or by a wide-screen mask. All the sprockets used in this projector and the rollers of the fire traps are universal and do not need to be replaced. Each sprocket is provided with two sets of teeth, one set spaced for 70 mm film and the other spaced for 35 mm film. The outer flanges of the intermittent sprocket have 20 teeth and the dinner flanges 16 teeth; for the other sprockets the number of teeth is 30 and 24 respectively. The teeth have the required shape for CinemaScope film.

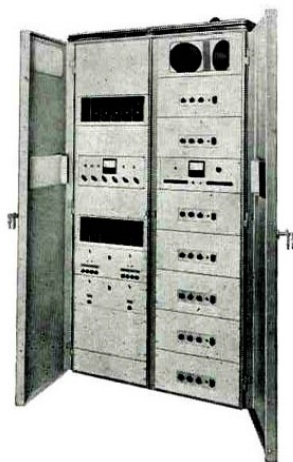
size of this system determines that of the lens holder. The lens is focused by means of the knob underneath the lens mount bracket over which the entire lens holder slides during focusing; this adjustment is free of any backlash.

Soundheads

The soundhead for the scanning of magnetic sound tracks is located in the top right-hand part of the projector. A combined scanning head for 70 mm films and



Magnetic scanning head



AMPLIFIER ASSEMBLY FOR 6-CHANNEL SOUND REPRODUCTION

A complete sound reproduction system can be supplied together with Philips 70/35 mm projectors. The sound amplification part consists of a Twin-Cabinet, housing all apparatus necessary for pre-amplification, power amplification, leveling and equalizing.

For volume control in the auditorium itself, a special remote-control box can be supplied.

The left part of the Twin-Cabinet contains all the pre-amplifiers and feed units, the right-hand part contains all power amplifiers, cross-over network and monitor loudspeakers.

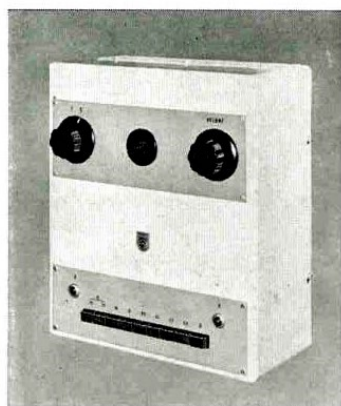
The cabinet is completely enclosed by doors, which can be locked to avoid accidental alteration to preset controls. The two control

panels, however, are left free for easy operation.

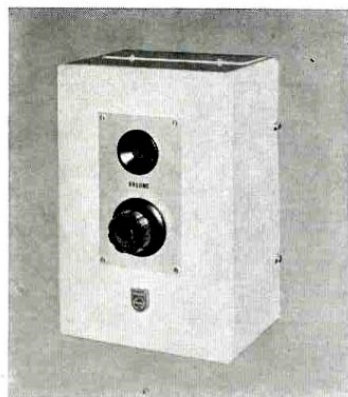
Operation during the performance requires only pressing of the push-buttons on the separate control box between the projectors.

The sound source required for reproduction can be selected from among the 9 push-buttons on this box: either Todd-AO 6-channel magnetic sound, or 35 mm CinemaScope 4-channel or single-channel magnetic sound, normal optical sound, PerspectaSound, pick-up, microphone, gong, or an extra signal.

Loudspeaker combinations required for Todd-AO reproduction can all be supplied from the normal range of Philips Cinema equipment.

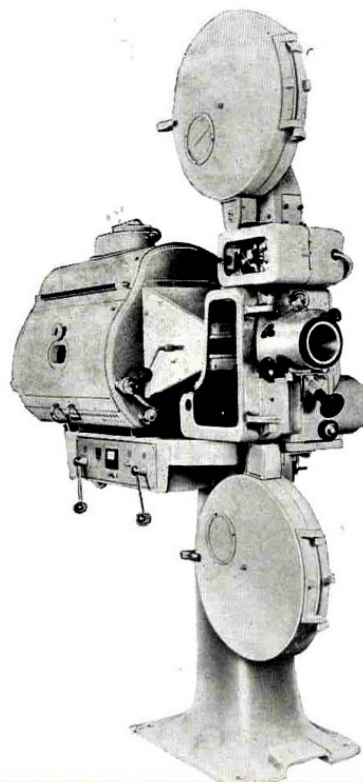


Control box for the projection room



Remote-control box for the auditorium

The 35 mm projectors FP 7 and FP 56



FP 7

The FP 7 is a so called "enclosed" projector, whereas the FP 56 is not enclosed.

The optical soundhead and the projector of the FP 7 form one entity; on the FP 56 the optical soundhead is a separate unit. Total enclosure of the film path of the FP 7, by means of a glass door, protects it against the entry of dust and, moreover, deadens the noise of the film running through the projector. The additional magnetic sound heads are also enclosed by glass doors when they are supplied for the FP 7.

The FP 56 projector has a lens holder for lenses with a diameter of max. 82.5 mm (about 3 1/4 ins); the FP 7 can accommodate a lens as large as 104 mm (about 4 ins). A water cooling system, manual film loop correctors for changing loop sizes during operation, and "de luxe" pedestals on which also the optical axis can be adjusted both vertically and horizontally, can be supplied for both types.

The basic construction of the FP 7 and FP 56 is the same. The following points summarize the many excellent qualities common to both types:

1. Sturdy and simple driving system. Safety clutch between motor and main shaft prevent the gear wheels from being damaged in the case of breakdown.
2. Rich lubrication visible through a sight-feed glass from a no-loss circulating system fed by a high pressure gear-wheel oil pump.
3. Gauze and magnetic oil filters in the illuminated oil circuit remove all impurities from the oil.
4. Intermittent mechanism satisfying the highest demands, owing to the use of high-grade materials, high precision finish and excellent lubricating system. Cam, striking pin and Maltese cross are ground to a tolerance of 1 micron.
5. The intermittent sprocket is milled out around the base of the teeth, lending more steadiness to the picture.
6. The intermittent sprocket weighs only 16 grammes. Owing to this low weight the acceleration forces remain small, thus minimizing wear and tear of the intermittent mechanism.
7. Central framing device with the intermittent movement rotating around the shaft of the intermittent sprocket, while the top and bottom loops retain the same size.
8. The lens holder together with the door of the picture gate forms one unit and is moved aside by pressing a button, thus considerably simplifying threading of the film.

9. Possibility of using a condenser lens, giving a substantial light gain and improved light distribution when lenses with short focal lengths are employed.

10. Skate pressure is adjusted centrally by only one screw, ensuring absolutely uniform pressure over the whole length of the film in the gate.

11. The film gate has been constructed in such a way that a splice is drawn into the gate and also leaves the gate at minimum speed. Consequently the danger of film rupture is reduced. Moreover, splices pass practically noiselessly.

12. Ventilating drum shutter cools the film in the gate aperture even without the use of a separate air compressor.

13. Possibility of connecting up an air compressor. All projectors are fitted with built-in cooling air channels. Complete water cooling unit can be fitted in a few minutes.

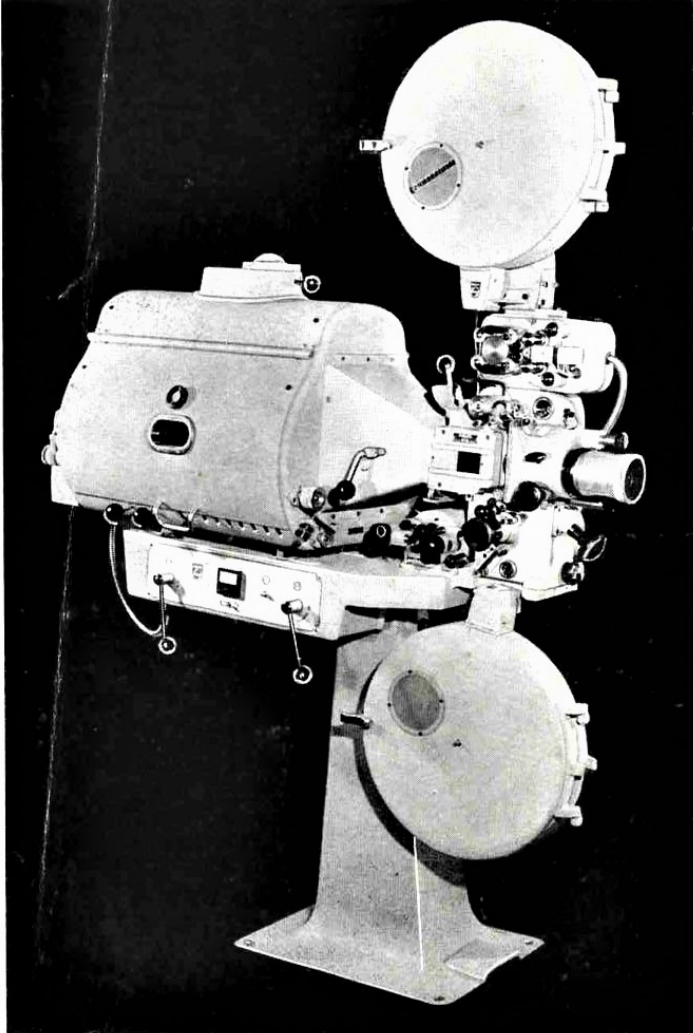
14. Paired knobs on all guide and pad rollers; film slides easily between them. Framing lamp behind the picture gate for simplified threading. Pad roller of intermittent sprocket closes automatically when lens holder is pushed back. No stray light reflections.

15. Automatic film rupture device automatically cuts off the light beam and switches off the motor and exciter lamp when the upper film loop becomes too big or too small. Further safety devices are: fire traps with profiled rollers, metal-gauze windows in the spool boxes, and shutter flaps cutting off the light beam when projector speed becomes too low.

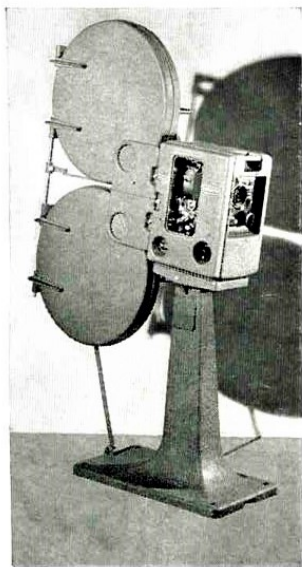
16. Built-in device for smooth changing over from one projector to the other; picture and sound are simultaneously switched over in one action.

17. Oil and dust-tight construction; oil for lubricating the different parts can never contact the film.

18. High-fidelity sound reproduction in the optical sound scanning part. Rotary sound drum, driven by the film, has a starting time of only 3 seconds. Ingenious scanning system with very uniform slit illumination, visual checking facility and easy adaptation to dual-track reproduction. Photocell and exciter lamp can readily be exchanged. Spring-loaded pressure roller closes automatically.



FP 56



These two projectors have an incandescent lamp as light source, instead of arc lamps. Nevertheless they have an exceptionally high light output. Due to the special construction of the lamp, the high-speed, surface-coated projection lens and the efficient rear shutter, bright pictures up to 13' x 10' (4 x 3 m) can be obtained.

The FP 3 has the same mechanism as the portable projector. It stands however on a slender, cast-iron pedestal with a measuring instrument built in. It is the obvious projector for smaller theatres, on board ships, in preview rooms, etc. Two FP 3 projectors and a cinema amplifier form a complete projection room equipment.

The portable equipment (type 8730/20) can briefly be described as follows:

In order to ensure real portability, the projector casing consists of a strong aluminium casting. The whole projector part weighs only 67 lbs (30,5 kg). Weight of the driving mechanism could only be kept so low by simplifying the construction, as the same high-class materials had to be used as for stationary theater projectors.

These demands led to a design in which not a single concession has been made as regards reliability. The Philips portable projector satisfies even the strictest safety regulations; any

risk due to mistakes in operation is precluded by the many safety measures incorporated in the construction. Operation is extremely simple and can even be done by non experts.

Many of the operations are fully automatic. Focusing, framing and skate pressure adjustment can all be effected at the front of the projector head with the door closed. All shafts run in ball-bearings, so that extra lubrication is not necessary. The intermittent unit runs in an oil bath provided with a magnetic oil filter.

Sound reproduction is true-to-life, thanks to the proved system with rotating sound drum, a high-quality 20 W amplifier and a specially designed loud-speaker combination.

The whole equipment can be erected in a few minutes! All parts of the installation are packed in sturdy fibre cases for easy transport.

A slide attachment, spool-boxes in several dimensions, a programme case with rewriter and accessories and a collapsible-frame projection screen, can be supplied with this equipment.

The Philips portable 35 mm sound film installation is giving eminent satisfaction to a multitude of users varying from travelling-cinema owners to missionary teachers in remote jungles.

The FP 3 and Portable 35 mm Projector

The professional 16 mm projector

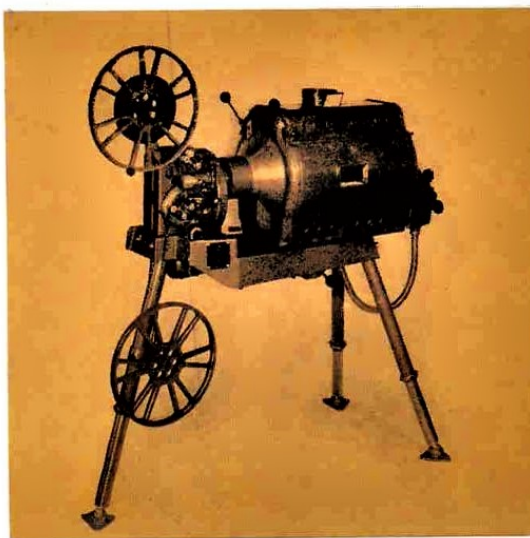
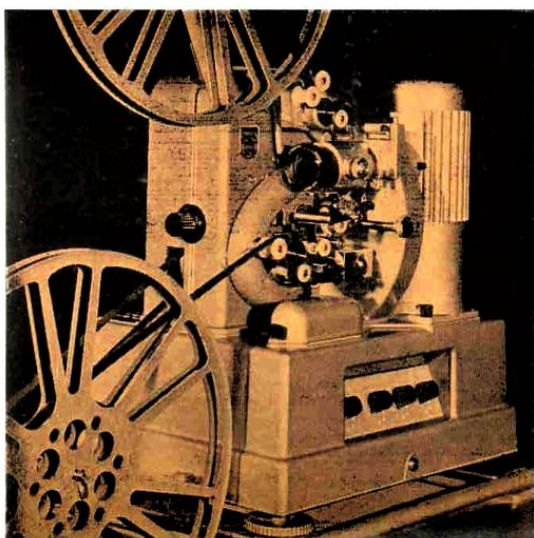
Two models of this highly professional projector can be supplied: A portable type (EL 5000) and a stationary type (EL 5060) for permanent installation.

The portable 16mm projector has a specially designed 750 W incandescent lamp with a built-in mirror. It can produce pictures in a size of 8' x 6' (2.35 x 1.75 m) on a matt-white screen or bigger when a glass-beaded screen is used. The amplifier is built in the base of the projector housing.

The stationary 16mm projector has a 30—35 A arc lamp with condenser lens and heat filter. The whole is built on a pedestal with three sturdy legs: A very bright picture of 15' x 11' (4.50 x 3.30 m) for normal film or of 21' x 8' (6.30 x 2.35 m) for CinemaScope film can be obtained on a matt-white

screen. On screens with a highly reflective surface the picture sizes can even be up to 21' x 15½' (6.35 x 4.70 m) for normal film and 30' x 11' (9 x 3.35 m) for CinemaScope.

PORTABLE AND STATIONARY



Thanks to a new, reliable grooved disc type intermittent mechanism (no claws!) the picture projected with both models of this 16mm projector is rock-steady.

The mechanism will transport also very old and badly damaged films and guarantees full protection of the perforations of prints in good condition.

The threading arrangement is very simple; the entire film path is opened and closed by moving only one lever! Loops need not be formed when threading the film; they are formed automatically in the correct size upon closing the film path.

Sound reproduction is completely free of hum, wow and flutter. Consequently the sound quality attains a very high standard.

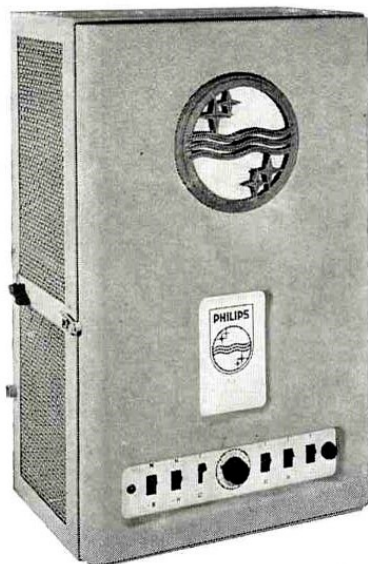
Both models of the Philips professional 16mm projector have a very sturdy construction and ensure excellent picture quality.

CINEMA AMPLIFYING EQUIPMENT

Amplifier Assembly "K"

Intended for use in small and medium-sized halls. It comprises an amplifier unit and a transformer for A.C. supply of the exciter lamp. The unit is provided with a dip filter to cut out the 100 c/s hum caused by the A.C. feed of the exciter lamp.

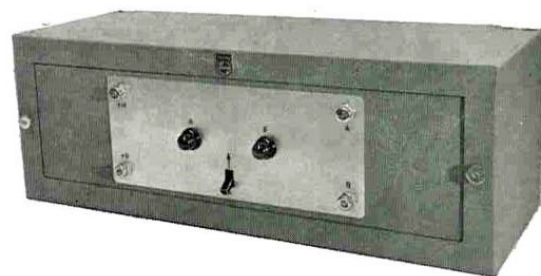
All Philips cinema amplifier cabinets contain the complete sound reproduction equipment necessary between the projector soundheads and the loudspeaker cable. The neatly arranged construction has the advantage of greatly simplifying the projection room wiring and of making the whole equipment readily accessible.



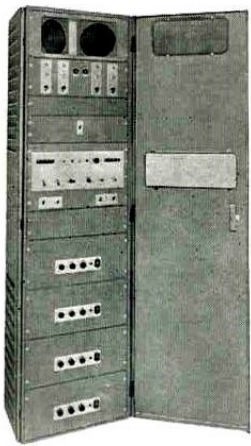
One-channel magnetic pre-amplifier assembly

Intended for small cinemas where only one (viz. the second) track of a 4-track magnetic print has to be reproduced. This second track contains the full recording of a magnetic CinemaScope-film, as it is meant for the central loudspeaker combination behind the screen. By bringing this signal — via a magnetic pre-amplifier — to a level sufficient for the pick-up input of a normal optical amplifier assembly, the CinemaScope sound can be reproduced via the existing sound installation.

The one-channel magnetic pre-amplifier assembly comprises a feed-unit, the pre-amplifier with treble and bass note controls, gain controls for the equalization of the output of two soundheads and a change-over device, in order to make its operation independent of the optical amplifier assembly.



PHILIPS
Cinema



Complete "All-in-one" amplifier assembly for optical and magnetic sound reproduction ("OMA")

This equipment, which is suitable for any 35 mm system, permits the reproduction of one-track or four-track magnetic CinemaScope copies and of Perspecta-Sound films.

Thus, in only **one** cabinet, sound control facilities for every 35 mm film system on the market have been combined. In spite of this, the cabinet is not bulky and takes up very little space in the projection room.

It is easy to install and easier still to operate. The assembly comprises a complete standby. To avoid all delays during the performance a special "emergency" relay circuit has been incorporated. By pressing only one push-button a defective amplifier is replaced automatically.

Four power amplifiers are built-in, as well as a double optical pre-amplifier, a four-channel magnetic pre-amplifier with separate feed-unit, and an incorporated 12 Kc/s unit. Furthermore the cabinet houses, the main control panel and a panel with two monitor loudspeakers.

Other features are: adjustable frequency response between ample limits, minimum distortion, low hum-and-noise level, etc.



Amplifier assembly for optical sound reproduction ("O")

Like the Assemblies MA and OMA the O Assembly consists of a grey standardized 19" cabinet housing, two identical pre-amplifiers and two output amplifiers with change-over switches for 100 % standby. Other features include: easy extension for one to four-track magnetic sound and for Perspecta-Sound, space for additional amplifiers being available, facility for change-over of exciter lamp supply from D.C. to A.C. 100 % standby, simple operation, built-in change-over relays, operated by push-buttons on the projectors for simultaneous change-over of picture and sound, readily accessible arrangement of the various components and easy servicing.



Amplifier assembly for magnetic four-channel sound reproduction ("MA")

Intended as extension of any optical amplifier equipment. This assembly comprises a 4-channel pre-amplifier, a power-supply unit (with built-in 12 Kc/s unit) for the magnetic pre-amplifier, 4 power amplifiers, a monitoring loudspeaker and the necessary control panels. The assembly offers complete stand-by for pre-amplifiers and for power-amplifiers. It is an all-in-one construction, easy to combine with any existing outfit for optical sound.

Loudspeakers, rectifiers and accessories

Philips supply all loudspeakers for treble and bass reproduction, multicellular horns, loudspeaker transformers, cross-over networks, cinema rectifiers, arc lamps in several amperages, film rewinders, film spools for any footage, splicing devices, gramophones, change-over relays, projection room windows, lenses, mirrors, carbons, etc. Moreover, Philips are well-known manufacturers of sound recording equipment and other apparatus of interest to the cinema world.



PHILIPS

PRE-SALE SERVICE FOR THEATRE-OWNERS AND ARCHITECTS

Besides the purely aesthetic requirements of a cinema, a number of conditions must be fulfilled to set off the films to advantage, both visually and acoustically. It is here that the advice of the architect should go hand in hand with those of a cinema equipment specialist.

In the course of the years Philips have built up quite a reputation among architects and theatre-owners for their expert advice on newly constructed and renovated picture houses. The important relation between the film reproduction equipment and the projection room lay-out will be clear: dimensions, insulation, ventilation, positioning of the projection room windows, etc. call for exchange of information between builder and cinema equipment supplier. But there are many more often complicated matters concerning the cinema building as a whole that make it advisable to consult the specialist **right at the beginning of the planning**. When this is omitted there are two very bad risks: either unsatisfactory picture or sound, or — when faults are corrected afterwards — an unnecessary loss of money...

The film reproduction equipment is the most essential and all-important part in a picture house!

It is no more than logical, then, that the actual theater lay-out, the lighting, the acoustics and everything must be adapted to the characteristics of this equipment in such a way that the final reproduction results reach optimum quality. Philips with their special Lighting, Acoustical, and Theatre Planning Advisory Bureaux can give you all the answers in this respect, as a **pre-sale service**.

The above means that the assistance Philips may give you can go so far as to prepare a complete lay-out for your site, if you simply furnish them with the initial plans.

This lay-out will include: the projection angle, picture dimensions, type of screen, location of screen, wiring diagrams for the projection booth, loudspeaker positioning, correct slope of auditorium floor and balcony floor, lighting designs for anywhere in the building, and, last but not least, acoustical advice.

The acoustical properties of the auditorium are determined by its shape, the quantity and kind of sound-absorbing materials, the methods of applying these materials and, finally, the places where they are mounted. Correct choice and application of these materials requires a lot of experience.

The new cinema presentation techniques in particular call for very careful acoustical treatment of the auditorium to derive the best results with stereophonic sound reproduction and magnetic sound, of which the quality is better and thus more critical than that of normal optical sound.

As both the shape of the auditorium and its acoustical treatment are of utmost importance for the acoustical possibilities, it must be repeated that co-operation between the architect and Philips should be established in the very first stages of planning.

Philips engineers are continuously investigating all new ideas and developments in connection with theatre design and they are always prepared to put their know-how at the disposal of their customers.

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