PHILIPS

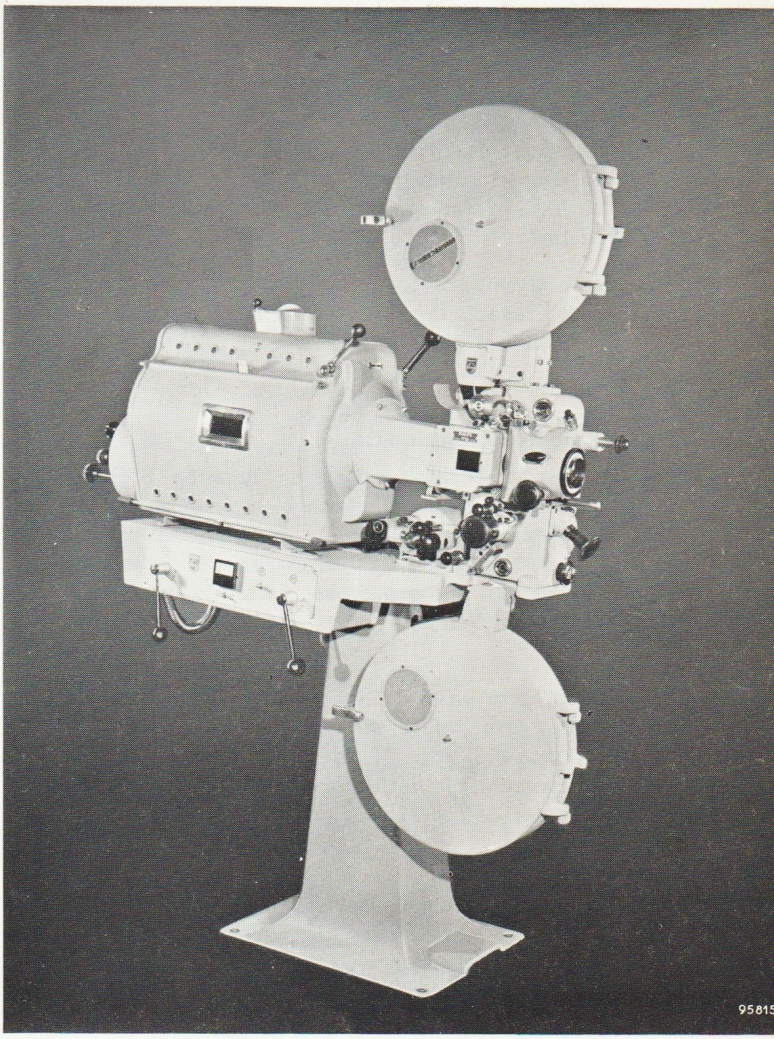
Projector FP 56

The Philips FP 56 projector of sturdy and modern construction, made of hard-wearing materials manufactured with highest precision, is suitable for any class of cinema. Its principal features are:

- high light output;
- simple operation;
- requires little maintenance;
- automatic lubrication;
- air cooling;
- easy replacement of all the parts;
- suitable for Wide-Screen and for Cinema-Scope projection;
- can be supplied for 110 V or 220 V, 50 or 60 c/s A.C. mains or D.C. mains;
- suitable for use under tropical conditions.

On request, the projector can be equipped with:

- water-cooling system;
- sprockets with loop correctors;
- soundhead for optical sound track;
- soundhead for magnetic sound tracks;
- spool boxes for 3000 ft (900 m) or 6000 ft (1800 m) of film;
- stand with height adjustment.



FP 56 projector with type 3837 optical soundhead and 50-A H.I. arc lamp type EL 4450.

Cinema

Projector FP 56

Cat. A-II-15-E

PHILIPS

Maximum reliability

The reliability of a projector depends largely on the driving system, the intermittent movement and the lubrication. Full attention was paid therefore to these three points.

Driving system

The driving system is simple and very sturdy. A split-phase asynchronous flange motor drives the vertical main shaft by means of gear wheels. The shaft has a diameter of $^{13}/_{15}$" (21 mm) and its speed amounts to only 360 r.p.m.; troublesome vibrations are consequently precluded.

The main shaft in turn drives:

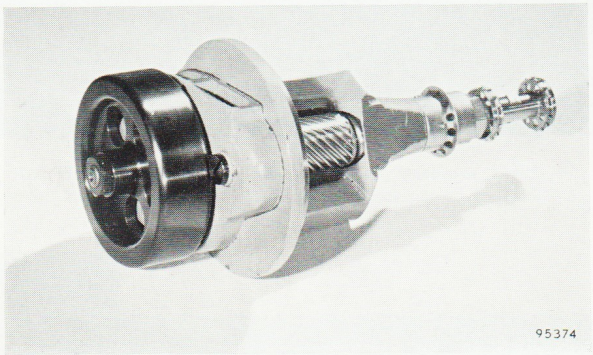
the intermittent mechanism,
the upper and the lower sprocket,
the drum shutter,
the high-pressure spur-gear oil pump,
the lower film spool.

A safety clutch located between motor and main shaft prevents the gear wheels from being damaged in the event of a breakdown.

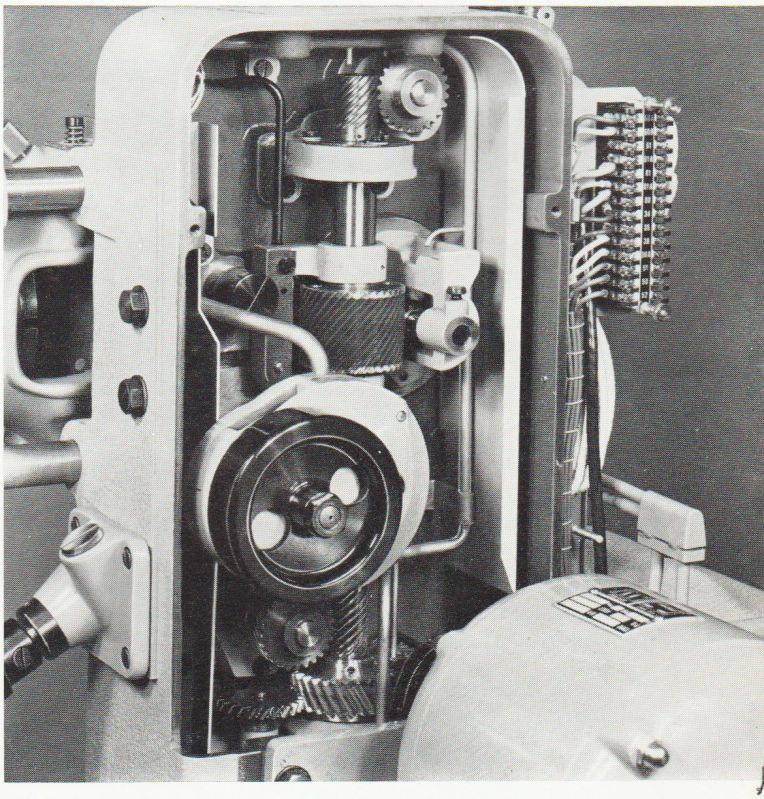
Intermittent mechanism

The intermittent mechanism satisfies the highest demands, owing to the use of high-grade materials, high-precision finish and an excellent lubricating system. Thus, for instance, the cam, the striking pin and the Maltese cross are made of steel of the very best quality and ground to a tolerance of 1 micron.

Holes have been drilled in the flanges of the intermittent sprocket, thereby reducing its weight to only 9 drams (16 grams), and subsequently minimizing the moment of inertia of this sprocket as well as the wear of the Maltese cross.



Intermittent mechanism.



Driving mechanism and lubricating system.

Continuous lubrication

The whole driving system is lubricated continuously by means of a very robust high-pressure spur-gear oil pump, which is always below the oil level. The oil circuit contains two magnetic filters, one combined with the normal gauze filter of the pump, the other being suspended in the oil flow to the intermittent mechanism. These filters remove all steel and iron particles from the oil and thus reduce the wear of the driving system and minimize acidification of the oil.

The whole intermittent mechanism is contained in a closed casing, which serves at the same time as an oil bath. The oil circuit keeps the intermittent mechanism continuously supplied with pure oil which has been filtered three times.

The rear cover of the projector can be removed together with the oil screen merely by loosening two screws. As no packing material is required between the projector casing and the rear cover, the latter is refitted by simply tightening up the two screws. Oil throwers prevent the oil from leaking along the shafts.

This lubricating system ensures excellent working and minimum wear of the projector mechanism, even in the case of very high or low temperatures.

Efficient cooling

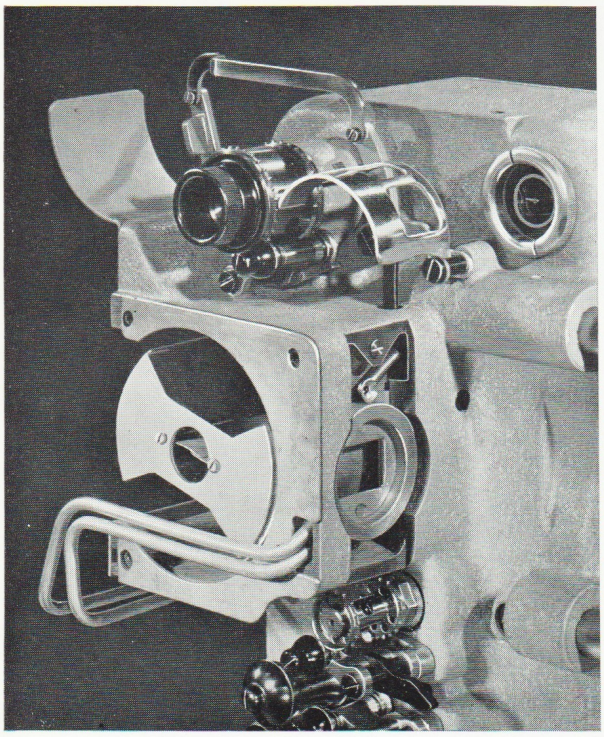
To guarantee perfect projection, it is necessary to protect the film against drying out through heat radiation by the arc lamp. The following cooling precautions have therefore been incorporated: automatic cooling by means of the shutter and the possibility of using an air compressor as well as additional water cooling.

The shutter and air-compressor cool above all the picture area of the film, whilst the water cooling ensures that the guiding edges of the film, which often get extremely hot, remain cold.

Efficient cooling is of primary importance, especially for Wide-Screen performances, where arc-lamps of very high intensity are used.

Ventilating shutter

The drum shutter is provided with ventilating blades, so that the film is automatically cooled in the picture gate, even when no air-compressor is used.

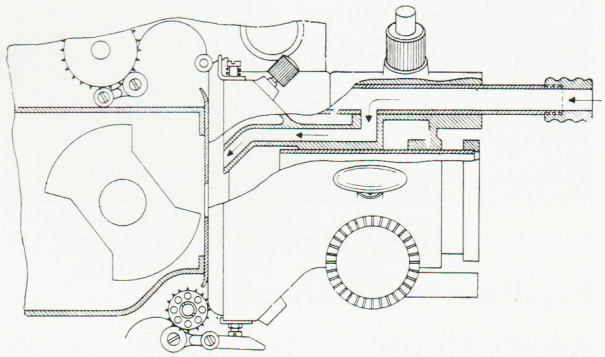


Water-cooled protective mask.

Water cooling

For water cooling, the projector can be equipped with a hollow protective mask through which cooling water flows; thus the projector mechanism, the runner plate and hence also the guiding edges of the film, all remain cold; the oil, moreover, retains its full lubricating properties.

Air cooling



Duct for air cooling.

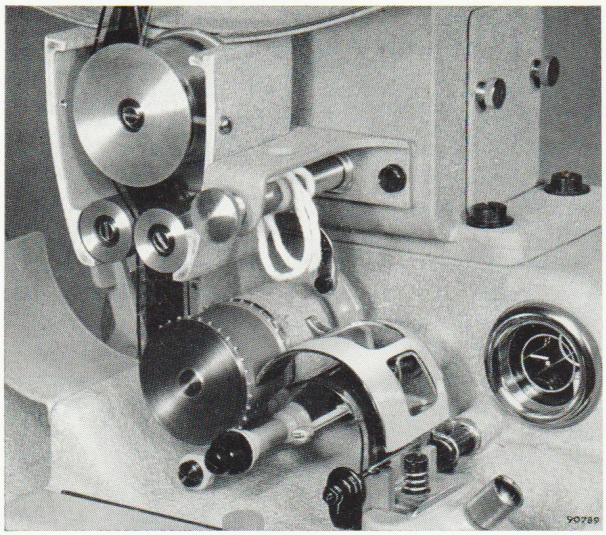
Additional air cooling may be provided when H.I. light sources with great heat radiation are used. The FP 56 projector is equipped with the necessary air duct to be connected to the air-compressor; since this duct ends above the mask plate in front of the film, the latter is efficiently cooled.

Perfect safety

In addition to the perfect film protection ensured by water and air cooling, the projector is equipped with a double-acting, automatic film-rupture device. The upper film loop passes between the two levers of this device which is operated as soon as the loop becomes too large (due to film rupture in the gate) or too small, which may occur when the film perforations are so badly damaged that the take-off sprocket cannot transport the film. In both cases, the light beam is intercepted and both the motor and the exciter lamp are switched off immediately.

The upper and the lower spool box are both provided with solid fire traps which prevent any film fire from spreading into the spool boxes.

Finally, the spool boxes have metal-gauze windows with 900 meshes per sq.in. (144 meshes per sq.cm) which ensure a supply of fresh air sufficient to eliminate any risk of explosion.



Fire trap and double-acting, automatic film-rupture device.

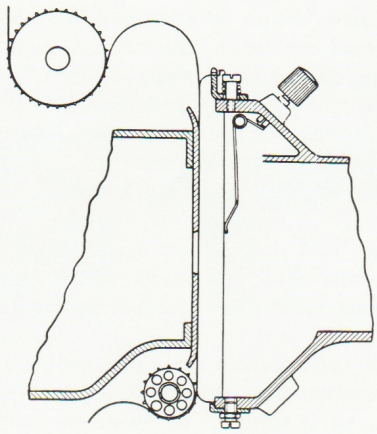
Excellent film protection

In order to ensure maximum film protection four important measures have been taken:

- central adjustment of the skate pressure;
- splices enter and leave the runner plate at the lowest speed;
- the oil for lubricating the pad rollers cannot grease the film;
- all parts of the film path—also the pad and guide rollers—are so profiled that the picture and sound-track areas of the film are never in contact with any part of the projector.

Central adjustment of the skate pressure

The central adjustment of the skate pressure offers the great advantage that the pressure is evenly distributed over the whole length of the runner plate, so that neither the film nor the teeth of the intermittent sprocket are unnecessarily strained.



Central adjustment of skate pressure.

Carefully designed gate assembly

The lengths of the runner plate and the pressure skates are such that film splices will be exactly at the beginning or at the end of the runner plate when the intermittent sprocket is at rest. Hence the velocity at which the splices enter or leave the film gate is practically zero, thus greatly reducing the danger of weak splices coming unstuck. The splices, moreover, pass through noiselessly.

No oil on the film

The oil for the pad rollers cannot grease the film because their bearings are oiled from within.

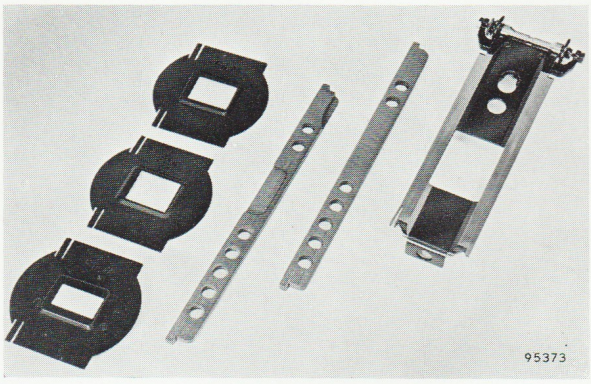
Steady picture

Steadiness in a vertical direction is ensured by the fact that the intermittent shaft is supported almost entirely by a long bearing. This results in a very good centring of this shaft and the avoidance of any irregularity in the rotation of the intermittent sprocket. The maximum wobbling of this sprocket is 0.16 mil (4 microns); owing to the special way in which this sprocket is fixed to its shaft, the wobbling does not increase when the sprocket is taken off to be cleaned and subsequently replaced.

To ensure that the film lies absolutely flat against the running surfaces between the teeth of the intermittent sprocket, there is a groove at the base of the teeth.

The plastic pressure skates are very light in weight; as they react rapidly, the passage of splices remains unnoticed.

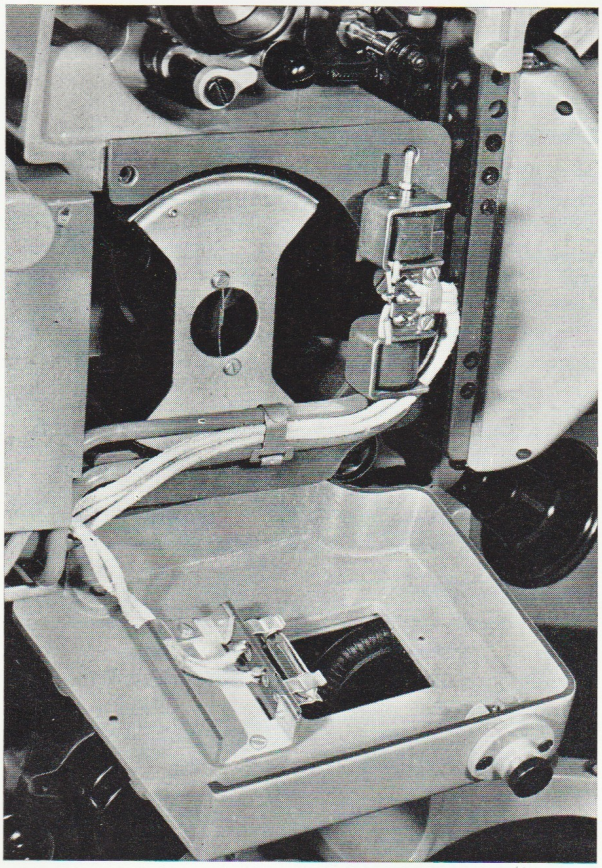
Steadiness of the picture in a horizontal direction is obtained by lateral guide rollers over the runner plate.



Masks for the various projection systems, pressure skates and runner plate.

Smooth change-over

To ensure that the performance is not interrupted when changing over from one projector to the other it is essential that both picture and sound be switched over simultaneously. To achieve this the projector is equipped with an electro-magnetically controlled flap, which can very easily be coupled electrically to the sound change-over switch. In this way picture and sound can be switched over in one movement simultaneously.



Picture change-over device.

This flap is situated close behind the gate, i.e. at the point where the light beam is at its narrowest. Consequently, the picture is covered and exposed very quickly, thus giving the impression that the film goes on without interruption.

A full description of the picture change-over relay with light cut-off, type 3850, is given on sheet A-II-11-E.

Simple operation

Easy threading

Threading the film is very simple. The knobs of all guide and pad rollers are streamlined, so that the film slides easily between them. The pad rollers have a disengaged position.

A framing lamp behind the picture gate simplifies the threading of the film.

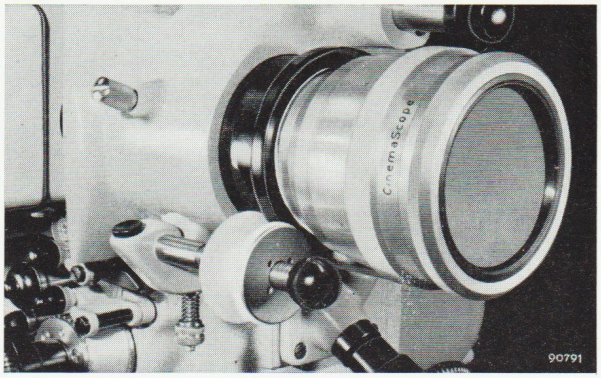
The pad roller of the intermittent sprocket can be closed independently of the lens holder when the film has been threaded in the gate. If one forgets to close this roller, it will be closed automatically when the lens holder is pushed back.

Sliding lens holder

The very robust lens holder and skate holder form one unit. By pressing a button, the unit slides on two rods, and thus considerably simplifies the threading of the film.
Owing to the closed construction, stray-light reflections from the projection lens are avoided without having to make use of a separate movable screen.

Instantaneous focusing

The lens is focused without any backlash by means of a large button. For cleaning, it can be taken out of the holder together with its sleeve.



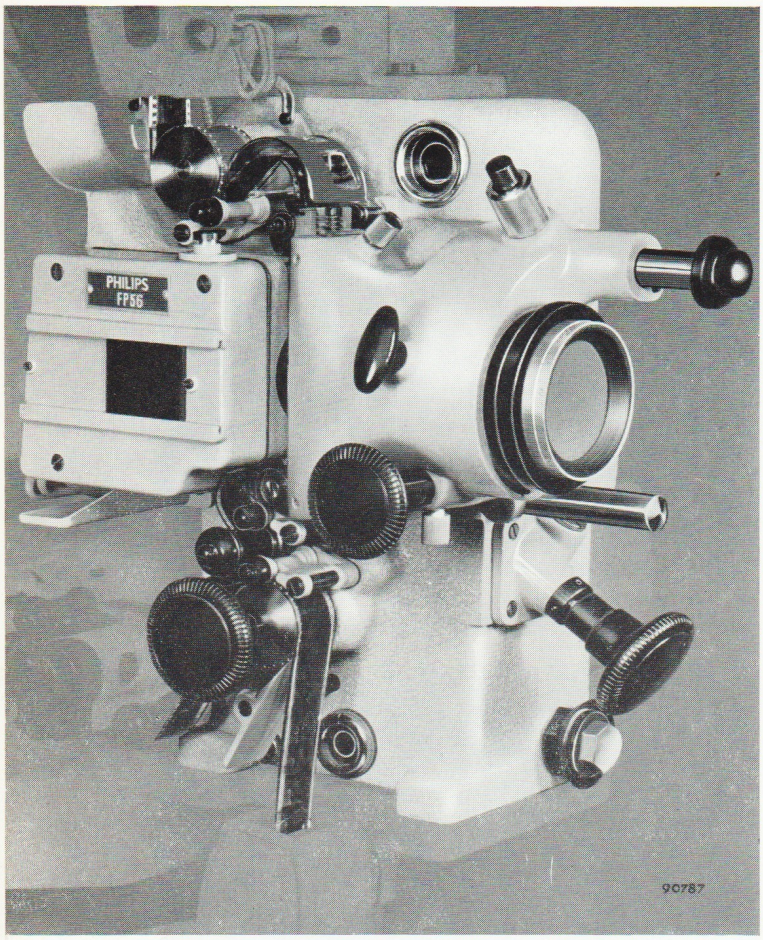
Fine-focusing device.

On request, the projector can be equipped with type EL 4200 fine-focusing device instead of the normal device. This has the following advantages:

- Very accurate focusing: one turn of the adjusting ring corresponds to shifting the lens over $^{5}/_{64}$" (2 mm).
- The sleeve of the lens need not be fixed after focusing.
- Easy replacement of the lens for the various projection systems: the lens together with its sleeve can be taken out by simply pushing the focusing device downwards.
- The lens is automatically focused when it is inserted again after removal.

Easy film-loop adjustment

When the projector is equipped with sprockets provided with loop correctors, the lengths of the film loops can be adjusted either before or during the performance.



Projector mechanism.

Central framing device

The framing knob is at the front of the projector and can be operated from both sides. The position of the framing device is indicated by a pointer fitted behind the upper oil-observation glass.

Framing is done by turning the whole of the intermittent mechanism round the axis of the intermittent sprocket. During framing the sizes of the upper and lower film loops are automatically kept constant.

Steel and velvet-covered runner plate

The projector is equipped with a steel runner plate which can easily be removed and refitted. For running new film prints, a strip of velvet can be applied in a very simple manner to the normal runner plate, thus making it unnecessary to wax these films.

Highest light efficiency

It is of primary importance that the highest light efficiency be obtained, especially for the reproduction of Wide-Screen films. As an additional optical system has to be used in the projection of certain panoramic films, the diameter of the lens holder has to be large enough to allow for the mounting of this optical system in front of the normal projection lens.

Maximum light efficiency is ensured in the FP 56 projector owing to the fact that it is equipped with a drum shutter and fitted with a large-diameter lens holder (82.5 mm) which permits a lens with high F-value to be used.

Efficient drum shutter

The use of a drum shutter increases the light efficiency because it cuts off the light beam from two directions, thus making the period of light interruption as short as possible.

Lens holder

The lens holder has a diameter of 82.5 mm. An adapter tube 82.5/62.5 mm is supplied with each projector.

On request, the projector can be equipped with a 104 mm lens holder and with adapter tubes for lenses of smaller diameter.
The lens holders are interchangeable without involving any modification of the projector.

Condenser lenses

When lenses with a very short focal length are used, a condenser lens placed behind the gate greatly improves both the light output and the light distribution. For fitting the condenser lens it is only necessary to replace the normal mask by a mask with attached lens holder, type 8663.

Easy maintenance

Visible oil circulation

Oil level and oil circulation can be observed through the oil-level gauge at the bottom and through the illuminated observation glass at the top, both on the operating side of the projector.

Combined magnetic oil filter and gauze filter.

Easy cleaning and servicing

All parts are readily accessible for cleaning.

Special attention has been paid to easy replacement of the vital parts, such as the magnetic oil filters and the gauze filter, the projection lens, the pad rollers, the sprockets and the intermittent mechanism. This greatly facilitates maintenance and servicing.

Universal application

The FP 56 projector can be installed in any projection room, used for any size of hall, and can be connected to practically all existing mains.

Wide tilting angle

Owing to the narrow width of the pedestal, the tilting angle can be adjusted between 30 ° downwards and 15 ° upwards. In both extreme positions, the lubrication is still amply sufficient.

A wedge can be inserted between top spool arm and projector; in this way the projector can always be installed close to the wall, even at large tilting angles.

Two types of wedges are available:

type 8644 with an angle of 10 ° and
type 8645 with an angle of 20 °.

Suitable for all mains

The projector can be used on practically all mains: A.C. of 110 and 220 V, 40 - 100 c/s or D.C. of 110 or 220 V.

Normally it is supplied for use on 110 and 220 V, 50 c/s. It can, however, also be supplied for use on 110 and 220 V, 60 c/s. In both cases the projector is driven by an asynchronous flange motor.

For A.C. mains of another frequency and for D.C. mains, a pulley motor for use on 110 V or 220 V is supplied.

For D.C. mains the speed is checked by means of a speedometer.

Also available with synchronous or interlock motors

For use in film studios the projector can be supplied with either a synchronous motor or an interlock motor; the latter is also indispensable for isochronous running of two projectors when showing 3-D films.

Rear projection

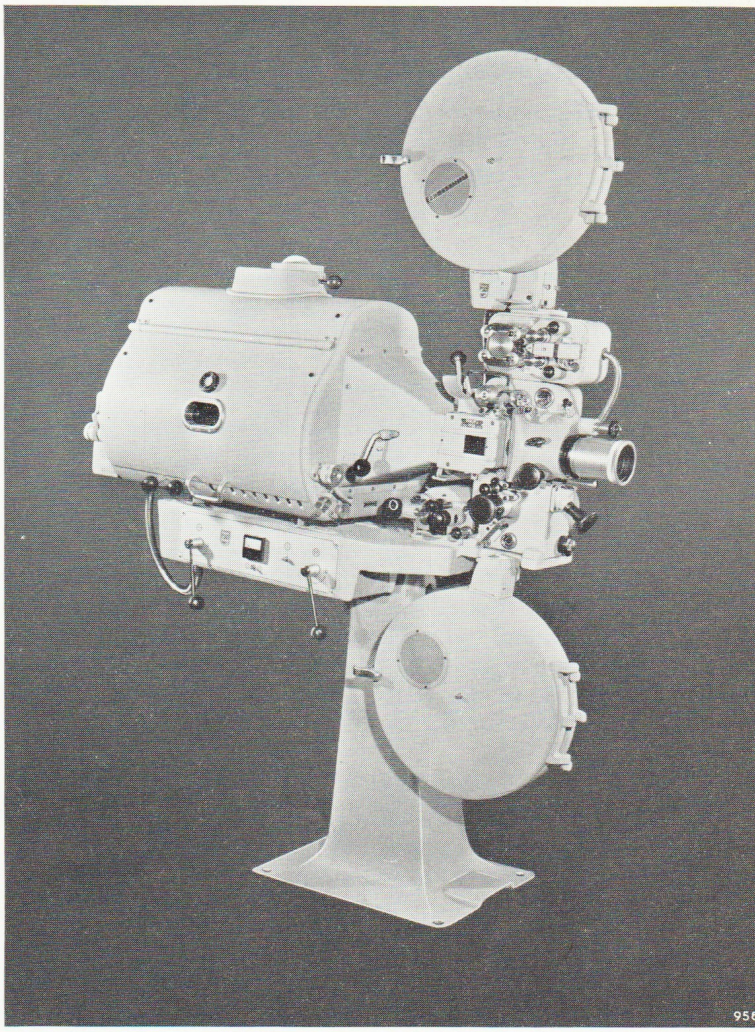
Rear projection is also possible with this projector. For this purpose lenses with short focal lengths are usually required, so that the auxiliary condenser lens already mentioned must be used.

Furthermore, in this case the film must be reversed in the gate, and so must the mask.

Spool boxes

Two types of spool boxes can be used on this projector: either
for 2000 and 3000 ft (600 and 900 m) spools, or
for 4000 ft and 6000 ft (1200 and 1800 m).

The upper spool box is provided with a friction coupling and a 6-V pilot lamp, the lower spool box with a take-up device and a friction coupling.



FP 56 projector with type 3837 optical soundhead, type EL 5860 magnetic soundhead and 85-A H.I. arc lamp type EL 4455.

Large-capacity spool boxes are of great advantage for 3-D performances, where both projectors are running simultaneously, and for cinemas with only one projector.

The spool boxes have the following important advantages:

- the upper spool box can be inclined backwards by inserting a wedge of 10° or 20° (type 8644 or 8645) between projector and spool arm, thus allowing the projector to be placed close to the front wall of the projection room;
- the spools can easily be taken out, since the spool boxes consist of two similar halves;
- the spindles of the spool boxes and the driving shaft of the lower friction coupling are mounted in ball-bearings;
- the 3000 ft upper spool boxes are provided with a time scale.

Projector stands

The stands and inclinable mounting tables can be supplied in two types:

type EL 4051 stand without height adjustment, with inclinable mounting table (height of the optical axis 46⅞");

type EL 4050 stand with height adjustment, with inclinable mounting table.
This type has the following features in addition to those of the normal construction:

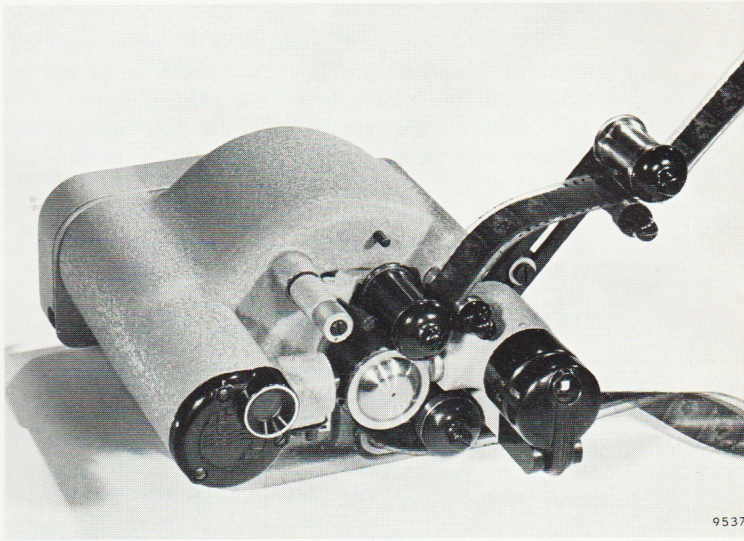
- the table can be turned in a horizontal plane;
- the height of the optical axis can be adjusted between 46⅞" and 54" (1190 and 1370 mm).

In the stands a number of terminal plates are provided for electrical connections. They are easily accessible through a large aperture at the left-hand side of the stands. The aperture is closed by a metal lid.

The inclinable mounting table is equipped with:

- the complete wiring,
- a motor switch,
- a 100-A arc-lamp switch,
- a meter for checking both the arc current and the arc voltage,
- a transformer for feeding the pilot and framing lamps,
- a push-button for changing over picture and sound from one projector to the other.

Optical soundhead



9537

For reproduction of optical sound, the Philips type 3837 soundhead (see catalogue A-II-7-E) is to be used. It ensures excellent quality of sound owing to the rotating sound drum driven by the film.

The film is pressed onto the sound drum by means of a resilient pad roller. Though the drum is coupled to the flywheel, its starting time is only about 2.5 seconds, without the strain on the film being too great.

The special optical system can easily be adapted to dual-track reproduction.

Besides the above-mentioned features, this soundhead offers many advantages, among which are to be mentioned:

- The film is very easy to thread, since the knobs of the guide-rollers are streamlined, so that the film glides easily between the rollers.
- The sound-track can be accurately adjusted with respect to the scanning beam. For this adjustment, which can also be effected during the performance, the soundhead is provided with a small milled knob. The position of the sound track with respect to the slit is visible through the observation window.
- Instantaneous replacement of exciter lamp and photocell. To take out the exciter lamp it is only necessary to open a hinged cover. The photocell can be replaced by removing the cap at the rear, which is fixed only with a knurled nut.
- The exciter lamp is pre-focused; it is provided with a centring flange with a slot, so that it is impossible to insert this lamp wrongly.

Magnetic soundhead

Type EL 5860/00 magnetic soundhead can be placed between the upper spool box and the projector housing. It is equipped with a quadruple magnetic head for four-channel reproduction.

The length of film running through the soundhead is kept constant, irrespective of the regularity with which the film is taken from the upper spool, owing to the fact that one large sprocket is used both for feeding the film into the soundhead and for taking it off.

Rigorously constant film speed at the scanning spot—and hence undistorted sound reproduction—is ensured by two rotating sound drums of anti-magnetic material, running in ball-bearings and provided with brass flywheels, and by two resilient nylon rollers.

Type numbers

Type	Description	Weight			
		Net		Gross	
		lbs	kg	lbs	kg
	FP 56 projector mechanism				
EL 4010/10	FP 56 with asynchronous flange motor for 110/220 V, 50 c/s and 24 frames/sec	117	53	187	85
EL 4011/10	Same as type EL 4010/10 but for 60 c/s	117	53	187	85
EL 4012/10	FP 56 with synchronous flange motor for 3 x 220/380 V, 50 c/s and 24 frames/sec	117	53	187	85
EL 4013/10	Same as type EL 4012/10 but for 60 c/s	117	53	187	85
EL 4014/10	FP 56 with synchronous flange motor for 3 x 220/380 V, 50 c/s and 25 frames/sec	117	53	187	85
EL 4015/10	FP 56 suitable for belt drive	88	40	158	72
...../11	Same as above but sprockets equipped with loop correctors.				
...../12	Same as above but arranged for water cooling.				
...../13	Same as above but arranged for water cooling and sprockets equipped with loop correctors.				
	Projector stands				
EL 4050/00	Stand of variable height with mounting table, suitable for 220 V, 50 and 60 c/s A.C. mains, provided with complete wiring, motor switch and 100-A arc-lamp switch	264	120	382	173.5
EL 4051/00	Stand without height adjustment, with mounting table, suitable for 220 V, 50 and 60 c/s A.C. mains, provided with complete wiring, motor switch and 100-A arc-lamp switch	231	105	338	153.5
...../01	Same as above, but for 110 V and 220 V, 50 and 60 c/s A.C. mains.				
...../02	Same as above, but for 110 V and 220 V D.C. mains.				
...../03	Same as above, but for 3 x 220/380 V, 50 and 60 c/s A.C. mains.				

Type	Description	Weight			
		Net		Gross	
		lbs	kg	lbs	kg
	Spool boxes				
8640/21	Upper spool box for max. 3000 ft (900 m) of film, with friction device and fire trap	68	31	147.5	67
8641/21	Lower spool box for max. 3000 ft (900 m) of film, with friction device and fire trap				
8642/21	Upper spool box for max. 6000 ft (1800 m) of film, with friction device and fire trap	111	50.5	200	91
8643/21	Lower spool box for max. 6000 ft (1800 m) of film, with friction device and fire trap				
	Soundheads				
3837/02	Soundhead for optical tracks	27.5	12.5	44	20
EL 5860/00	Soundhead for CinemaScope films with one or four magnetic tracks	31	14	59	27

Aperture plates

Types	Description
22 416 89	For normal films, aspect ratio 1 : 1.37: aperture plate without condenser-lens holder;
8663/00	aperture plate with condenser-lens holder.
C1 311 33	For CinemaScope films with an aspect ratio of 1 : 2.55: aperture plate without condenser-lens holder.
8663/12	For CinemaScope films with an aspect ratio of 1 : 2.34: aperture plate without condenser-lens holder.
8663/11	For Wide-Screen films, aspect ratio 1 : 1.85: aperture plate with condenser-lens holder.
8663/13	For R.K.O.-Scope and SuperScope films, aspect ratio 1 : 2: aperture plate without condenser-lens holder.
8663/10	Blind aperture plate with condenser-lens holder.

Sleeves and adapter tubes

Types	Description
22 437 94	Centric sleeve for the projection of normal and Wide-Screen films.
EL 5865/80	Eccentric sleeve with adapter tube for the projection of CinemaScope films with an aspect ratio of 1 : 2.55.
EL 5865/00	Centric sleeve for the projection of CinemaScope films with an aspect ratio of 1 : 2.34.
8683/60	Adapter tube 82.5/62.5 mm.
EL 5866/01	Adapter tube 82.5/70.6 mm for anamorphic lenses.

Pulley motors

Type	Description	Weight			
		Net		Gross	
		lbs	kg	lbs	kg
	For 110 and 220 V A.C. mains				
8601/00 (40 c/s) 8602/00 (50 c/s) 8603/00 (60 c/s) 8604/00 (100 c/s)	Motor complete with pulley, protecting cover, belt and bracket for fixing to the mounting table.	31	14	42	19
	For D.C.				
8605/00 (220 V) 8606/00 (110 V)	Motor complete with pulley, protecting cover, belt and bracket for fixing to the mounting table.	31	14	42	19
	Speedometer				
8662/10	Speedometer with pulley and belt.	—	—	—	—

Condenser lenses

Types	Focal length of projection lens
8688/00	40 mm
8689/00	45 mm
8690/00	50 mm
8691/00	55, 60 and 65 mm
8692/00	70, 75, 80 and 85 mm

For fitting these lenses, it is necessary to use an aperture plate provided with a condenser-lens holder.

Wedges and lamps

Types	Description
8644/00	10° wedge for upper spool box.
8645/00	20° wedge for upper spool box.
6844	Framing lamp and spool-box pilot lamp 6 V, 0.5 A.

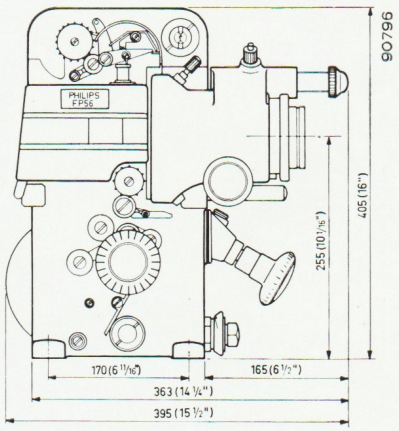
Technical data

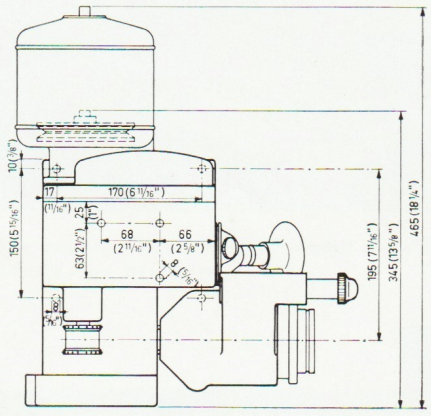
Asynchronous flange motor

Voltage	110/220 V
Frequency	50 or 60 c/s
Power factor	0.9
R.p.m. at 50 c/s	1440
Power	1/6 H.P.
Consumption	165 W

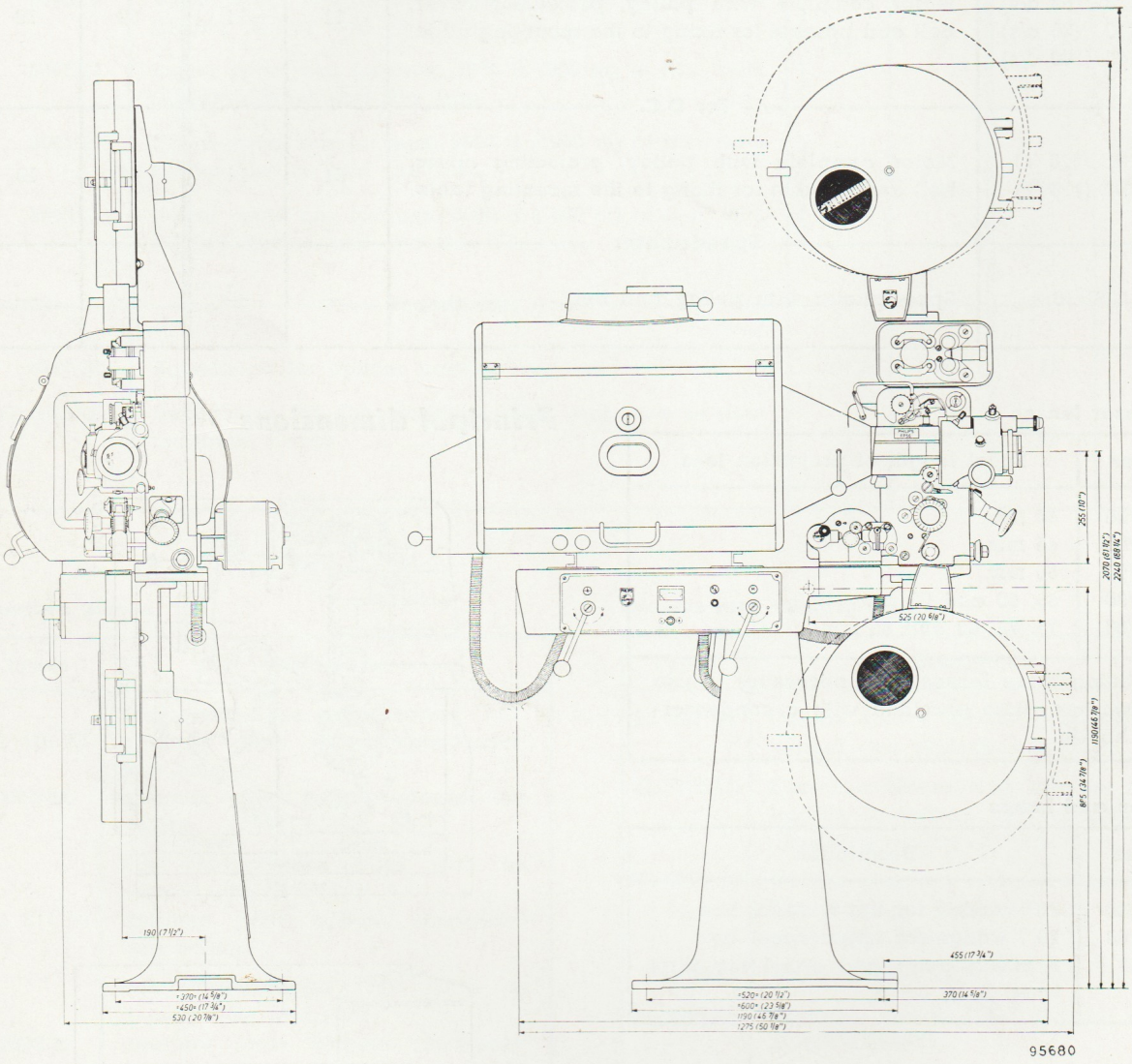
For other frequencies it is recommended to use a pulley motor.

Principal dimensions





Principal dimensions



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