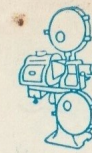


PROJECTS
PAGES

INSTRUCTIONS FOR
USE AND MAINTENANCE
OF PROJECTORS
FP 66 AND FP 7

**PAGES AA-1 to AA-6
MISSING**

HINTS ON INSTALLATION



GENERAL DESCRIPTION

Although the FP 56 and FP 7 projectors differ greatly in construction, the instructions for operation and maintenance are essentially the same.

The FP 7 (fig. 1) is the ideal projector for very large cinemas but is also suitable for smaller theatres. It is provided with a built-in soundhead. The film path is enclosed by a hinged door with a glass window. The projector is equipped for both water and air cooling. The take-up and hold-back sprockets are provided with manual loop correctors with which, even during operation, the upper and the lower film loop can be adjusted at their correct lengths.

The projector also incorporates a film-rupture device which automatically closes a light-shutter, switches off the motor and cuts off the electric supply to the exciter lamps if for any reason the film should stop in the gate.

The lens holder accommodates lenses having a diameter up to 104 mm. The built-in soundhead is of the same construction as our type 3837. The rotary sound drum with flywheel ensures absolutely constant speed of the film at the spot where the sound is scanned. A pressure roller which, like the sound drum, runs on high-precision ball-bearings, presses the film on to the drum, so that the film attains the required speed in about 3 seconds.

For further particulars on the soundhead see the relevant instructions for operation (sheets AB).

The FP 56 (fig. 2) is of simpler design than the FP 7. It has no built-in soundhead, normally being supplied with the PHILIPS type 3837 soundhead; it can, however, also be used with soundheads of other makes.

The film path is not enclosed. The lens holder accommodates lenses having a diameter up to 82.5 mm. The projector is not equipped with manual loop correctors nor with a water-cooling system, but both can be fitted on request.

The principal common features of the FP 7 and FP 56 projectors are summarized on the following pages.



Principal common features
of the FP 56 and FP 7 projectors

1. Central framing device

Framing is effected by turning the whole of the intermittent mechanism round the axis of the intermittent sprocket.

2. Two magnetic filters in the oil circulation

One of these filters is combined with a fine-mesh gauze filter and is situated on the delivery side of the oil pump. The other filter is suspended behind the upper oil-observation glass in the oil supply to the intermittent mechanism; this filter can be visually inspected.

3. Oil circulation by a powerful high-pressure spur-gear oil pump

The pump is always below the oil level, even when the projector is tilted far forwards or backwards, so that it can never "pump empty".

4. The lens holder forms one unit with the door of the film gate

Lens holder and door are opened in one manipulation by means of only one push-button, this making for simplified operation.

5. The lengths of the runner plate and of the pressure skates are such that film splices are drawn between them and leave them at minimum speed

This much reduces the risk of weak splices becoming unstuck; the splices, moreover, pass through noiselessly.



6. Central adjustment of the skate pressure

The pressure of the skates is adjusted by only one central set screw. This simplifies operation and ensures uniform distribution of the pressure over the whole length of the runner plate, thus reducing wear of the mechanism and of the film to a minimum.

7. Ventilating drum shutter

The drum shutter is provided with ventilating blades so that the film is cooled in the gate even when no air compressor is used. A stream of air is blown from the mask to the rear, ensuring that no carbon particles from the arc lamp can reach the film. The air stream is not blown into the lamp house but escapes above its front cone, so that the constancy of the arc is not affected.

8. Designed for optional use with air compressor

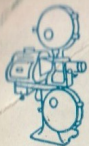
The projectors are equipped with the necessary duct ending above the mask in front of the runner plate. The film, therefore, is efficiently cooled exactly at the place where the light beam impinges upon it.

9. The whole mechanism is oil-tight without liquid sealing agent

A metal oil screen at the inside of the rear cover impedes oil leakage through the joints. It is, therefore, unnecessary to seal the joints and screw holes in the rear cover, this greatly simplifying replacement of parts.

10. The intermittent sprocket has teeth with milled-in bases

Consequently, the film lies perfectly flat on the running surfaces between the teeth and the picture is much steadier than when the bases are not milled in.



PHILIPS Cinema

AA-8

Principal common features
of the FP 56 and FP 7 projectors

1. Central framing device

Framing is effected by turning the whole of the intermittent mechanism round the axis of the intermittent sprocket.

2. Two magnetic filters in the oil circulation

One of these filters is combined with a fine-mesh gauze filter and is situated on the delivery side of the oil pump. The other filter is suspended behind the upper oil-observation glass in the oil supply to the intermittent mechanism; this filter can be visually inspected.

3. Oil circulation by a powerful high-pressure spur-gear oil pump

The pump is always below the oil level, even when the projector is tilted far forwards or backwards, so that it can never "pump empty".

4. The lens holder forms one unit with the door of the film gate

Lens holder and door are opened in one manipulation by means of only one push-button, this making for simplified operation.

5. The lengths of the runner plate and of the pressure skates are such that film splices are drawn between them and leave them at minimum speed

This much reduces the risk of weak splices becoming unstuck; the splices, moreover, pass through noiselessly.

AA-11

INTRODUCTION



PHILIPS Cinema

The unpacking, setting up and testing of the equipment will usually be done by an expert. A few important points should be noted.

1. Fitting out the projection room

It is advisable not to install the equipment before the projection room has been completely fitted out, i.e. has been provided with windows with automatic fire-shutters, the complete electric wiring and any water-pipes and air-ducts that may be needed.

2. Unpacking

Care should be taken when opening the cases; use a nail extractor, not a hammer. Do not try to take the apparatus from the cases before all the fixing material has been removed. Do not remove the oil-paper before all the wood-wool has been taken out. Special care should be taken not to leave any parts in the packing.

While the installation work is going on, the apparatus should be covered by dust-sheets to keep out dust and moisture. In the factory all bright parts are coated with anti-rust oil; this should not be removed before the equipment is ready for initial testing.



1. Positioning of the pedestal (figs 3 and 4)

The pedestal must be positioned with the vertical side facing the operating side of the projector. With type EL 4051 pedestal the height of the optical axis in horizontal projection is $46\frac{7}{8}$ " (119 cm) and with type EL 4050 pedestal it is adjustable between $46\frac{7}{8}$ " and 54" (119 and 137 cm). When a magnetic soundhead is used, the total height is $65\frac{1}{16}$ " (160 mm) larger.

For projectors which are tilted steeply forwards, wedges can be supplied for inclining the upper spool box backwards (see page AA-56).

2. Fixing the mounting table (figs 3 and 4)

- Before fixing the mounting table to the pedestal, let the cables which stick out of flexible shaft "8" sink into the top of the pedestal.
- Place the mounting table in the correct position on the pedestal and pass rod "1" through the opposite holes in pedestal and mounting table.
- Tighten bolt "3" (spanner width $\frac{1}{16}$ " = 27 mm) and then fix rod "1" to the mounting table with one screw and to the pedestal with two screws.
- Connect the numbered cables sticking out of flexible shaft "8" to the terminal strip at the bottom left in the pedestal.
- Pass the end of flexible shaft "2" which sticks out of hole "7" through the hole in the mounting table, and fix it with a screw.
- Fix the projector, the soundhead and the lamp house provisionally to the mounting table.
- Connect the bundle of wires sticking out of shaft "2" to the terminal strip of the projector.

N.B. Later on, when adjusting the tilting angle of the projector, have the mounting table firmly supported by an assistant before loosening bolt "3".

3. Aligning the projector and the soundhead

- Use a steel ruler or a special aligning tool (order No. 22 467 36).
- Remove the lower pad roller and place ruler or tool on the soundhead as shown in fig. 5.
- Shift soundhead and projector so that the ruler or the tool is in contact with the whole front of the hold-back sprocket.

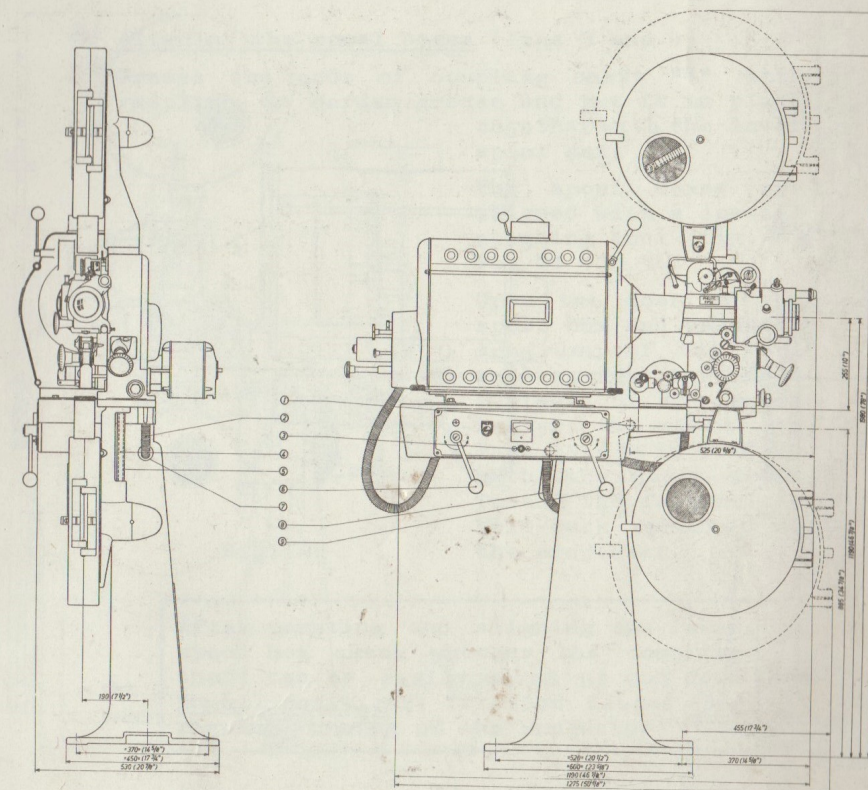
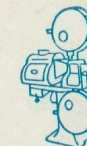


Fig. 3

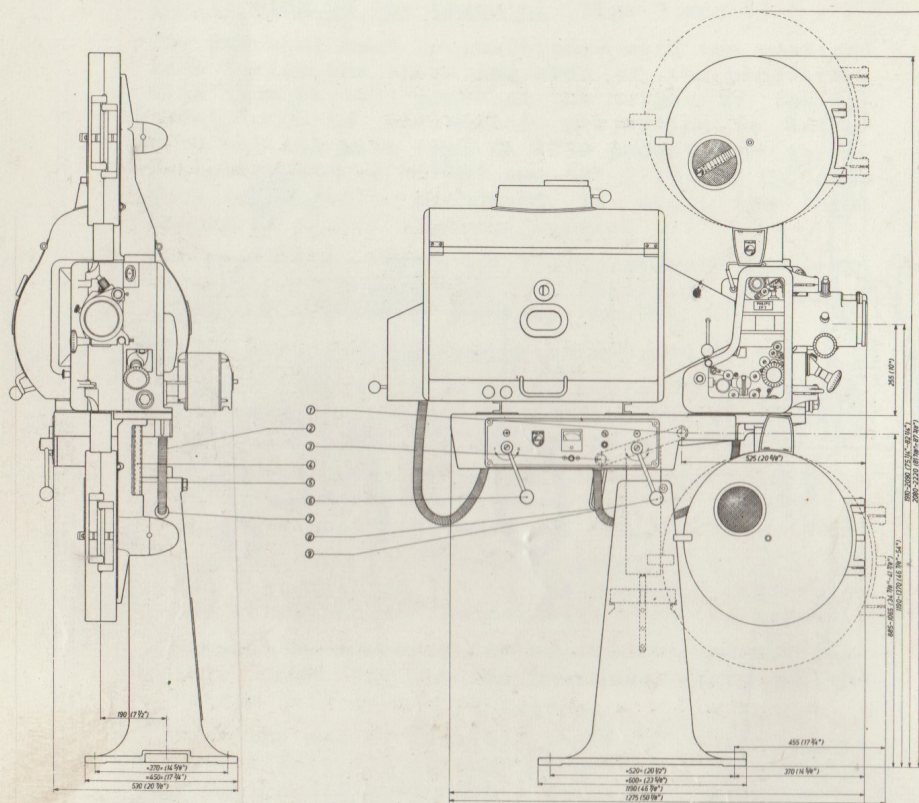
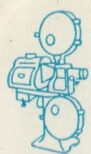


Fig. 4

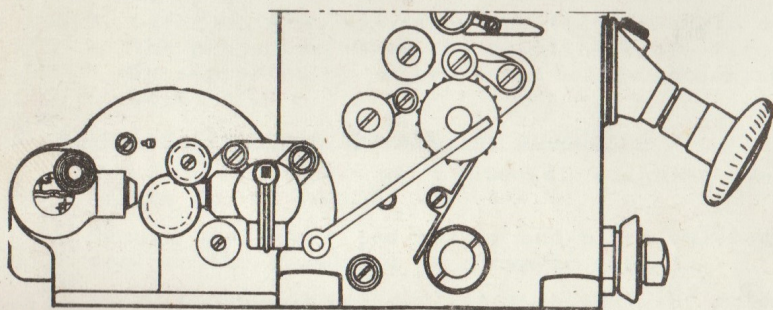
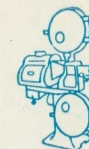


Fig. 5



4. Aligning the spool boxes (figs 3 and 4)

Grease the ends of coupling shaft "4" with vaseline or cardan grease and put it in place together with the lower spool box.

The spool boxes are aligned with a special aligning tool (fig. 6) No. C1 408 56.

Open the door of the spool box and push the long leg of the tool well against the whole surface of the guide roller; the short leg must then be in contact with the whole front face of the feed or the hold-back sprocket of the projector.

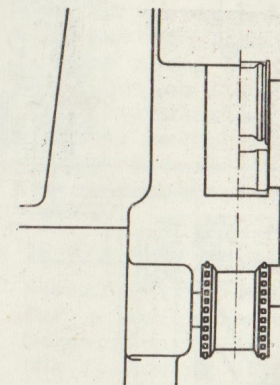


Fig. 6

After mounting and aligning the lower spool box check whether the coupling shaft can be easily moved up and down in all positions; friction causes irregular running of the projector!

5. Mounting the lamphouse

Fillers are supplied with all PHILIPS lamp-houses for insertion between lamphouse and mounting table. The light-cone of the lamp-house must fit well up against the projector. The optical axis of the projection lamp must coincide with that of the projection lens; this is achieved in the first instance by mounting the lamphouse so that its two sides project equally over the mounting table.

For final alignment see page AA-25.

After mounting, carefully clean the reflector - and in H.I. arc lamps also the protecting glass - with a lens cloth.

6. Connection of the water-cooling system

See page AA-51.

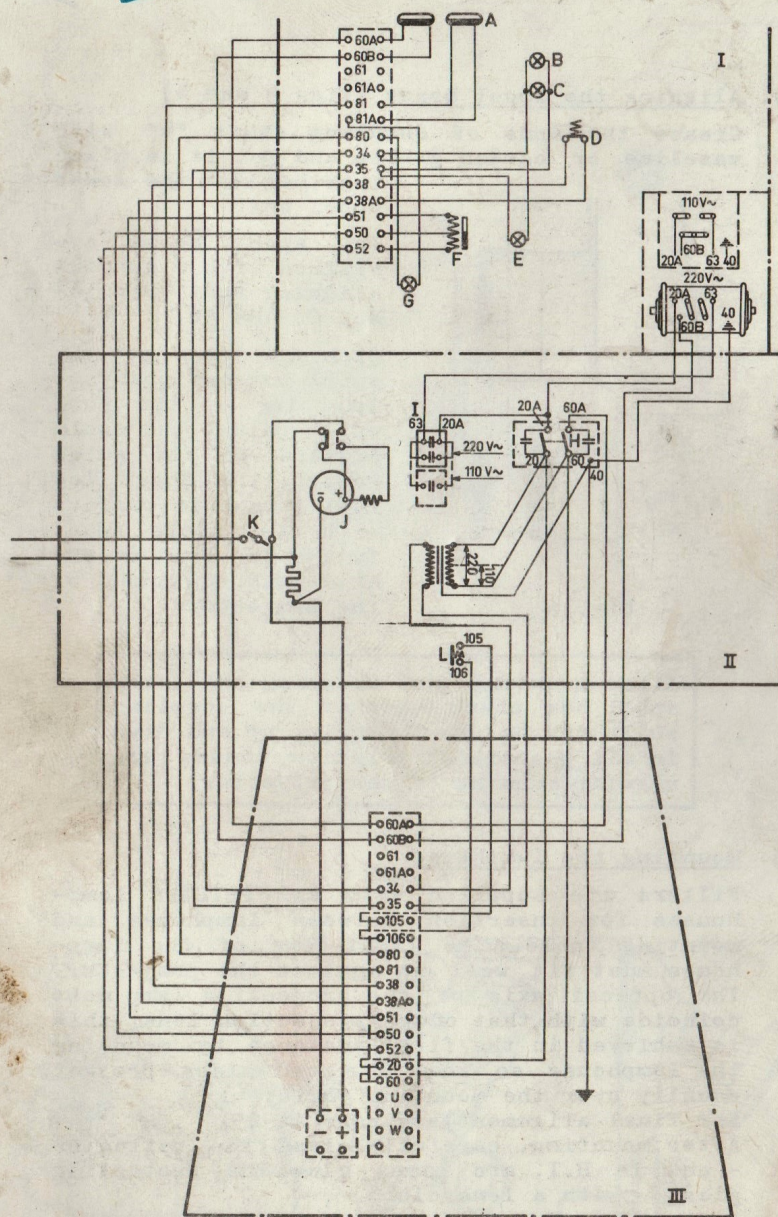
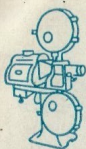
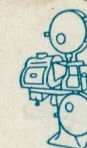


Fig. 7



ELECTRICAL CONNECTIONS

1. A.C. mains

Fig. 7 shows the wiring of a projector connected to A.C. mains. In this diagram:

I = projector II = mounting table III = pedestal

- | | |
|---|--|
| A = mercury switch | G = exciter lamp |
| B = inspection lamp of upper spool box | H = motor switch |
| C = inspection lamp for oil circulation | I = starting resistor |
| D = safety switch | J = volt and ammeter |
| E = framing lamp | K = arc-lamp switch |
| F = picture change-over relay | L = picture and sound change over switch |

a. 50 c/s A.C. mains and flange motor

Normally, the projector as supplied is adjusted for a mains voltage of 220 V. Modification for connection to 110 V can be effected on the spot in the following way:

- connect the motor windings in parallel instead of in series;
- change over the soldered transformer connections for the inspection lamps;
- connect a second starting capacitor (order No.: 48 348 10/C20M) in parallel with the existing one and fix it under the same bracket. Each starting resistor consists of two parts: one of 4 μ F - used under normal conditions - and one of 2 μ F which can be connected in parallel with the first part when a shorter starting time is desired.

b. 40, 50 and 60 c/s A.C. mains and pulley motor

Mains voltage

For adjustment to the available mains voltage see above.

Choice of the motor pulley

The diameter of the motor pulley that should be used depends on the mains frequency. The projector pulley is the same for 40, 50 and 60 c/s mains.

The various motor pulleys and the approximate distances "centre of projector pulley - centre of motor pulley" are indicated in fig. 8.

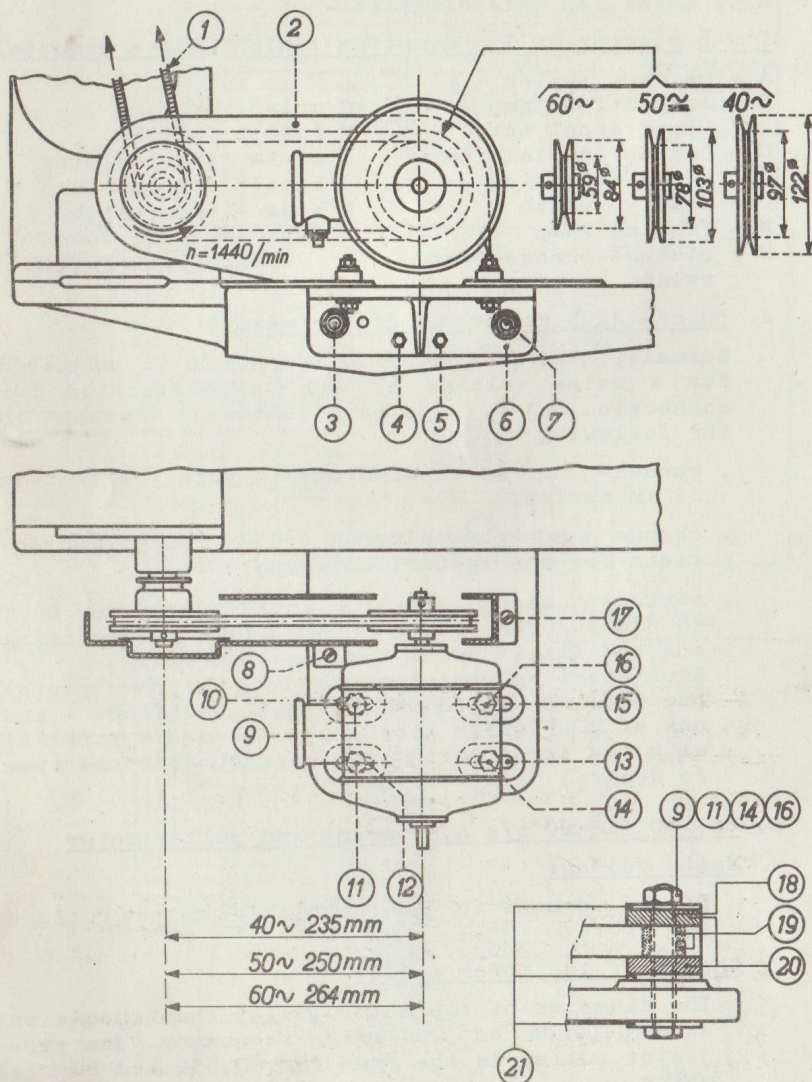


Fig. 8



Mounting of motor bracket and motor (fig. 8)

- . Fix motor bracket "6" with bolts "3" and "7" provisionally to the mounting table of the projector.
- . Position the bracket parallel to the mounting table by means of bolts "4" and "5".
- . Tighten bolts "3" and "7".
- . Fix the motor provisionally with bolts "9", "11", "14" and "16" (in fig. 8 is: "18" = spacing piece, "19" and "20" = four rubber rings, "21" = three washers).
- . Lay the belt over the pulleys of motor and projector and stretch it by shifting the motor in the oblong holes "10", "12", "13", "15" of the bracket.
- . Align the motor so that its pulley is in line with that of the projector.
- . Fix guard "2" with the bolts "8" and "17" to the bracket.

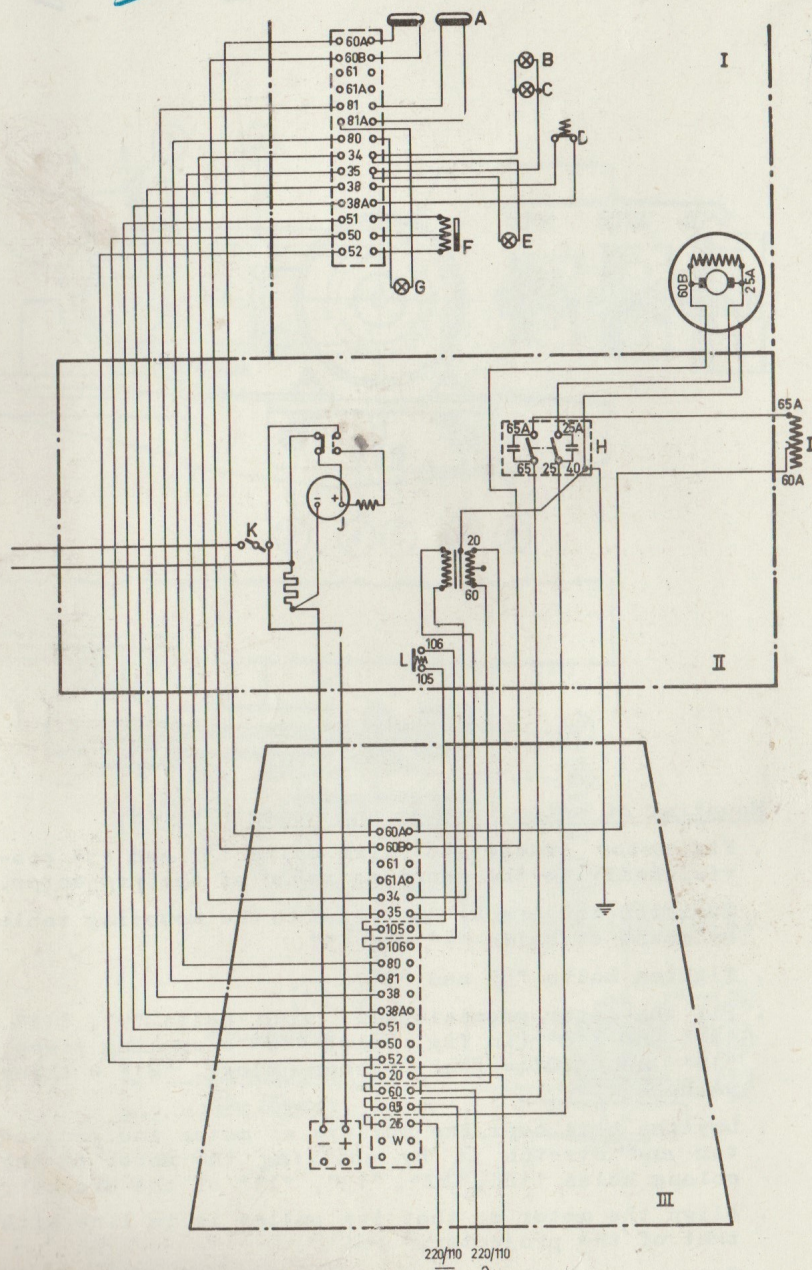
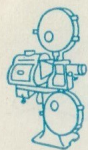


Fig. 9

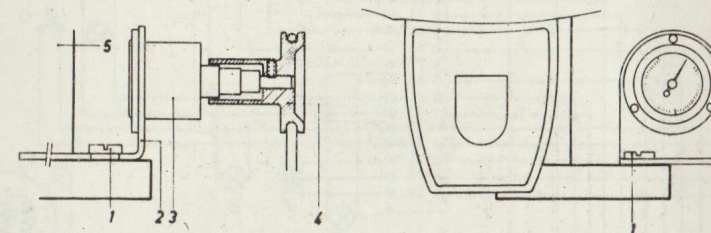
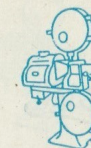


Fig. 10

2. D.C. mains and pulley motor

Fig. 9 shows the wiring of a projector connected to D.C. mains. In this diagram:

I = projector II = mounting table III = pedestal

- | | |
|---|--|
| A = mercury switch | G = exciter lamp |
| B = inspection lamp of upper spool box | H = motor switch |
| C = inspection lamp for oil circulation | I = rheostat |
| D = safety switch | J = volt and ammeter |
| E = framing lamp | K = arc-lamp switch |
| F = picture change-over relay | L = picture and sound change-over switch |

The rheostat serves for setting the speed of the film accurately at 24 frames/sec. A speedometer, type 8662/10, can be supplied for supervising the film speed.

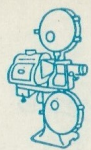
Mounting the motor bracket

See page AA-19.

Mounting the speedometer (fig. 10)

- Fix the speedometer "3" with its bracket "2" and fix pulley "4" with the two screws "1", which are also used for the spool box, to the projector.
- Lay belt "1" (fig. 8) over the pulley of the speedometer and over the small pulley at the rear of the projector pulley.

The speed of the projector pulley has to be 1440 r.p.m. (24 frames/sec). The direction of rotation is counter-clockwise.



PHILIPS Cinema

AA-22

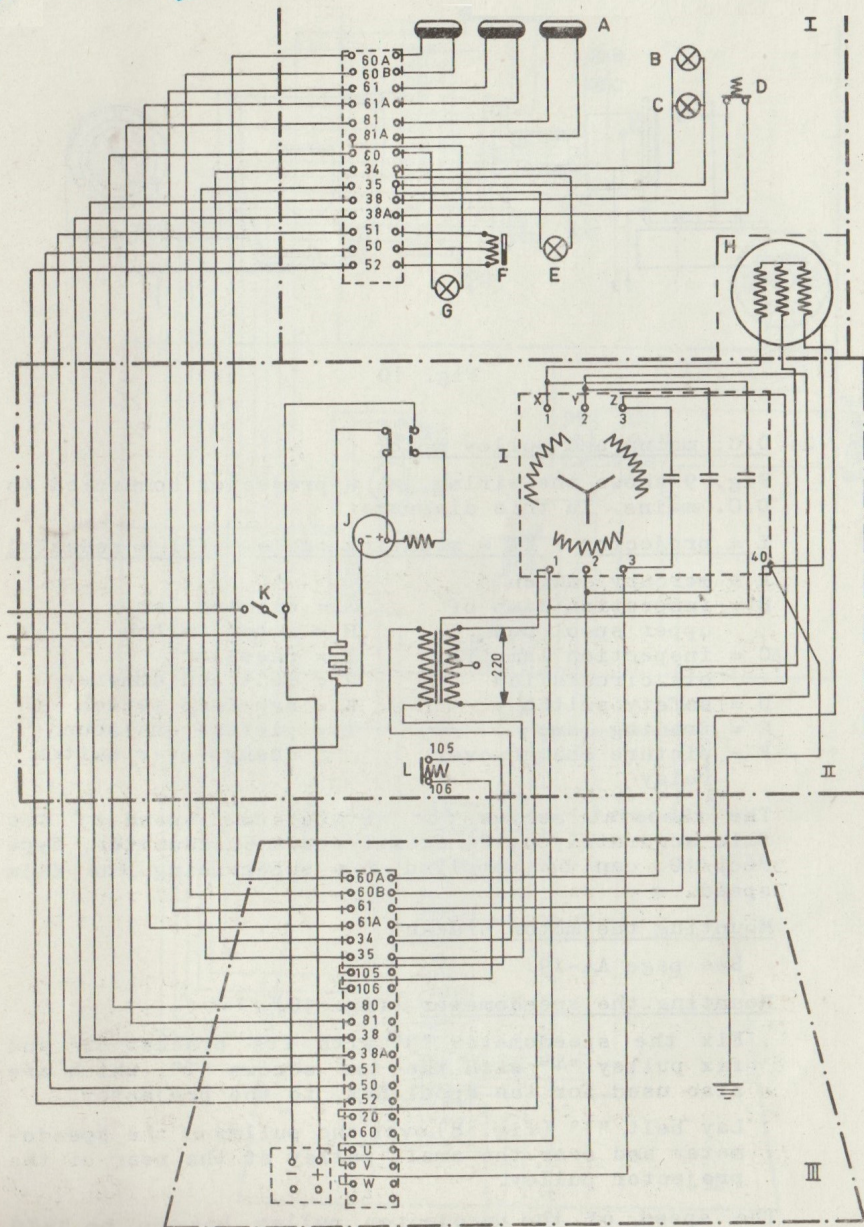
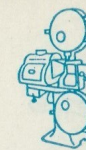


Fig. 11

AA-23



PHILIPS Cinema

3. Three-phase A.C. mains 220/380 V, 50 or 60 c/s and synchronous motor

Fig. 11 shows the wiring of a projector connected to A.C. mains of $3 \times 220/380$ V. In this diagram:

I = projector II = mounting table III = pedestal

A = mercury switch	G = exciter lamp
B = inspection lamp of upper spool box	H = synchronous motor
C = inspection lamp for oil circulation	I = starting resistor
D = safety switch	J = volt and ammeter
E = framing lamp	K = arc-lamp switch
F = picture change-over relay	L = picture and sound change-over switch

With a synchronous motor it is always necessary to use a starting resistor in order to prevent the motor from starting too rapidly causing film rupture.

The gear-wheel transmission between motor shaft and main shaft as well as that between main shaft and oil pump are different for 50 and 60 c/s mains.

Mounting the starting resistor

- . Mount the starting resistor under the mounting table of the projector.
- . Replace lever "9" (figs 3 and 4) by the control of the starting resistor.



PHILIPS Cinema

AA-24

PREPARING THE EQUIPMENT FOR OPERATION

1. Lamps and photocell

- . Push aside the red glass of the shutter housing and insert the framing lamp (No. C1 408 02).
- . Insert the lamp of the upper spool box (also No. C1 408 02).
- . Open the exciter-lamp housing and insert the exciter lamp - type 3874C (about 6 V, 1.48 A) or type 7251C (about 5 V, 4 A), depending on the power-supply unit used.
The exciter lamps are provided with a slotted centring flange; they have to be inserted so that the notch of the socket engages in the slot of the flange; the filament is then automatically focused.
- . Insert the photocell, type 3533, in the socket under the lid at the rear of the soundhead.

2. Automatic film-rupture device

The correct position of the holder for the mercury tubes depends on the tilting angle of the projector.

- . Adjust the holder so that the two mercury switches are horizontal in the operating position (in which contact has to be established). For this purpose loosen fixing screw "4" (fig. 33, page AA-54) half a turn and tighten it again after adjustment.

3. Lubrication

- . Hook the magnet behind the observation glass at the right-hand top of the projector.
- . Replenish the running projector with oil according to the instructions given on page AA-32. The filler opening is located in the holder of the framing knob.

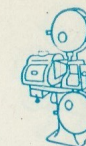
When the projector is tilted backwards or when it is tilted through max. 20° forwards, the oil level should lie at the top of the red circle on the oil-level gauge and when the projector is tilted more than 20° forwards, it should lie at the bottom of this circle.

4. Projection lens

- . For inserting the lens see page AA-39.

AA-25

ALIGNMENT OF THE EQUIPMENT



PHILIPS Cinema

1. Alignment of the running projector without film

- . Let the projector run without film, project the mask onto the screen and focus its image.
- . Check the automatic lubrication through the observation glass at the right-hand top of the projector.
- . Shift the projector so that the light beam passes through the centre of the projection-room window and the mask image is symmetrical with respect to the screen.
If the image is too large or too small, use a lens with a larger or smaller focal length respectively.

2. Alignment of the arc lamp

- . Let the projector run without film and without lens and switch on the arc lamp; the crater will then appear on the screen as a round black spot. Shift the mirror so that this spot lies in the centre of the screen.
- . Insert the lens in its holder and focus the mask again. Check whether the image is illuminated symmetrically. If not, shift the arc lamp slightly sideways and repeat the above adjustments.



PHILIPS Cinema

AA-26

CHECKING THE RUNNING PROJECTOR WITH A FILM LOOP

Clean the greased parts with carbon tetrachloride or turpentine (always use a clean cloth).

1. Checking the FP 7 projector

- . Remove the fire trap of the upper spool box.
- . Thread a new film loop of about 2 yds (2 m) into the projector as indicated in fig. 12 and let it run through about 50 times.
- . Examine the film; the source of any damage can easily be recognised from its appearance.

2. Checking the FP 56 projector with type 3837 soundhead

- . Thread a new film loop of about 2 yds (2 m) into the projector and the soundhead as indicated in fig. 13, let it run through about 50 times and check it for any damage.

Black film loops 2 yds (2 m) in length for checking the FP 7 and FP 56 projectors are supplied under No. 22 463 87.

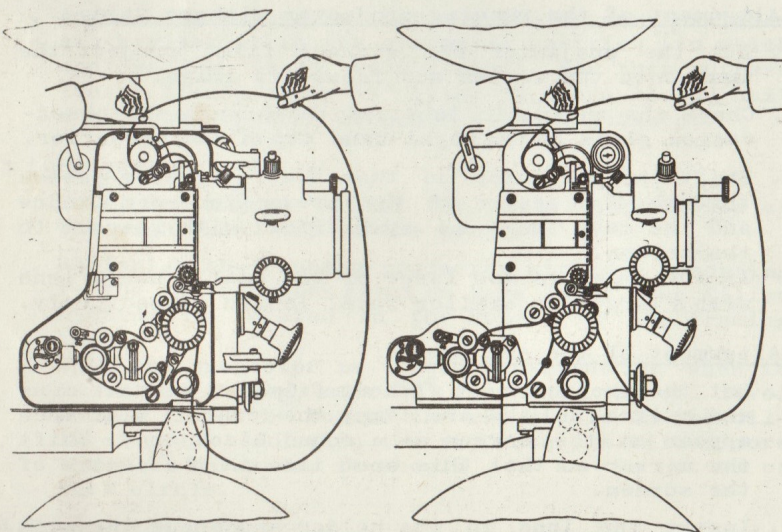


Fig. 12

Fig. 13



PHILIPS Cinema

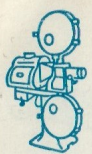
AA-27

CHECKING THE RUNNING PROJECTOR WITH FILM

- . Thread in an old test film (see page AA-29) and while the projector is running, adjust the skate pressure and the frictions of the upper and the lower spool boxes (see pages AA-41 and AA-57).
- . Check whether the spool boxes and the soundhead are correctly aligned with respect to the projector; the film must run smoothly over the rollers of the fire traps without twisting.
- . Project a good test film and check whether the text is perfectly horizontal. If necessary, shift the projector slightly and insert metal plates under the pedestal. After the fixing bolts of the pedestal have been tightened, a final check is necessary.

The speed of the projector can be checked easily with the aid of a stop watch:

- . Hold a finger on the feed sprocket so that you can feel the fixing screw pass and count the number of r.p.m. of this sprocket (beginning at zero, not at one!). If the count is 180 ± 2 the film speed is correct (24 frames/sec), if the count has another value, first check the mains frequency.



PHILIPS Cinema

AA-28

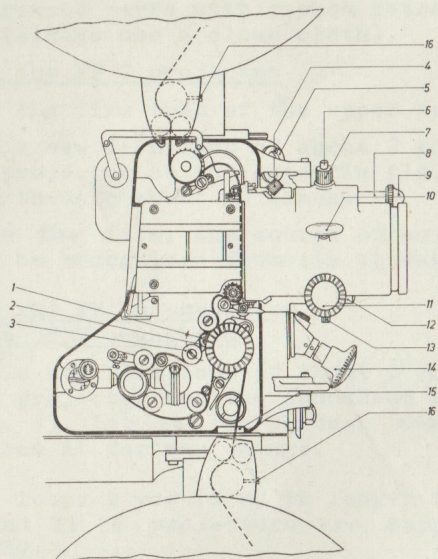


Fig. 14

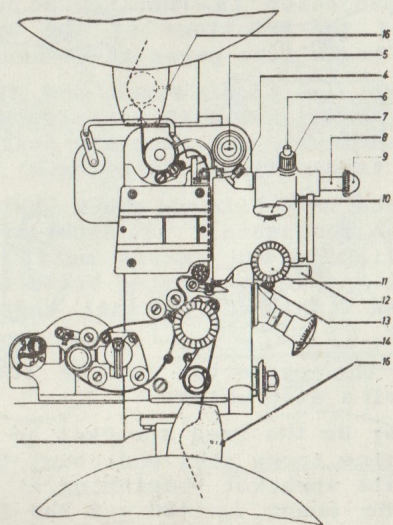
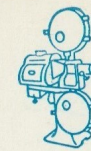


Fig. 15

OPERATION



THREADING THE FILM

The film path of the FP 7 projector is indicated in fig. 14, that of the FP 56 projector in fig. 15.

When the film spool unwinds in a clockwise direction, the red screw "16" of the upper fire trap has to be screwed in at the right-hand side and when the spool unwinds in a counter-clockwise direction, the screw has to be at the left-hand side of the fire-trap (the direction of rotation of the upper spool depends on how the operator is accustomed to rewinding his films).

Screw "16" of the lower fire trap has always to be screwed in at the right-hand side.

To open the film path for threading the film, depress button "6"; the lens holder then slides forwards on the guide rods "8" and "12". The lens holder can be pushed back to its original position, this closing at the same time the pad roller of the intermittent sprocket.

In the FP 7 projector the lower film loop automatically assumes the correct size on starting up the projector by stretching the film between the intermittent and the hold-back sprocket and pushing it at the same time against notch "15" (fig. 14) when it is being threaded.

SWITCHING ON

1. ProjectorConnection to A.C. mains

- . Switch on the motor with lever "9", (see figs 3 and 4).

Connection to D.C. mains

Initial running:

- . Insert the whole rheostat (see page AA-21).
- . Switch on the motor with lever "9".
- . Adjust the speed of the motor accurately for 24 frames/sec by means of the rheostat and the speedometer. Leave the rheostat in the position found.

Normal operation:

- . Switch on the motor with lever "9"

Use the rheostat to correct small speed variations caused, for example, by mains-voltage fluctuations.



Connection to three-phase mains:

Turn the control of the starting resistor (which has been substituted for lever "9"; see page AA-23) slowly clockwise until it strikes against the stop.

When the motor is switched on or off, this control must always be turned as far as the stop since in an intermediate position the starting resistor might burn out.

2. Arc lamp

- . Switch on the arc voltage with switch "6" (figs 3 and 4).

The meter in the mounting table of the projector indicates either the arc voltage (meter switch to the left) or the arc current (meter switch to the to the right).

FRAMING

- . Turn framing knob "14"; it can be operated from either side of the projector. The position of the framing device is indicated by arrow "5" behind the oil-observation glass.

FOCUSING THE PICTURE

- . Focus the picture with knob "11".
- . Fix the sleeve of the lens with knob "10".

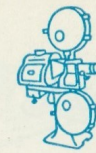
ADJUSTMENT OF THE SKATE PRESSURE

- . See page AA-41.

LOOP CORRECTION

- . After threading the film, turn the milled disc of the loop corrector on the feed or hold-back sprocket until the loop is of the correct size.

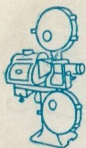
MAINTENANCE



- . All the instructions for maintenance are indicated in figs 16 and 17 which are a photographic reduction of the cardboard instruction card supplied with each installation.

Proper observance of these instructions is essential for the life of the projector.

- . Always keep the lubrication oil in closed tins.
- . Use a clean funnel.
- . For preference use PHILIPS oil.



PHILIPS Cinema

AA-32

REPLENISHING WITH OIL

The projector should only be replenished with oil whilst it is running.

Oil level in the oil-level gauge under the hold-back sprocket:

at any tilting angle backwards } up to the top of
and for angles up to 20° forwards } the red circle
for angles of more than 20° for- } up to the bottom
wards } of the red circle

REFILL WITH FRESH OIL

In the case of a newly installed projector or replacement of essential parts, such as intermittent unit and gear wheels:

- . drain off the oil after the first 20 running hours, then after 50, then after 100 and thereafter every 250 running hours;
- . clean the gauze filter with a soft brush soaked in petrol and the magnetic filters with a dry cloth;
- . replenish with fresh oil.

ALWAYS USE THE CORRECT TOOLS
FOR DISMANTLING AND ASSEMBLY!

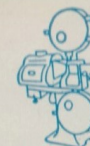


PHILIPS Cinema

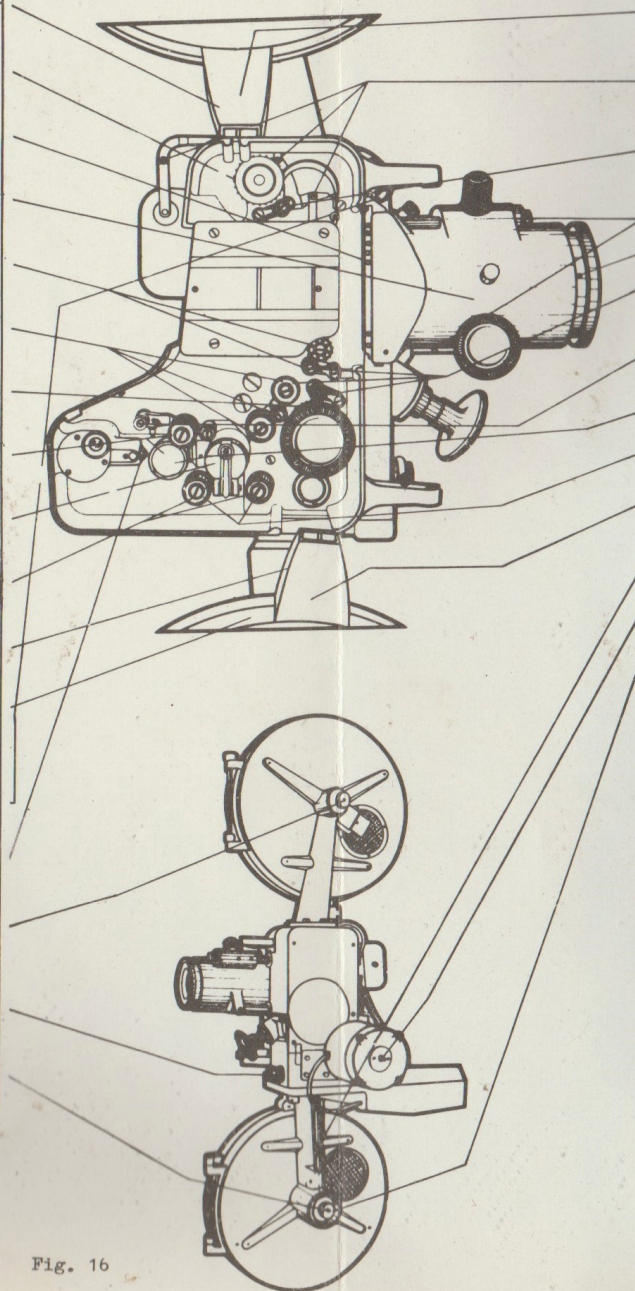
ONS FOR
ATION

PERIOD	OIL OR GREASE
weekly	Esso Handy Oil
monthly	Esso Handy oil
weekly	Esso Handy oil
monthly	type 8657
monthly	type 8657
weekly	Esso Handy oil
monthly	type 8657
monthly	projector oil*)
er overhaul	projector oil*)
weekly	Esso Handy oil
weekly	Esso Handy oil
en removing e spool box	type EL 4850
er overhaul	type EL 4850
ery three months	type 8657

on	To be used at temperatures of:
:	+ 5 °C and lower + 5 °C to +25 °C +25 °C and higher
1, light grease	- - -


**DIRECTIONS FOR
CLEANING**
FP 7 PROJECTOR
**DIRECTIONS FOR
LUBRICATION**

DAILY
Rollers of fire trap
Hold-back sprocket and pad roller
Runner plate and pressure skates
Lens
Intermittent sprocket and pad roller
Guide rollers
Take-up sprocket and pad roller
Pressure roller and sound shaft
Exciter lamp
Guide rollers
Rollers of fire trap
Spool boxes
EVERY THREE MONTHS
Magnetic filter
Optical system
Upper friction coupling
Gauze and magnetic filter
Lower friction coupling



PART	PERIOD	OIL OR GREASE
Spindles of rollers in fire trap	weekly	Esso Handy Oil
Pivot points of film-rupture device	monthly	Esso Handy oil
Pad roller; remove ornamental nut; lubricate through hollow spindle	weekly	Esso Handy oil
Lens guides	monthly	type 8657
Sleeve	monthly	type 8657
Pad roller; see above	weekly	Esso Handy oil
Pivot point of pad roller	monthly	type 8657
Ball-bearing of pad roller	monthly	projector oil*)
Ball-bearing of sound shaft	after overhaul	projector oil*)
Guide rollers	weekly	Esso Handy oil
Spindles of rollers in fire trap	weekly	Esso Handy oil
End of coupling shaft	when removing the spool box	type EL 4850
Bearing of motor	after overhaul	type EL 4850
Felt discs of friction couplings	every three months	type 8657

Type	Description	To be used at temperatures of:
3671	PROJECTOR OIL: Light oil	+ 5 °C and lower
3672	Medium oil	+ 5 °C to +25 °C
3673	Heavy oil	+25 °C and higher
8657	Cardan oil	-
C1602 17	Esso Handy oil, light	-
EL 4850	Ball-bearing grease	-

Fig. 16


**DIRECTIONS FOR
CLEANING**
FP 56 PROJECTOR
**DIRECTIONS FOR
LUBRICATION**

DAILY
Rollers of fire trap
Hold-back sprocket and pad roller
Runner plate and pressure skates
Lens
Intermittent sprocket and pad roller
Guide rollers
Take-up sprocket and pad roller
Pressure roller and sound shaft
Exciter lamp
Guide rollers
Rollers of fire trap
Spool boxes
EVERY THREE MONTHS
Magnetic filter
Optical system
Upper friction coupling
Gauze and magnetic filter
Lower friction coupling

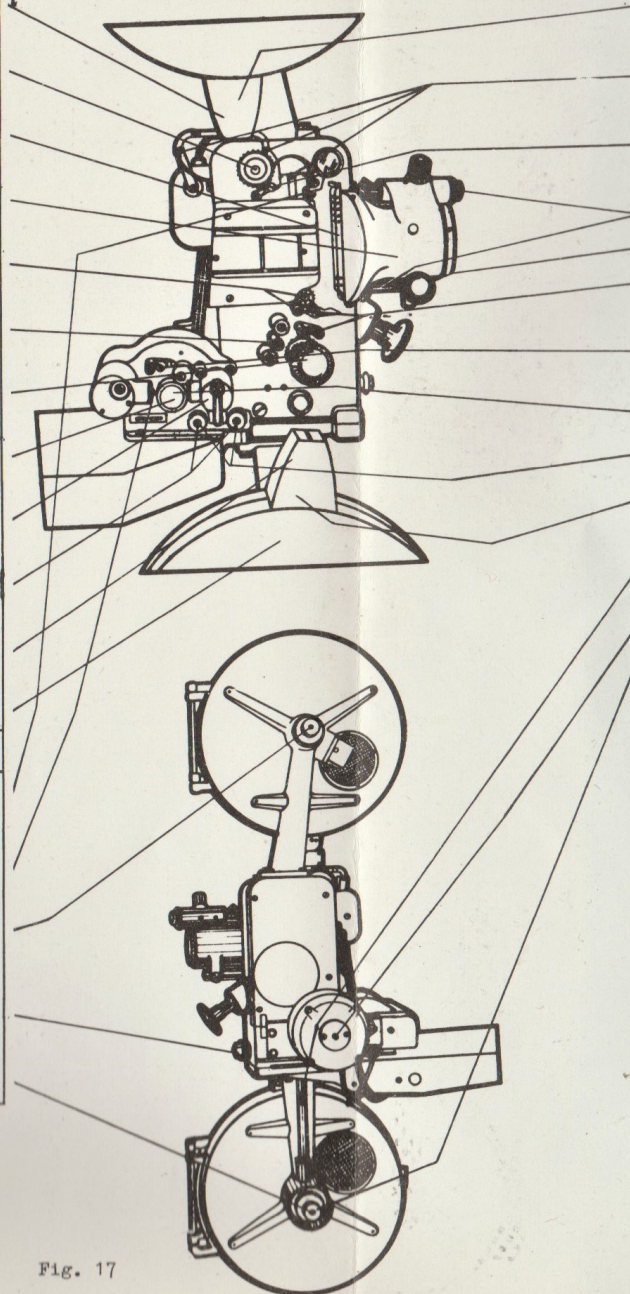


Fig. 17

PART	PERIOD	OIL OR GREASE
Spindles of rollers in fire trap	weekly	Esso Handy Oil
Pivot points of film-rupture device	monthly	Esso Handy oil
Pad roller; remove ornamental nut; lubricate through hollow spindle	weekly	Esso Handy oil
Lens guides	monthly	type 8657
Sleeve	monthly	type 8657
Pad roller; see above	weekly	Esso Handy oil
Pivot point of pad roller	monthly	type 8657
Ball-bearing of pad roller	monthly	projector oil*)
Ball-bearing of sound shaft	after overhaul	projector oil*)
Guide rollers	weekly	Esso Handy oil
Spindles of rollers in fire trap	weekly	Esso Handy oil
End of coupling shaft	when removing the spool box	type EL 4850
Bearing of motor	after overhaul	type EL 4850
Felt discs of friction couplings	every three months	type 8657

Type	Description	To be used at temperatures of:
3671	<u>PROJECTOR OIL:</u> Light oil	+ 5 °C and lower
3672	Medium oil	+ 5 °C to +25 °C
3673	Heavy oil	+25 °C and higher
8657	Cardan oil	-
C160217	Esso Handy oil, light	-
EL 4850	Ball-bearing grease	-



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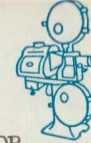
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PARTS AND THEIR MAINTENANCE



OIL CIRCULATION OF THE PROJECTOR

The driving mechanism is lubricated by means of a high-pressure spur-gear oil pump (fig. 18). The gear wheels and the suction opening of the pump are always below the oil level, so that it can never "pump dry".

The oil is forced into the delivery pipe via a gauze filter combined with a magnetic filter; the pipe terminates behind the oil-observation glass in the right-hand top of the projector. From there the oil flows via a second magnetic filter through a funnel direct to the intermittent mechanism which, therefore, receives triple-filtered oil.

The delivery pipe has branches leading to the other points to be lubricated.

After the oil has been drained off, the combined gauze and magnetic filter can be pulled out of the drain opening. The magnetic filter behind the oil-observation glass can be removed after unscrewing this glass.

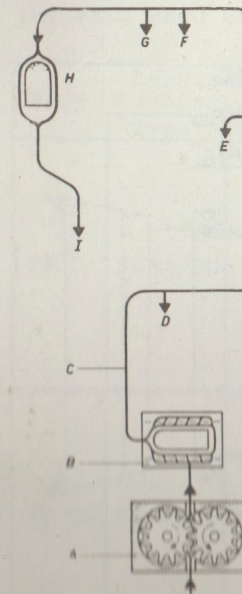
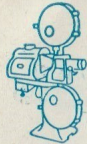


Fig. 18

- A = High-pressure oil pump
- B = Combined gauze and magnetic filter
- C = Delivery pipe
- D = Main-shaft drive
- E = Shutter drive
- F = Bearing
- G = Drive
- H = Magnetic filter
- I = Intermittent mechanism

Never let the projector run without the filters!



PHILIPS Cinema

AA-36

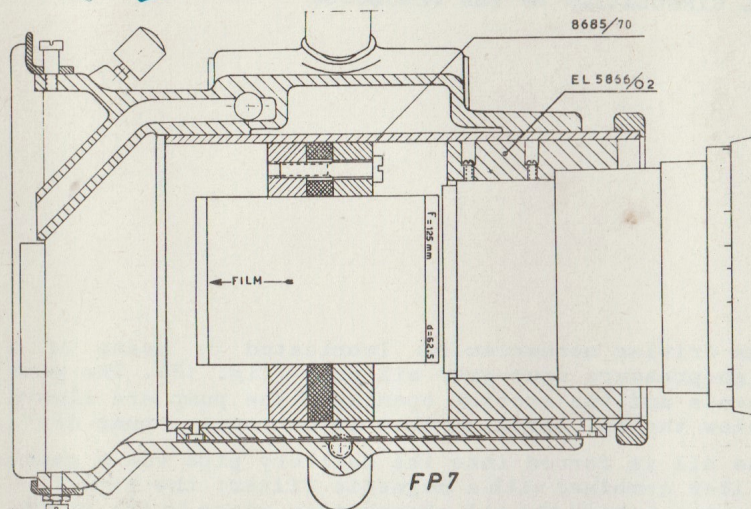


Fig. 19

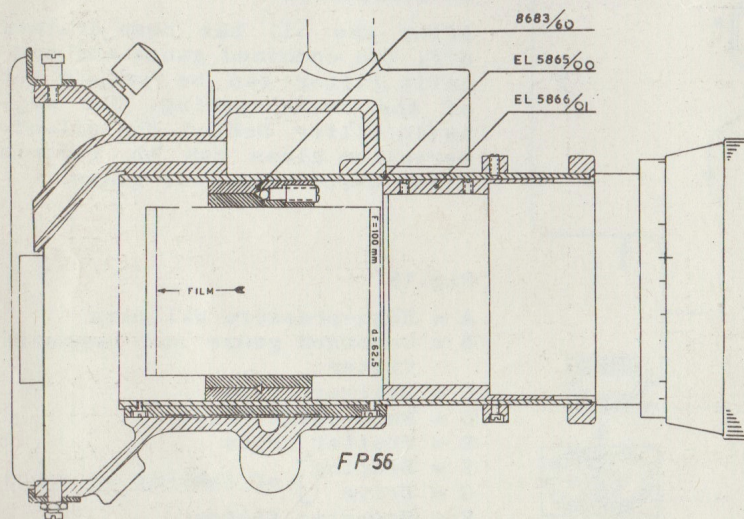


Fig. 20



PHILIPS Cinema

AA-37

LENS HOLDERS, ADAPTERS AND LENSES

1. Description

In the table below are indicated the lens holders with which the projectors are equipped normally as well as the various adapters required for the different projection systems.

The lens holders are mutually interchangeable. They are so constructed that the optical axis of the lens coincides with the centre of the projected picture; the axis need not, therefore, be adjustable.

Proj.	Lens holder + sleeve		Proj. system	Adapters	
	Type	Ø mm		Type	Diameter in mm
FP 7	8682/00	104	Normal film 1:1.37	8685/70	104/62.5
			Wide Screen 1:1.85	8685/70	104/62.5
			CinemaScope 1:2.34 Fig. 19	8685/70 + EL5866/02	104/62.5 104/70.6
FP 56	8681/00	82.5	Normal film 1:1.37	8683/60	82.5/62.5
			Wide Screen 1:1.85	8683/60	82.5/62.5
			CinemaScope 1:2.34 Fig. 20	EL5865/00 +8683/60 +EL5866/01	- 82.5/62.5 82.5/70.6

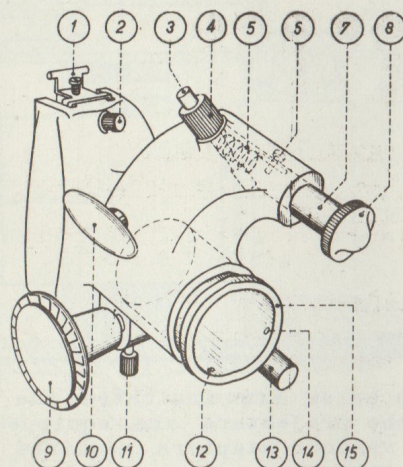


Fig. 21

2. Lens holder (Fig. 21)

Removal:

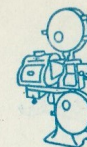
- Slide the lens holder forwards, remove screw "6" and ornamental nut "8" and slide the lens holder off the guide rods.

Mounting:

- Depress button "3", slide the lens holder onto the guide rods, press spring "5" in the hollow guide rod "7" backwards past screw "6", tighten screw "6" and screw on ornamental nut "8" again.
- When the projector is tilted forward at a steep angle, the lens holder when slid forwards (e.g. for threading the film) may strike up hard against nut "8". This may throw the lens out of focus. In that case it is advisable to shorten pressure spring "5" by one or more turns.

Lubrication:

- Lubricate guide rods "7" and "13", sleeve "15" and rack and pinion for focusing with cardan oil.



3. Mounting the lens in the adapter

a. Normal and Wide Screen projection with the FP 56 and FP 7 projectors

Required adapters: 8683/60 for FP 56 and 8685/70 for FP 7.

- Slide the adapter over the lens.
- Insert lens with adapter in the lens holder of the projector.
- Check whether the lens can be focused; if not, shift lens and adapter slightly in the lens holder.
- Tighten uniformly the three screws at the front of the adapter.

b. CinemaScope projection with the FP 56 projector (fig. 20)

Required adapters: 8683/60 and EL 5866/01

Required sleeve : EL 5865/00

- Loosen milled nut "11", pull focusing knob "9" together with its shaft out of the lens holder and remove sleeve "15" together with the lens.
- Slide sleeve EL 5865/00 into the lens holder; insert the shaft of knob "9" into the lens holder until the groove in the shaft faces milled nut "11"; then tighten nut "11".
- Insert the lens with adapter 8683/60 as indicated under a.
- Slide adapter EL 5866/01 over the anamorphic lens and fix it with the screws.
- Insert the anamorphic lens with adapter in the lens holder and fix it by uniformly tightening the screws at the rim.

CinemaScope projection with the FP 7 projector (fig. 19)

Required adapters: 8685/70 and EL 5866/02

- Slide adapter EL 5866/02 over the anamorphic lens, fix it with the screws and insert the lens and adapter into the lens holder of the projector as described for the FP 56.



6. Cleaning the projection lens

- The lens is surface-coated so that reflectivity is considerably reduced and a great light gain is obtained. To take full profit of this light gain it is necessary to observe the following points when cleaning the lens.
- Clean the lens only when it is absolutely necessary, because cleaning may easily damage the coating.
- Never touch the glass surfaces with the fingers.
- To make it superfluous to focus the lens after cleaning, it is advisable to mark on the sleeve how far it projects from the lens holder when the picture is focused.

For cleaning the lens:

- Loosen milled nut "11", remove focusing knob "9" together with its spindle and take sleeve "15" with lens out of the lens holder.
- Hold the lens with the surface to be cleaned pointed downwards and brush lightly with a soft camel or marten hair brush.
- Polish the dusted surface lightly with a soft linen cloth such as a cambric handkerchief, breathing on it if necessary. If the surface is greasy and cannot be cleaned in this way, wipe it with a cloth sparingly damped with the supplied cleaning liquid and then rub it with a soft clean linen cloth.
- After cleaning, slide sleeve "15" with lens back into its original (marked) position in the lens holder; the projected picture will then be focused.
- See that milled screw "11" snaps into the groove in the spindle of focusing knob "9".

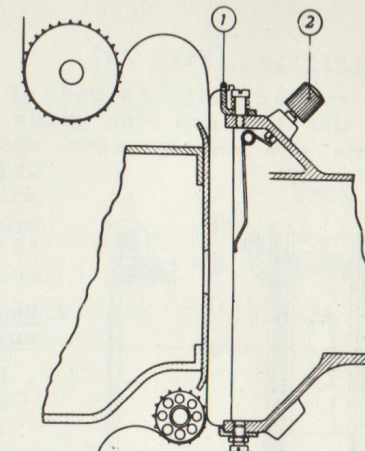
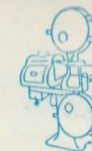


Fig. 22

1. Description

The pressure skates are made of "Novotext". A double spring pushes them against the film so that the pressure is uniformly distributed over the whole runner plate. The skate pressure is adjusted by means of only one screw "2" (fig. 22).

2. Operation

The skate pressure should be as light as possible in order to reduce the stress on the film perforations and on the intermittent mechanism and to minimize wear of the teeth of the intermittent sprocket.

To adjust the skate pressure:

- Loosen the set screw until the picture begins to jump, then tighten it until the picture just becomes steady.
- Re-adjust the pressure whenever the runner plate or the skates have been replaced or when running colour films which are thicker than black-and-white films.

3. Maintenance

- Once a day take the pressure skates out of the projector - by loosening screw "2" and tilting support "1" - and clean them with an oiled cloth.
- After the skates have been put back, check whether they give easily.



1. Description (fig. 23)

The runner plate is made of hard-wearing stamp steel. At the top are two guide rollers: roller "1" which forms one entity with spindle "2", and roller "3" which can move along this spindle and is pressed laterally by spring "4". Spindle "2" rotates in the pointed screw "5".

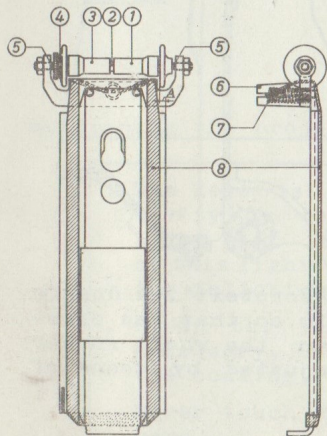


Fig. 23

2. Removal and assembly of the roller unit

- Remove screw "5" situated at the side of the resilient roller and take the whole unit out of its holder.

To assemble the unit again:

- Tighten screw "5" until spindle "2" has a slight but still perceptible play; the unit will then automatically assume its original position.

- Remove the roller unit only when this is absolutely necessary.
- When mounting the unit again or after replacement, see that the fixed roller is at the side to which the film tends to run, i.e.: running to the right: fixed roller to the right; running to the left: fixed roller to the left.
- The distance A must always be 0.1" (2.6 mm).

3. Maintenance

- Slide the runner plate upwards and pull it off in the direction of the lens.
- Lubricate guide rollers "1" and "3" regularly as well as spindle "2"; clean the rollers after lubrication.
- The runners of the plate are highly polished in the factory; clean them carefully with a lightly oiled cloth every time another film reel is put in. Remove agglomerated film deposit carefully with a piece of wood, never with a metal object.



4. Application of the velvet tape (fig. 23)

- Compress spring "7" with a coin and fix it with a needle through the holes in bush "6".
- Lay the middle of tape "8" at the bottom behind the runner plate and lead the two ends over the runners of the plate and under the rollers "1" and "3" towards the rear.
- Stretch the tape firmly, pass one end through the slit in bush "6" and knot the ends behind the bush.
- Remove the needle; the spring pressure then keeps the tape sufficiently stretched.

5. Adjustment of the skate pressure when using a velvet-covered runner plate

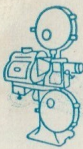
- Reduce the skate pressure when replacing a steel runner plate by one covered with velvet; this is necessary since the film is subject to greater friction on velvet than on steel and because a velvet-covered runner plate is thicker than a steel one.

6. Maintenance of a runner plate covered with velvet

- Every time before putting in a new film reel, clean the velvet carefully by brushing it in the direction of film travel, i.e. from top to bottom.

Renew the velvet tape in good time; if it is badly worn the film may be damaged.

With each projector are supplied a steel and a velvet-covered runner plate as well as a spare strip of velvet.



PHILIPS Cinema

AA-44

INTERMITTENT SPROCKET

1. Description

As the bases of the teeth are milled in, the film always lies flat on the running surfaces, this greatly reducing wear on the teeth and guaranteeing a perfectly steady picture.

When the teeth become worn on one side, the sprocket can be reversed; this doubles its life.

2. Removal and mounting

- . The intermittent sprocket should only be removed when absolutely necessary and never for normal cleaning for which a tooth brush or other suitable brush should be used.
- . When loosening or tightening the fixing screw, see that the sprocket is blocked.

Removal of the sprocket:

- . Take out the milled screws which hold the film stripper against the bottom of the shutter housing.
- . Remove fixing screw with washer and nut and slide the sprocket from its spindle.
- . If the sprocket cannot easily be removed from the spindle, use the PHILIPS sprocket puller (fig. 24) No. 22 468 76 which has left-hand thread.

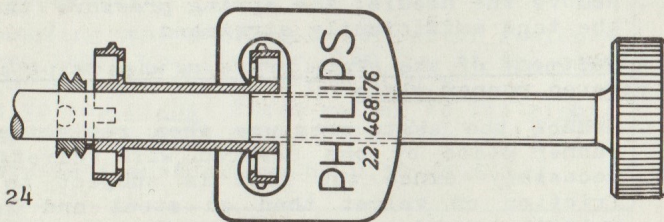


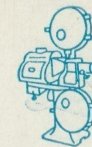
Fig. 24

Mounting:

- . Before mounting the sprocket again, carefully clean and lubricate the spindle and the bore.
- . Push the roller onto the spindle over the driving notches as far as the stop (it is then correctly aligned) and secure it with the fixing screw, washer and nut.
- . Put the film stripper against the surface between the cast-on ribs of the shutter housing and fix it with the two milled screws.

AA-45

FEED AND HOLD-BACK SPROCKETS WITH LOOP CORRECTORS



PHILIPS Cinema

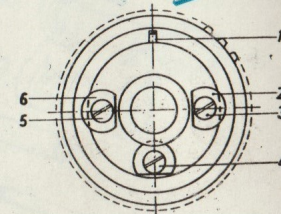


Fig. 25

1. Description

The feed and hold-back sprockets with loop corrector of the FP 7 projector are identical. They can be used on the FP 56 projector which normally is equipped with sprockets without loop corrector.

The sprockets themselves - i.e. without loop corrector - can be replaced separately; they are reversible, this doubling their life.

2. Dismantling the sprocket with loop corrector

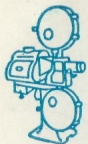
- . Turn the milled ring of the loop corrector until the red dot at the front faces the screw hole between the two toothed rims of the sprocket. The sprocket fixing screw is now accessible.
- . Loosen this fixing screw and slide the sprocket from its spindle.

3. Mounting

- . Slide the sprocket on its spindle as far as the stop; it is then correctly positioned.
- . See that the fixing screw presses centrally on the milled surface of the spindle.

4. Reversal of the sprocket proper

- . Remove the sprocket with loop corrector (see above).
- . Remove screws "3" and "5" and washers "2" and "6" at the rear of the sprocket (fig. 25); never loosen screw "4".
- . Keeping hold of the milled ring of the loop corrector, pull the sprocket from the internal mechanism.
- . Slide the reversed sprocket or a new one onto the spindle; see that pin "1" snaps into the groove provided for this purpose.
- . Fit washers "2" and "6" again in the position indicated in fig. 25 and tighten screws "3" and "5".



PHILIPS Cinema

AA-46

FEED AND HOLD-BACK SPROCKETS
WITHOUT LOOP CORRECTOR

1. Description

The feed and hold-back sprockets of the FP 56 projector are identical and therefore interchangeable. Like the intermittent sprocket, they are reversible, this doubling their life.

2. Dismantling

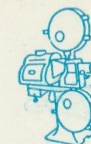
- Loosen the fixing screw and slide the sprocket from its spindle. If it cannot be pulled off easily, use the PHILIPS sprocket puller No. C1 904 51.

3. Mounting

- Slide the sprocket on its spindle as far as the stop; it is then correctly positioned.
- See that the fixing screw pushes centrally on the milled surface of the spindle.

AA-47

PAD-ROLLER ASSEMBLY



PHILIPS Cinema

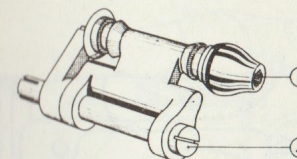


Fig. 26

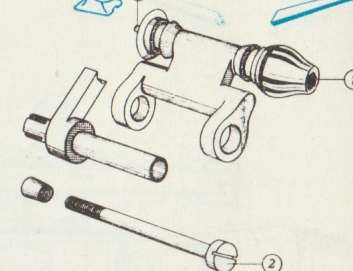


Fig. 27

1. Lubrication

- Loosen ornamental nut "1" and squirt some drops of spindle oil through the hollow pin; both pad rollers are thus lubricated from the outside.

2. Dismantling the rollers (Figs 26 and 27)

- Push up the pad-roller assembly; loosen the long screw "2" and pull the whole assembly from its spindle.
- Loosen ornamental nut "1" and screw "3" and slide the two rollers from the spindle.

3. Dismantling the whole pad-roller assembly

Dismantle only when absolutely necessary!

- Push up the pad-roller assembly; loosen the long screw "2" about two turns and tap the head of the screw lightly with a hammer to loosen the spindle, interposing a piece of wood to protect the screw head.
- Pull the whole pad-roller assembly out of the projector.

4. Mounting and adjusting the pad-roller assembly

- Insert the assembly in the projector in roughly the correct position and tighten screw "2" loosely.
- Push down the assembly and adjust it so that:
 - a. the side flanges of the rollers run free of the sprocket;
 - b. there is enough space left between the running surfaces of sprocket and pad rollers for the latter to run lightly with two thicknesses of film and heavily with three thicknesses between rollers and sprocket.
- Tighten screw "2" firmly and check the adjustment again.

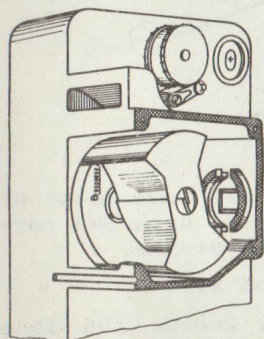


Fig. 28

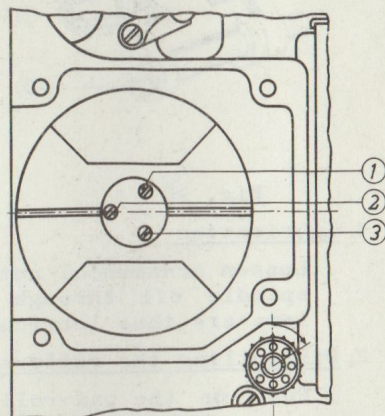
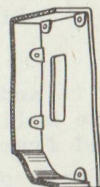


Fig. 29

1. Description (fig. 28)

As the whole drum shutter is made of steel, there is no danger of deformation by heat, not even when a 150 A arc lamp is used. The shutter is provided with two centrifugal blades which cut off the light beam automatically should the projector run too slowly or stop.

2. Adjustment (fig. 29)

Remove the cap of the shutter housing and loosen screws "1", "2" and "3" one turn; the shutter can then be turned about its shaft.

Turn the shutter so that the engraved line is exactly parallel to the optical axis and at the same time turn the intermittent sprocket $2\frac{2}{3}$ tooth intervals out of its rest position.

Tighten the screws again and check the adjustment.

If desired, check with a test film whether the picture on the screen travels, if so, proceed as follows:

travel ghost at bottom: turn shutter to the right;
travel ghost at top: turn shutter to the left.

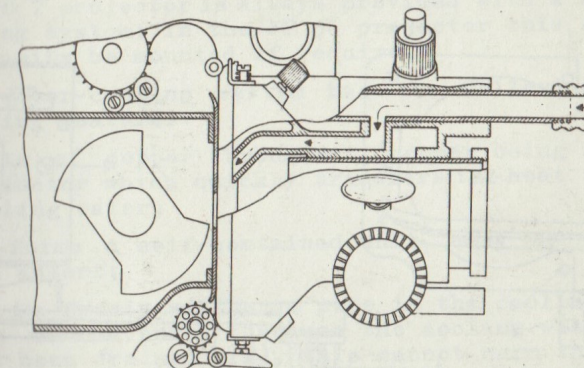
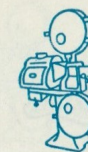


Fig. 30

Unless local regulations dictate otherwise, no special cooling is necessary.

If air cooling is officially stipulated, an air blower has to be used. The FP 56 and FP 7 projectors are provided with an air duct for this purpose.

Water cooling is always advisable because:

- . it reduces buckling, shrinkage and drying-out of the film - and hence lengthens its life - and enhances the quality of reproduction;
- . it keeps the projector cool even in continuous operation, so that the oil retains its full lubricating power.

In view of these advantages, it is recommended always to use water cooling when operating with arc lamps over 45 A.

1. Air cooling (fig. 30)

In both types of projectors the air duct goes from the upper hollow guide rod of the lens holder to the picture gate and ends just above the gate, in front of the film. The film and the runner plate, therefore, are cooled at the spot exposed to greatest heat.

The air compressor can be connected after simply replacing the cap-nut of the upper guide rod by a tubing nipple.

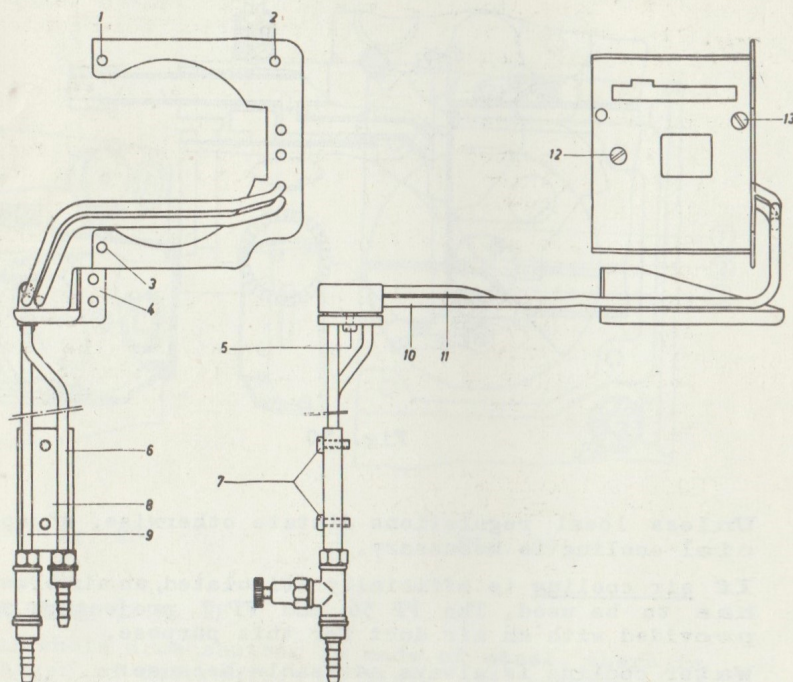
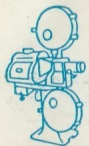


Fig. 31



2. Water-cooling system, type 8659

a. Description

The FP 7 projector is always provided with a water-cooling system; in the FP 56 projector this system can easily be mounted if required.

This water-cooling system has the following outstanding features:

- . it is of copper throughout, copper being a good conductor which quickly transfers the heat to the cooling water;
- . it forms a self-contained unit, easy to remove and insert;
- . if in frosty weather a pipe in the cooling system should burst (because the cooling water has not been drained off), this cannot harm the projector mechanism and consequently operation is unaffected; only the cooling system will have to be replaced.

b. Mounting the water-cooling system in the FP 56 projector (fig. 31)

- . Remove the lens holder (page AA-38), the picture change - over relay if present, the cap of the shutter housing, and the shutter (page AA-48).
- . Loosen screws "12" and "13" and remove the fire-plate; this plate is no longer used.
- . Before mounting the cooling system in the shutter housing, remove the lacquer from all the surfaces of the projector with which the cooling system comes into contact, so as to ensure the best possible heat transfer. These surfaces are shaded in fig. 28.
- . Slide the cooling system in the shutter housing and see that holes "1", "2" and "3" coincide with the screw holes in the housing. Fix the system with screws "12" and "13" that were used for fixing the fire-plate.
- . Mount the shutter (page AA-48), the cap of its housing, the picture change-over relay when used, and the lens holder (page AA-38).
- . Fix pipes "10" and "11" with strip "4" to the projector.
- . Fix pipes "6" and "9" with bracket "8" and two screws "7" to the mounting table of the projector.
- . Fix the two couplings of pipes "6" and "9" and of pipes "10" and "11" to each other with screws "5".

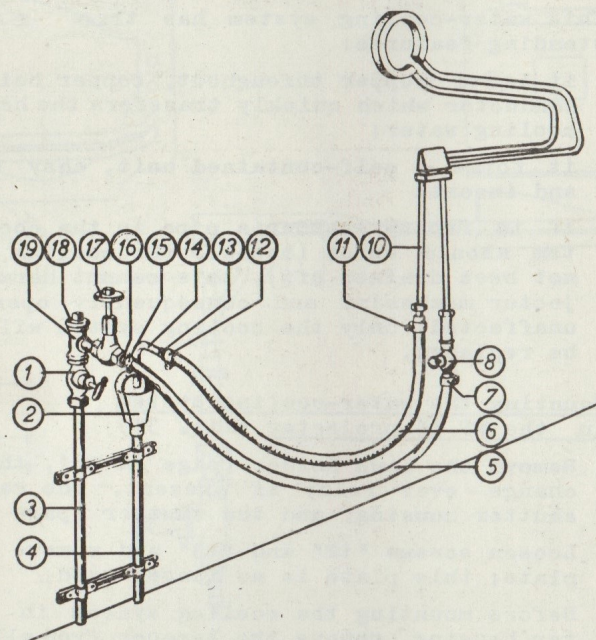


Fig. 32



3. Connection to the water mains (fig. 32)

The requisites for connection are not supplied with the water-cooling system. For each projector are required:

Number or length	Description	No. in fig. 32
1	Main cock 1/2"	1
1	Funnel	2
-	Galvanised pipe 1/2" ..	3 and 4
5'3" (1.6 m)	Rubber tube 3/8"	5 and 6
4	Fixing clamps for 3/8" rubber tube	7, 11, 12, 15
2	Tubing nipples 1/8"	13 and 16
-	Galvanised pipe 3/8" ..	14
1	Reducing valve 1/8"	17
1	Plug 1/2"	18
1	T-piece 1/2"-1/8"	19

The water is supplied through pipe "3", main cock "1", T-piece "19", reducing valve "17", rubber tube "5", needle valve "8" and pipe "9".

The water runs off through pipe "10", tube "6", pipe "14", funnel "2" and pipe "4".

The lengths of pipes "3" and "4" depend on the height of the projection-room windows above the floor.

The outlet of pipe "14" must be lower than the needle valve, as otherwise the water will flow off through needle valve "8" instead of through pipe "14".

Funnel "2" can be of any size; it has to be made of galvanised iron sheet with a thickness of about 3/64" (1 mm). This funnel makes it possible to check how much water is flowing through the system; this should be about 1/3 pint (1/5 litre) per minute and can be regulated with reducing valve "17".

4. Operation and maintenance

It is advisable to let the projector run for 5-10 minutes before turning on the cooling water; this is to prevent condensation.

To drain off the water, close main cock "1" and open needle valve "8"; air will then enter and the whole system will operate as a siphon. Do not forget to close the needle valve after draining.



AUTOMATIC FILM-RUPTURE DEVICE

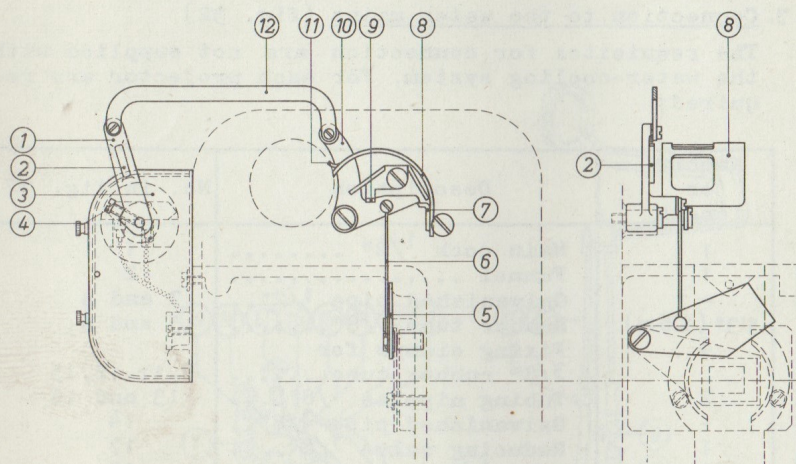


Fig. 33

1. Description

The film-rupture device (fig. 33) consists of a light cut-off, a system of levers and brackets and two mercury switches. The latter are housed in the connection box at the rear of the projector.

The light cut-off intercepts the light beam if, while the projector is running, the film stops in the gate (e.g. because of rupture). Since the feed sprocket continues to supply film, the upper film loop then becomes too large and strikes against lever "8" and lifts it. Lever "10" then loses its support from "7" and drops together with lever "6" and light cut-off "5". The most dangerous place for film rupture, the gate, where the film might immediately catch fire, is thus very simply safeguarded.

The film-rupture device also comes into action when the upper film loop becomes too small, which may occur when the film perforations are damaged. The loop then pushes lever "9" downwards, which has the same effect as the lifting of lever "8".

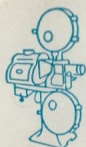
The two mercury switches mounted in holder "3" ensure that as soon as the light cut-off drops, the current supply to motor and exciter lamp is interrupted. Holder "3" has room for a third mercury switch. The holder is pivotable on lever "1" which is connected to lever "12" by means of rod "10".



- . The film-rupture device is returned to its original position by moving stud "2" to the left.
- . When threading a film see that the distance between the upper film loop and lever "8" is about $\frac{1}{2}$ " (1.5 cm).

2. Mounting

- . For mounting the device see fig. 33.
Electrical connections: see pages AA-17 to AA-23.
 - . After the tilting angle of the projector has been adjusted, turn holder "3" so that the mercury tubes are horizontal (i.e. in the position in which they close the circuit). To this effect, loosen screw "4" half a turn and tighten it again after adjustment.
 - . See that the connecting wires from the mercury tubes do not hinder operation; if necessary, shorten these wires.
 - . Check the light cut-off, levers and rods for freedom of movement. Lubricate all the pivots once a month with Esso Handy oil.
- N.B. For replacement of a mercury tube only the connecting wires need be disconnected.



SPOOL BOXES AND WEDGES

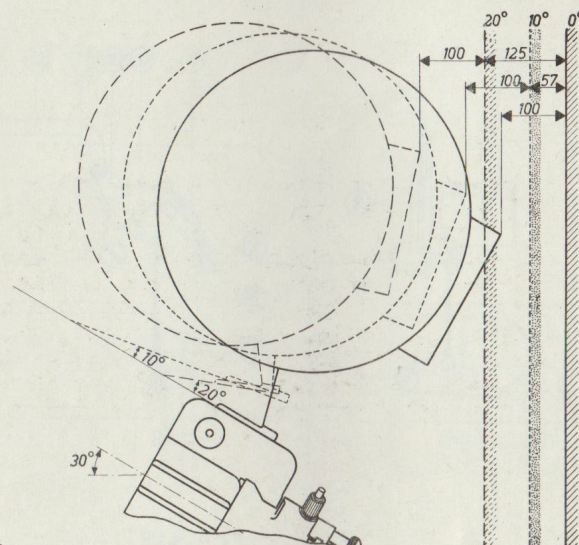


Fig. 34

1. Description

Spool boxes can be supplied in two sizes: for max. 3000 ft (900 m) and for max. 6000 ft (1800 m) reels. They run on ball-bearings so that there is no risk of seizure.

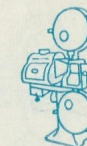
The spool boxes need no special supervision: all that is necessary is to soak the felt lining of the friction couplings with cardan oil periodically.

The fire traps are described in detail on page AA-59.

If the projector has to be inclined forward at a steep angle or if 6000 ft (1800 m) spool boxes are used, a good clearance has to be left between the projector and the front wall of the projection room, as otherwise the upper spool box would come against this wall. Apart from the considerable loss of space this entails, it is possible that the light beam will not pass freely through the projection-room window when lenses with a very short focal length are used.

These difficulties can be avoided by inclining the upper spool box backwards by inserting a wedge (fig. 34) and thus enabling the projector to be placed closer to the front wall of the projection room

Two types of wedges can be supplied:
type 8644 with an angle of 10° and
type 8645 with an angle of 20°.



Reels must be used with a core diameter of at least 5" (127 mm), which has been the standardised diameter for many years. When the core diameter is smaller, the film will at first form a slack loop because, at the beginning, the upper reel will then supply more film than can be dealt with by the small peripheral speed of the lower reel.

2. Mounting of the wedges

With the FP 56 projector. the wedges can be mounted simply between the arm of the spool box and the projector.

With the FP 7 it is necessary to saw a new slit at the top of the projector casing for the passage of the film; the existing slit has to be covered with a small plate.

3. Adjustment of the friction couplings (figs 35 and 36)

- Loosen by about two turns the nuts with which cap "6" is fixed and remove the cap.
- Adjust the friction couplings of the upper and of the lower spool box by turning nut "5". These couplings should be on the loose side, yet tight enough to obviate looping in all normal circumstances. Adjust, therefore, the coupling of:
upper reel: so that looping is avoided when the projector is switched off;
lower reel: so that from the beginning to the end of the reel, the film piece between hold-back sprocket and lower spool box is neither too slack nor too taut.

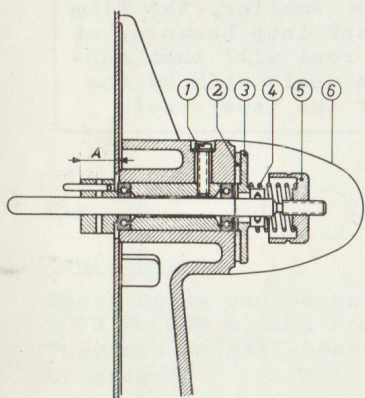
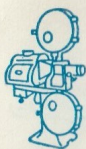


Fig. 35

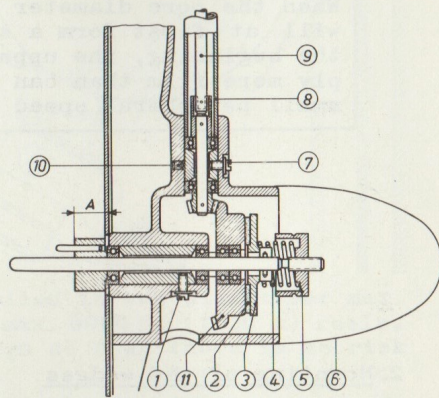


Fig. 36

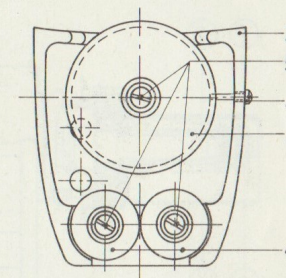
4. Dismantling of the shafts (figs 35 and 36)

- Remove nut "5", pressure spring "4", friction disc "3" and coupling disc "2" - and with the lower spool box also gear wheel "11" - from the reel shaft; this can be done without tools.
- Extract screw "1" and remove the reel shaft together with its ball-bearings and spacer by pulling it forwards.
- Remove the spool box, dust tube "8" with coupling shaft "9", screw "7" and screw "10" and take out the vertical driving shaft together with its ball-bearings and spacer.

N.B. When replacing this shaft, see that dimension A is exactly $\frac{7}{8}$ " (22 mm).



Fig. 37



1. Description

In each fire trap there are three rollers which are so profiled that film damage is precluded. Roller "3" has flanges and hence ensures that the film is guided perfectly in a lateral direction. The two rollers "4" are interchangeable.

To avoid wrong threading of the film the fire traps are provided with a red screw "2".

The screw of the lower spool box should always be screwed in at the right-hand side.

The side at which the screw of the upper spool box is screwed in depends on the direction of rotation of the reel (i.e. on how the projectionist is accustomed to rewind the films); the rule is:

reel turns clockwise: screw "2" at right-hand side
anti-clockwise: screw "2" at left-hand side.

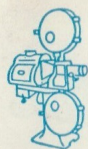
2. Dismantling and mounting of the rollers

- Remove screw "5"; the rollers can then easily be pulled from their spindles.
- When mounting the rollers again see that the protruding bearing bush is at the rear; the rollers are not reversible.

3. Lubrication

- Take the rollers from their spindles. Let a drop of Esso Handy oil fall on the spindles and rub it in with the fingers.

Clean the fire traps daily and check the easy running of the rollers!
 Dirt causes damage!



PHILIPS Cinema

AA-60

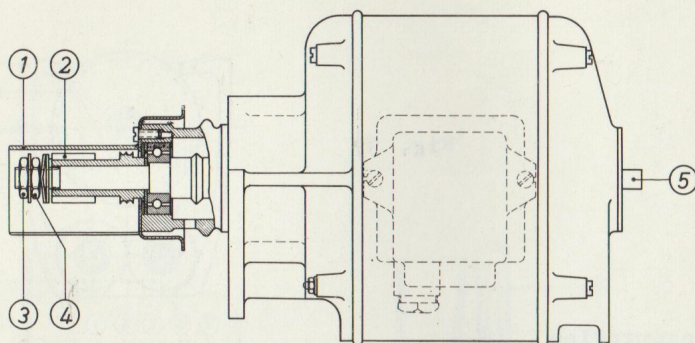


Fig. 38

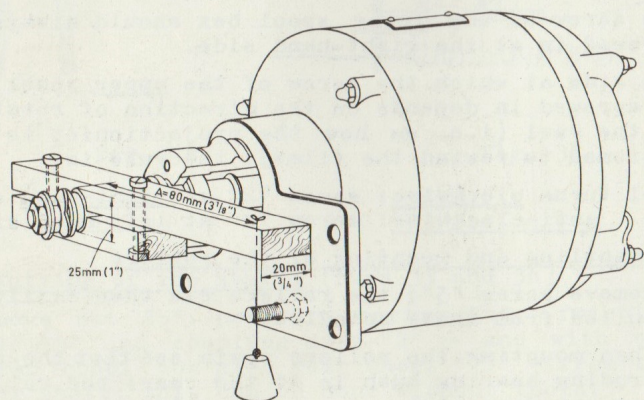
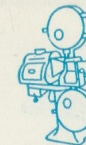


Fig. 39

AA-61

SAFETY CLUTCH



PHILIPS Cinema

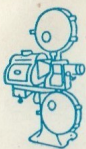
1. Description

This clutch serves to prevent damage to the gear wheels of the projector mechanism. The friction between the motor shaft (or the pulley shaft) and gear wheel "2", mounted on this shaft, has been so adjusted that during normal operation the gear wheel does not slip, whereas it would slip immediately if the mechanism should seize up.

2. Adjustment

Re-adjustment or correction of the adjustment are only necessary after replacement of the gear wheel or when the projector does not attain its full running speed some seconds after it has been started. In the latter case a quick remedy is to tighten nut "4" and then nut "3" so much that gear wheel "2" can no longer be turned by hand round the locked shaft. Since, however, by doing this, the slip coupling is put out of action, correct adjustment has to take place as soon as possible. For this purpose proceed as follows:

- Remove the motor (or the support for the pulley); set it up with its shaft horizontal; lock the free end of the shaft and remove oil-splash guard "1".
- Clamp gear wheel "2" between two pieces of hard wood as shown in fig. 39 and adjust the clutch, by tightening nut "4", so that gear wheel "2" does not turn round its spindle when a weight of 10 lbs (4.5 kg) is suspended at a distance "A" of $3\frac{1}{8}$ " (80 mm) but that it turns with a weight of 13 lbs (5.5 kg).
- Screw lock-nut "3" tight against nut "4" and check the adjustment.



PHILIPS Cinema

AA-62

ADJUSTABLE GUIDE ROLLER
OF THE FP 7 PROJECTOR

1. Description

As is well-known, in long halls the sound takes more time to reach the rear seats than it does in short halls. It may, therefore, sometimes be advisable to advance the sound a little with respect to the picture. In the FP 7 projector this can be done by shifting roller "3" (fig. 14, page AA-28).

2. Adjustment

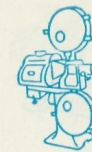
- Remove guide roller "2" and loosen pin "1" by one turn.
- Adjust the length of the film piece between the centre of the gate and the sound-scanning spot according to the following table:

Length of hall	in ft	up to 115	115-150	150-180	180-215
	in m	up to 35	35-45	45-55	55-65
Length of film piece in frames	20 (standard)	19	$18\frac{3}{4}$	$18\frac{1}{2}$	

REAR PROJECTION

and

FRONT PROJECTION
WITH SHORT-FOCAL LENSES



The assembling and dismantling of internal parts is the work of skilled technicians and should not be undertaken by the operator unless absolutely necessary.

The various parts mentioned in this chapter are shown in fig. 41.

INTERMITTENT MECHANISM

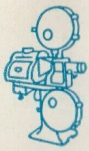
- . Depress button "45"; the whole lens holder then slides forwards.
- . Lift the pad roller of the intermittent sprocket and remove the runner plate.
- . Remove the rear cover of the projector.
- . Turn framing knob "9" as far as possible to the right and remove the screw then accessible through the aperture; do the same for the extreme left-hand position of the framing knob.
- . Bring framing knob "9" approximately in its centre position and take the whole intermittent unit together with its sprocket carefully out of the projector.
- . After assembling re-adjust the shutter (see page AA-48).

COMBINED GAUZE AND MAGNETIC FILTER

- . Unscrew oil-drain plug "16" ($1\frac{1}{16}$ " = 27 mm wrench), drain off the oil and remove filter "17".
- . To clean the filter, remove the ring fixed at the end with three screws; the filter can then be taken apart without difficulty.

OIL-DELIVERY PIPE

- . Loosen hollow screw "19" which fixes the delivery pipe to the pump housing and take out screws "20" and "25" which fix it to the inside of the projector; the pipe can then be removed.



OIL PUMP

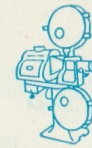
- . Loosen the three screws "13", "14" and "15" and remove the combined gauze and magnetic filter, the oil-delivery pipe and the oil pump; for this purpose push the oil-splash guard aside a little.
- . After reassembling, adjust the gear-wheel transmission to have minimum but still perceptible play.

SUPPORTS OF THE FEED AND HOLD-BACK SPROCKETS

- . Lift the pad roller and remove either the feed sprocket together with the oil-delivery pipe (see point 3) or the hold-back sprocket together with the inching knob.
- . Remove screws "11" and "12" or "23" and "24" at the rear of the projector.
- . After reassembling adjust the gear-wheel transmission to have minimum but still perceptible play.

SUPPORT OF THE SHUTTER SHAFT

- . Loosen screws "36", "45" and "46" and remove the cover of the shutter housing.
- . Unscrew screws "31", "34" and "35" and remove the shutter.
- . Unscrew screws "32", "38" and "44" and remove the support of the shutter shaft.
- . Before reassembling the support check whether packing rings "33", "37" and "43" are still in good condition; if not, replace them.
- . After reassembling adjust the shutter shaft again axially. For this purpose loosen locking screw "30" one turn and adjust pivot "29" to have smallest but still perceptible play.
- . Adjust the shutter again (see page AA-48).

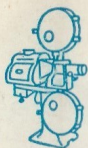


MAIN SHAFT

- . Remove the intermittent mechanism and the support of the shutter shaft (see above) as well as the flange motor or the support for the pulley (page AA-68).
- . Loosen screws "39" and "41" or "21" and "22" of the upper or the lower support of the main shaft, as well as large screw "1" for guide fork "2". Slide the main shaft upwards and take it out of the projector.
- . Before mounting check whether the packing rings "40" and "42" are still in good condition; if not, replace them.
- . After reassembling adjust the gear-wheel transmission to have minimum but still perceptible play.
- . Adjust the shutter again (see page AA-48).

SHAFT OF THE FRAMING DEVICE

- . Loosen the four screws "7"; the whole support of the framing device can then be taken out of the projector.
- . To replace the shaft with gear-wheel unscrew knob "9" and knock the tightening pin out of the locking ring.



REPLACEMENT OF THE DRIVING MOTOR

The flange of the motor (or the support for the pulley) are pinned; they need, therefore, not be adjusted again after dismantling and consecutive assembling.

When the motor, the support for the pulley or a gear wheel has been replaced, it is advisable, in order to avoid metal chips or suchlike, not to pin the flange or the pulley support anew. The gear-wheel transmission has then to be set to have minimum but still perceptible play.

1. Removal of the flange motor or the pulley support

- Loosen the five fixing bolts with a special wrench (No. 22 443 29) and remove the motor or the pulley support. Take care not to damage packing plate "29" (fig. 41).
- After mounting the motor or the support again, tighten up the bolts uniformly several times at intervals of a few hours.

2. Replacement of the pulley motor by a flange motor

- Remove:**
the belt guard,
the belt,
the motor,
the motor support,
the support with the pulley.

- Mount:**
the flange motor.

3. Replacement of the flange motor by a pulley motor

- Remove:**
the flange motor.
 - Mount:**
the support with the pulley,
the motor support*)
the motor with pulley*)
the belt*)
the belt guard*)
- } see page AA-19 and
for 110 V mains
also page AA-17

*) These parts have to be suitable for the mains frequency; the order numbers for the whole assembly are indicated in the table below:

Frequency	40 c/s	50 c/s	60 c/s	100 c/s
Assembly	8601/00	8602/00	8603/00	8604/00

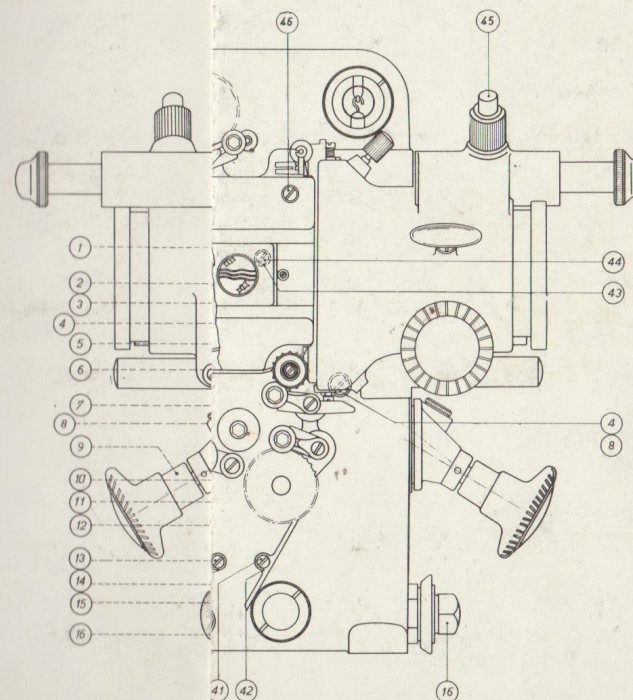


Fig. 41

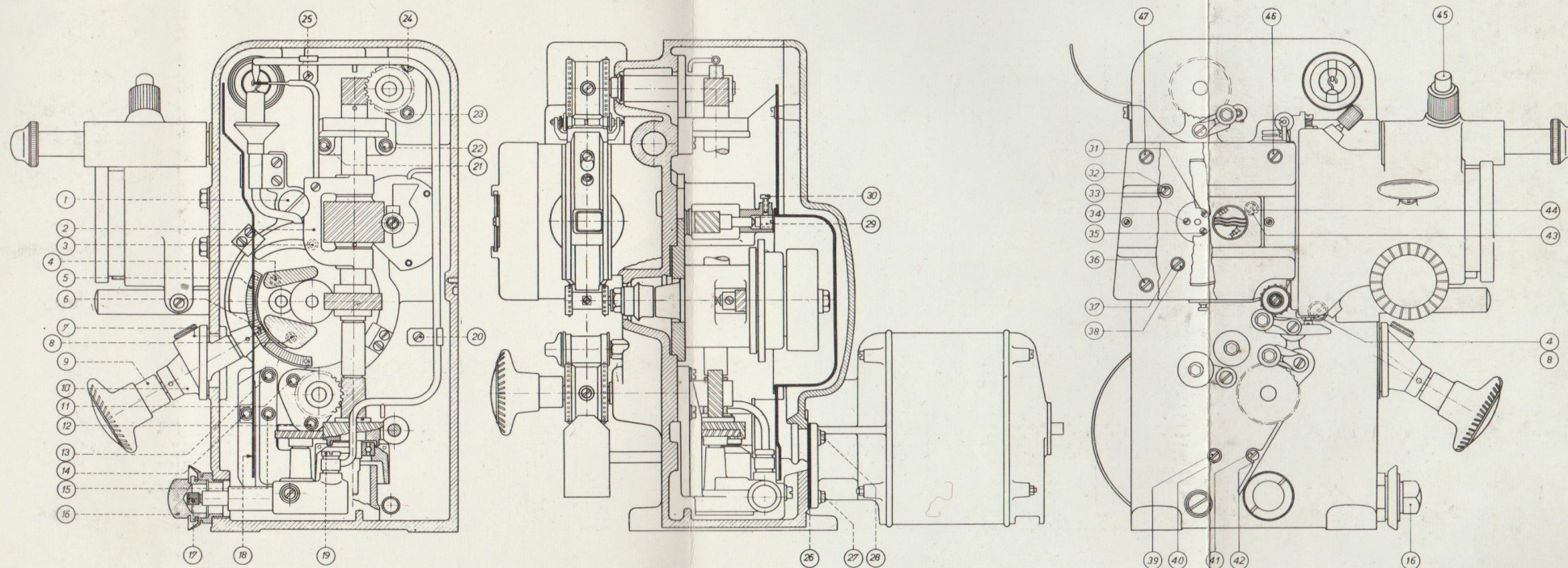
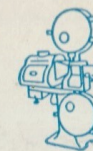
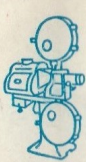
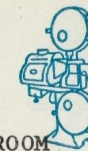


Fig. 41



ARRANGEMENT
of the
PROJECTION ROOM



ARRANGEMENT OF THE PROJECTION ROOM

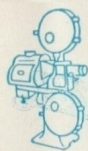
1. General lay-out

It is of first importance that the projection room be spacious. Fig. 42 shows a general lay-out for an outfit consisting of two projectors and the best way to lay the water-supply and drain pipes against the front wall of the projection room.

2. Windows to be made in the front wall (table I)

As a rule, the observation windows are made at a height (b) of 4'2" (1.25 m) above the floor. The projectionist can then inspect the screen image whilst in a sitting position.

Although the position of the film and slide-projection windows depends on the tilting angle of the projector (see table II), these windows are often made at the same height as the observation windows, the projector being raised, if necessary, by mounting the pedestal on a block of wood.



PHILIPS Cinema

AA-72

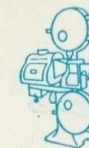
Table I

Letter in fig. 42	Description	Dimensions
a	Height of the projection windows above the floor	see table
b	Height of the observation windows above the floor	4'2" 1.25 m
c/d	Dimensions of projection windows for CinemaScope (1:2.34)	6" x 11" 15 x 28 cm
e/f	Dimensions of observation-windows and of projection windows for normal film (1:1.37)	6" x 6" 15 x 15 cm
	Centre-to-centre distance between:	
g	observation and slide-projection windows	1'4" 40 cm
h	slide and film - projection windows, depending on lamp-house used	11" (28 cm) or 13 ³ / ₈ " (34 cm)
i	film-projection and observation windows	1'4 ⁵ / ₈ " 42.5 cm
k	film - projection windows for left-hand and right-hand projector	max. 6'7" min. 4'7" (2 m - 1.4 m)
l	Distance between front of pedestal and front wall of projection room *).	see table
m	Distance between optical axis and centre line of pedestal	7 ¹ / ₂ " 19 cm

*) This distance allows for the convenient insertion and removal of the assembly consisting of anamorphic attachment + projection lens (up to $f = 180$ mm) + adapter. The lens for slide projection can have a focal length up to $f = 700$ mm.

When a projection lens with a smaller focal length is used (e.g. $f = 50$ mm), the projector has to be placed closer to the front wall, as otherwise the projection windows will be too small for the light beam.

AA-73



PHILIPS Cinema

Table II

Projection angle	Projector with 3000 or 6000 ft (900 or 1800 m) spool boxes			
	Height a		Distance l	
	in.	cm	in.	cm
+10°	52 ¹ / ₂	133.5	25 ¹ / ₂	65
+ 8°	51 ¹ / ₂	131	26	66
+ 6°	50 ¹ / ₂	128	26 ¹ / ₂	67
+ 4°	49 ¹ / ₄	125	26 ³ / ₄	68
+ 2°	48	122	27 ¹ / ₄	69
0°	46 ³ / ₄	119	27 ¹ / ₂	70
- 2°	45 ³ / ₄	116	28	71
- 4°	44 ¹ / ₂	113	28 ¹ / ₄	72
- 6°	43	109	28 ³ / ₄	73
- 8°	41 ³ / ₄	106	29 ¹ / ₈	74
-10°	40 ¹ / ₂	103	29 ³ / ₈	74.5
-12°	39	99.5	29 ¹ / ₂	75
-14°	37 ³ / ₄	96	29 ³ / ₄	75.5
-16°	36 ¹ / ₂	93	30	76
-18°	35 ¹ / ₂	90	*)	*)
-20°	34	86.5	*)	*)

*) Different for 3000 and for 6000 ft spool boxes, viz.:

-18°	for 3000 ft	30 ¹ / ₈	76.5
	for 6000 ft	30 ³ / ₄	78
-20°	for 3000 ft	30 ³ / ₈	77
	for 6000 ft	32 ¹ / ₂	82.5

N.B. +, 0° = projector tilted upwards
-, 0° = projector tilted downwards

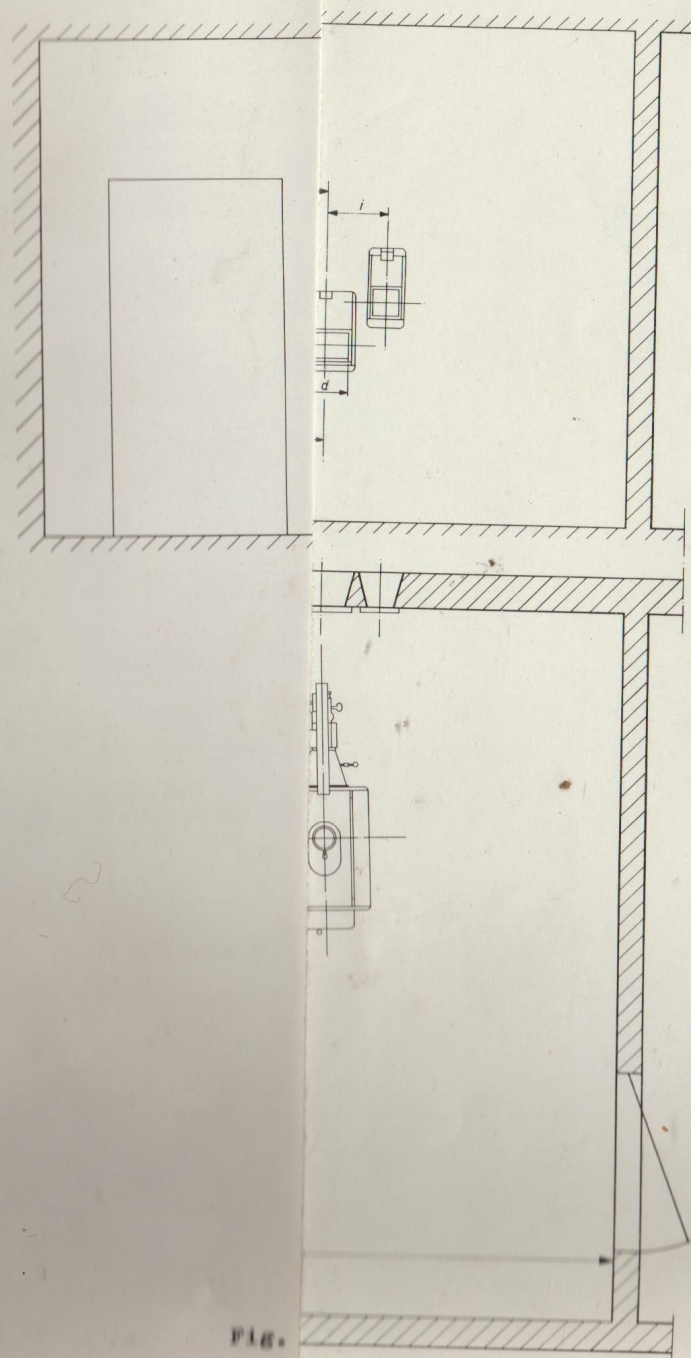


PHILIPS Cinema

AA-74



PHILIPS Cinema



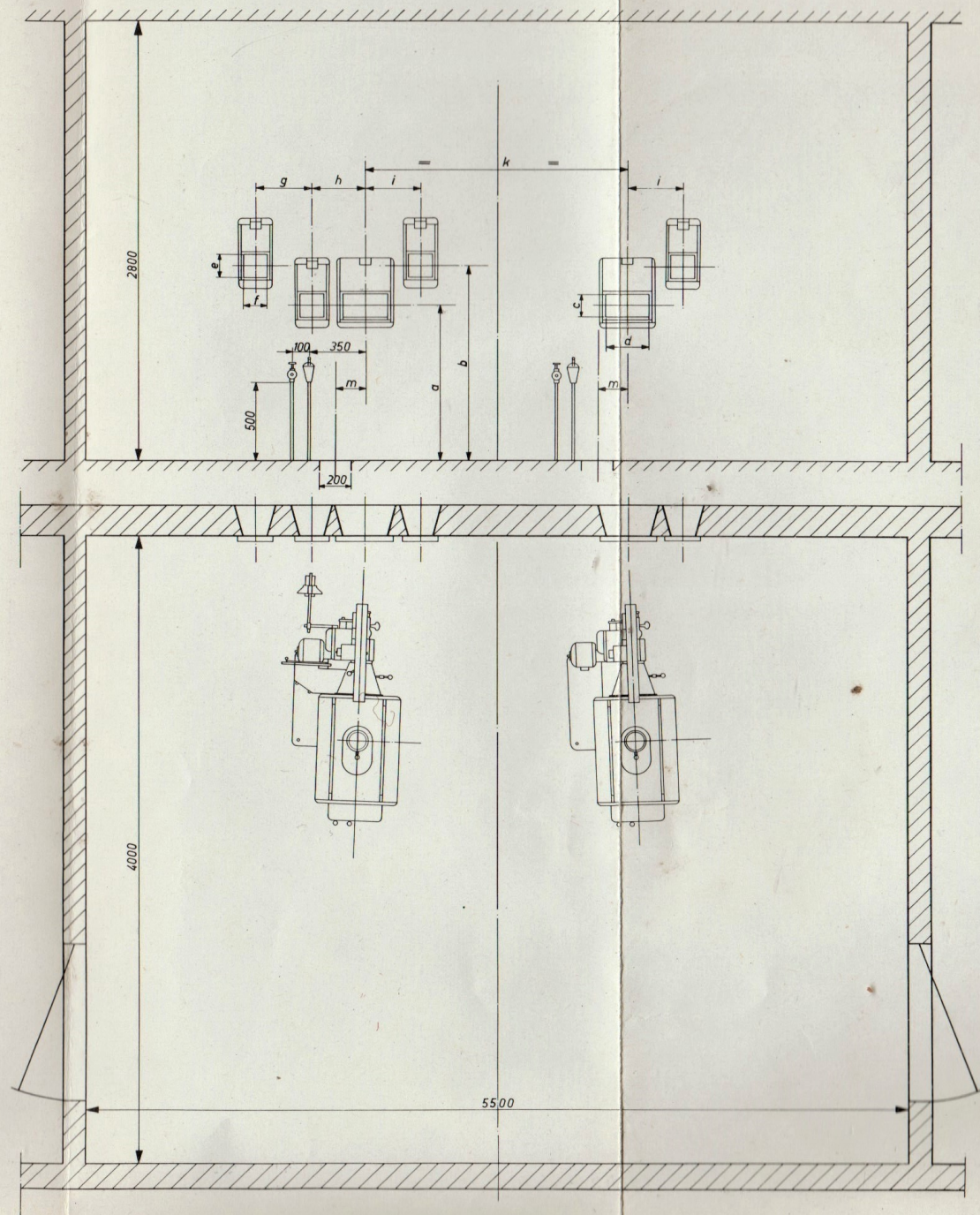
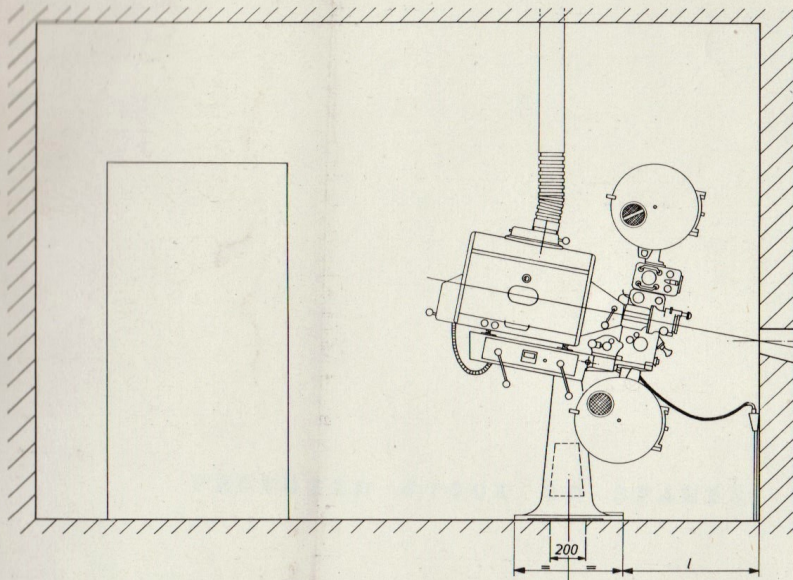
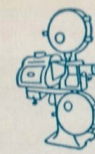


Fig. 42



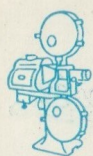
PROPOSED STOCK OF SPARES



A set of the most important spares should be available on the cinema premises, in order to minimise programme hold-ups that may arise on account of wear in or damage to projector parts.

Suggestions are given on the following pages for a small and for a larger outfit of spares.

The various parts can be found in the drawing bearing the initial letter of its order number (e.g. part A08 is indicated in Fig. A).



Small stock per FP 56 projector

Number or length	Description	Order number
1	Steel runner plate	A08
42"(110 cm)	Velvet tape	-
1	Pair of pressure skates	A25
1	Pad-roller assembly	E01(=A06=A46)
1	Intermittent sprocket	A35
1	Feed (or hold-back) sprocket: without loop corrector ...	A05(=A38)
	with loop corrector	A05A(=A38A)
1	Mask plate: for normal film (1:1.37)..	A24
	for Wide Screen (1:1.85)..	A24A
	for CinemaScope (1:2.34)..	A24B
1	Ball-bearing for main shaft.	C15(=C29)
1	Ball-bearing for driving shaft of lower spool box..	F16(=F18)
1	Ball-bearing for spool-box shafts	F06(=F24)
1	Pressure spring for spool- box lock	F01(=F28)
1	Pressure spring for guide rod of lens holder	A20
1	Shutter spring	A03
1	Packing ring	A41
3	Packing rings	A39

Large stock per FP 56 projector

Beside the above-mentioned parts:

Number	Description	Order number
1	Shutter	A04
1	Maltese cross without inter- mittent sprocket	C24
1	Pressure spring for the friction couplings of the spool shafts	F09(=F20)
1	Oil pump for: 50 c/s asynchronous motor.	C20
	50 c/s synchronous motor..	C20A
	60 c/s asynchronous motor.	C20B
1	Guide roller (dia. 26 mm)...	A47(=A48)
1	Mercury tube for film-rup- ture device	A02



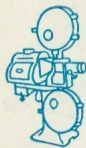
Small stock per FP 7 projector

Number or length	Description	Order number
1	Steel runner plate	B08
42"(110 cm)	Velvet tape	-
1	Pair of pressure skates	B25
1	Pad-roller assembly	E01(=B06=B59)
1	Intermittent sprocket	B35
1	Feed (or hold-back) sprocket with loop corrector	B05(=B38)
1	Mask plate: for normal film (1:1.37)..	B24
	for Wide Screen (1:1.85)..	B24A
	for CinemaScope (1:2.34)..	B24B
1	Ball-bearing for main shaft.	C15(=C29)
1	Ball-bearing for driving shaft of lower spool box..	F16(=F18)
1	Ball-bearing for spool-box shafts	F06(=F24)
1	Pressure spring for spool- box lock	F01(=F28)
1	Pressure spring for guide rod of lens holder	B20
1	Shutter spring	B03
1	Packing ring	B41
3	Packing rings	B39
1	Photocell	3533
1	Exciter lamp	3874C (6 V, 1.48 A) or 7251C (5 V, 4 A)

Large stock per FP 7 projector

Beside the above-mentioned parts:

1	Shutter	B04
1	Maltese cross without inter- mittent sprocket	C24
1	Pressure spring for the friction couplings of the spool shafts	F09(=F20)
1	Oil pump for: 50 c/s asynchronous motor.	C20
	50 c/s synchronous motor..	C20A
	60 c/s asynchronous motor.	C20B
1	Guide roller (dia. 26 mm) ..	B57(=B60)
1	Mercury tube for film-rup- ture device	B02



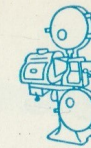
PHILIPS Cinema

AA-78

ORDER NUMBERS
of the
PRINCIPAL PARTS

Stock for the mounting table
of the FP 56 and FP 7 projectors

Number	Description	Order number
1	Picture and sound change-over relay	G05
1	Starting capacitor, 4+2 μ F, 380 V.	G07
1	Transformer for framing and pilot lamp supply	G08
1	Fuse	G09


Fig. A - Parts of the FP 56 projector

Order number	Description
A01	Lever for the film-rupture device
A02	Mercury tube
A03	Shutter spring
A04	Complete shutter
A05	Feed sprocket without loop corrector
A05A	Feed sprocket with loop corrector
A05B	Sprocket for A05A
A06	Complete pad roller (for parts see fig. E)
A07	Light cut-off for film-rupture device
A08	Runner plate
A09	Fixing screw for runner plate
A10	Pressure-skate support
A11	Screw for pressure-skate support
A12	Spring for pressure skate
A13	Oil-observation glass
A14	Milled screw for skate-pressure adjustment
A15	Rubber stopper
A16	Pressure spring for pawl
A17	Bush for spring of lens holder
A18	Stop nut
A18A	Tubing nipple
A19	Rubber stopper
A20	Pressure spring for lens holder
A21	Pawl
A22	Winged nut for lens sleeve
A23	Spring for skate-pressure adjustment
A24	Mask plate for normal film (1:1.37)
A24A	Mask plate for Wide Screen (1:1.85)
A24B	Mask plate for CinemaScope (1:2.34)
A25	Pair of pressure skates
A26	Fixing screw for gear rack
A27	Gear rack for 82.5 mm lens holder
A28	Shaft of lens-focusing device
A29	Knob of lens-focusing device
A30	Milled screw
A31	Oil-filling screw
A32	Framing knob
A33	Packing plate
A34	Fixing screw, nut and washer for intermittent sprocket
A35	Intermittent sprocket + A34

When ordering parts, always indicate:

1. the type of the projector (FP 56 or FP 7);
2. the serial number of the projector; this can be found at the rear of the projector on the machined surface to the left of the motor or on the pulley support;
3. the order number of the part in question.

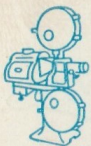


Fig. A - Parts of the FP 56 projector (continued)

Order number	Description
A36	Oil-drain screw
A37	Spacing piece
A38	Hold-back sprocket without loop corrector
A38A	Hold-back sprocket with loop corrector
A38B	Sprocket for A38A
A39	Packing ring
A40	Oil-level gauge
A41	Packing ring for oil-level gauge
A42	Packing ring
A43	Milled screw
A44	Inching knob
A45	Guide roller
A45A	Shaft
A45B	Ornamental screw
A46	Complete pad roller (parts: see fig. E)
A47	Guide roller
A47A	Shaft
A47B	Ornamental screw
A48	Guide roller
A48A	Shaft
A48B	Ornamental screw
A49	Complete pad roller for intermittent sprocket
A50	Milled screw
A51	Film stripper
A52	Lamp holder
A53	Framing lamp
A54	Window for shutter housing
A55	Centrifugal shutter blade

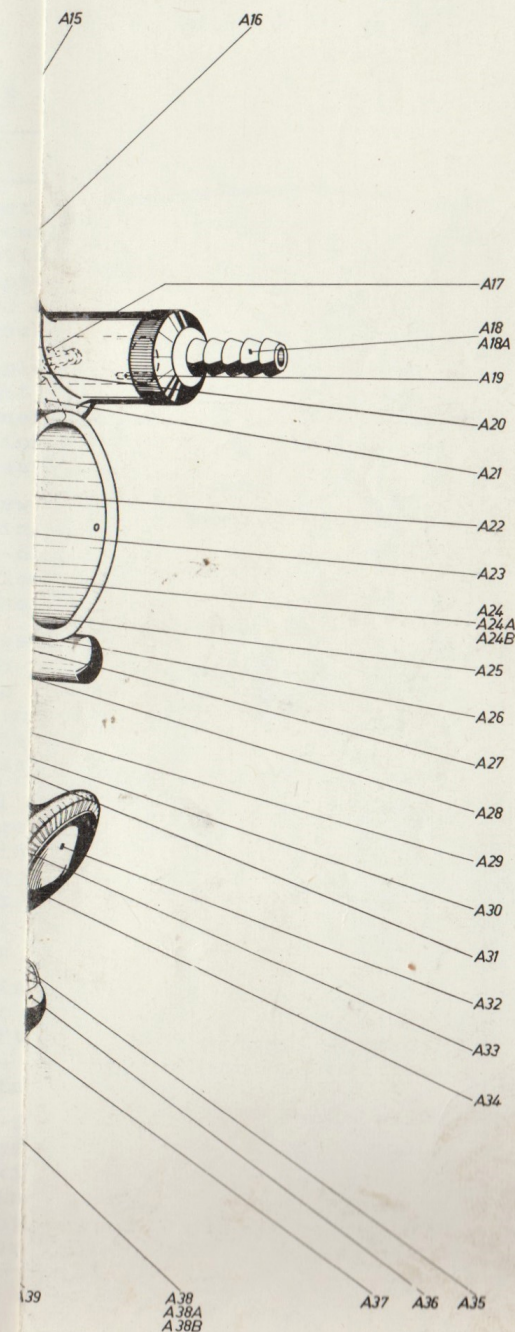


Fig. A

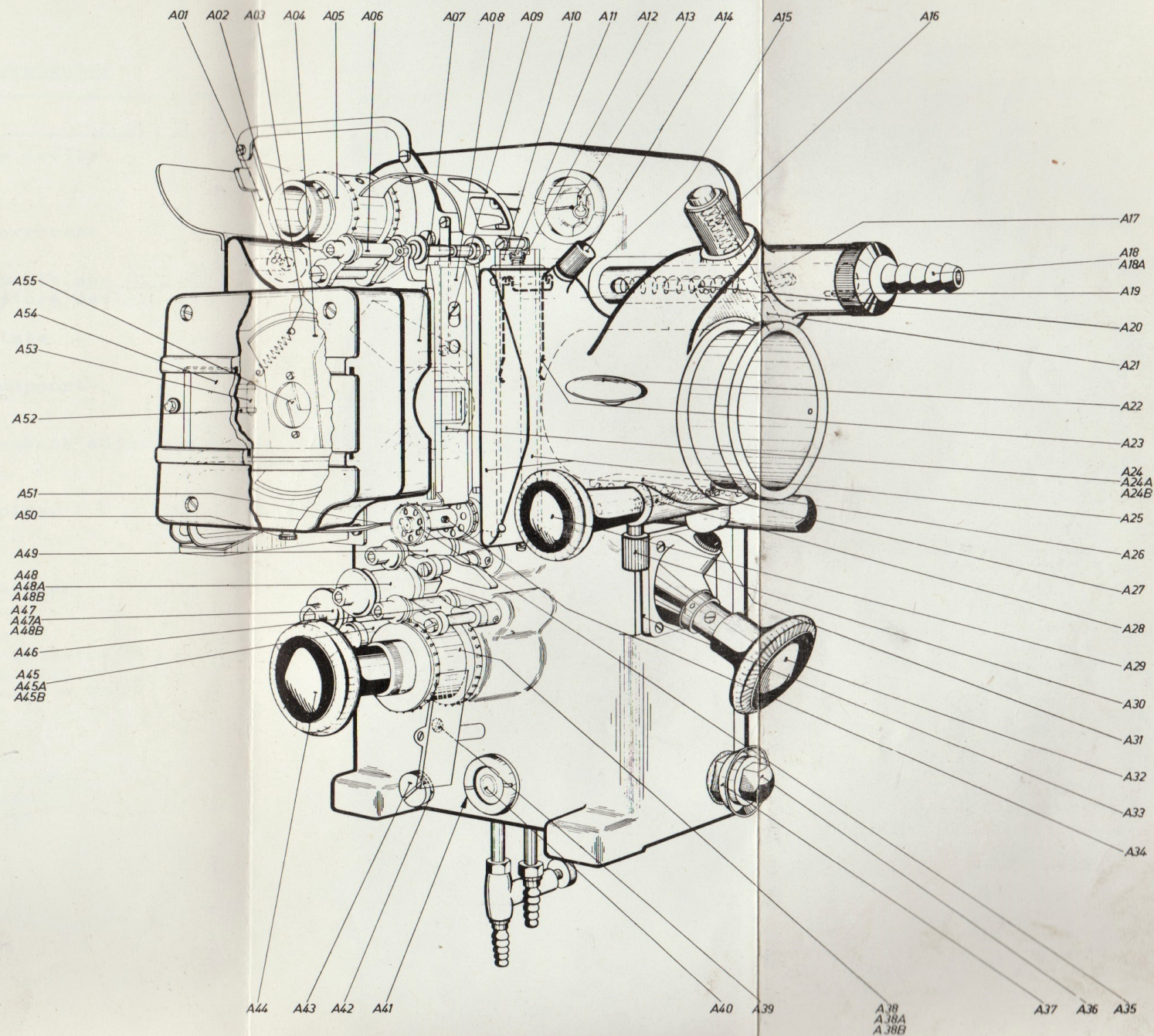
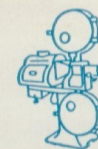


Fig. A

Fig. B - Parts of the FP 7 projector

Order number	Description
B01	Lever for the film-rupture device
B02	Mercury tube
B03	Shutter spring
B04	Complete shutter
B05	Feed sprocket with loop corrector
B05A	Sprocket for B05
B06	Complete pad roller (for parts see Fig. E)
B07	Light cut-off for film-rupture device
B08	Runner plate
B09	Fixing screw for runner plate
B10	Pressure-skate support
B11	Screw for pressure-skate support
B12	Spring for pressure skate
B13	Oil-observation glass
B14	Milled screw for pressure-skate adjustment
B15	Rubber stopper
B16	Pressure spring for pawl
B17	Bush for spring of lens holder
B18	Stop nut
B18A	Tubing nipple
B19	Rubber stopper
B20	Pressure spring for lens holder
B21	Pawl
B22	Winged nut for lens sleeve
B23	Spring for skate-pressure adjustment
B24	Mask plate for normal film (1:1.37)
B24A	Mask plate for Wide Screen (1:1.85)
B24B	Mask plate for CinemaScope (1:2.34)
B25	Pair of pressure skates
B26	Fixing screw for gear rack
B27	Gear rack for 104 mm lens holder
B28	Shaft of lens-focusing device
B29	Knob of lens-focusing device
B30	Milled screw
B31	Oil-filling screw
B32	Framing knob
B33	Packing plate
B34	Fixing screw, nut and washer for intermittent sprocket
B35	Intermittent sprocket + B34



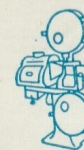
PHILIPS Cinema

AA-86

Fig. B - Parts of the FP 7 projector (continued)

Order number	Description
B36	Oil-drain screw
B37	Spacing piece
B38	Hold-back sprocket with loop corrector
B38A	Sprocket for B38
B39	Packing ring
B40	Oil-level gauge
B41	Packing ring
B42	Shaft
B43	Film stripper
B44	Packing ring
B45	Milled screw
B46	Inching knob
B47	Guide roller
B47A	Ornamental screw
B48	Complete lamp holder
B49	Guide roller
B49A	Shaft
B49B	Ornamental screw
B50	Guide roller
B50A	Shaft
B50E	Ornamental screw
B51	Sound shaft
B52	Pressure roller
B52A	Ornamental screw
B53	Eccenter pin
B54	Adjusting screw
B55	Ring
B56	Observation glass
B57	Guide roller
B57A	Shaft
B57B	Ornamental screw
B58	Guide roller
B58A	Shaft
B58B	Ornamental screw
B59	Complete pad roller (parts: see fig. E)
B60	Guide roller
B60A	Shaft
B60B	Ornamental screw
B61	Milled screw
B62	Complete pad roller for intermittent sprocket
B63	Film stripper
B64	Lamp holder
B65	Framing lamp
B66	Window for shutter housing
B67	Centrifugal shutter blade

AA-87



PHILIPS Cinema

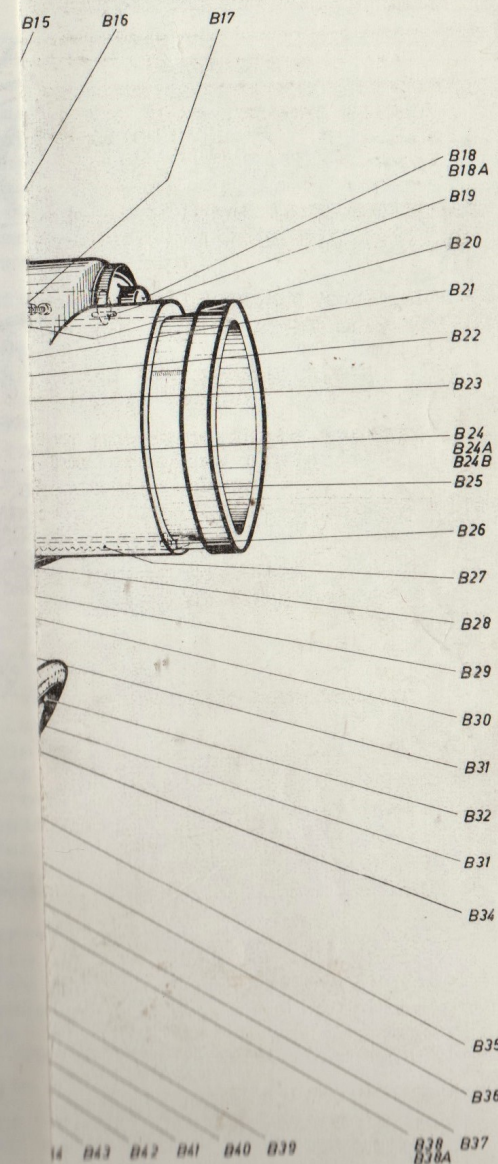


Fig. B



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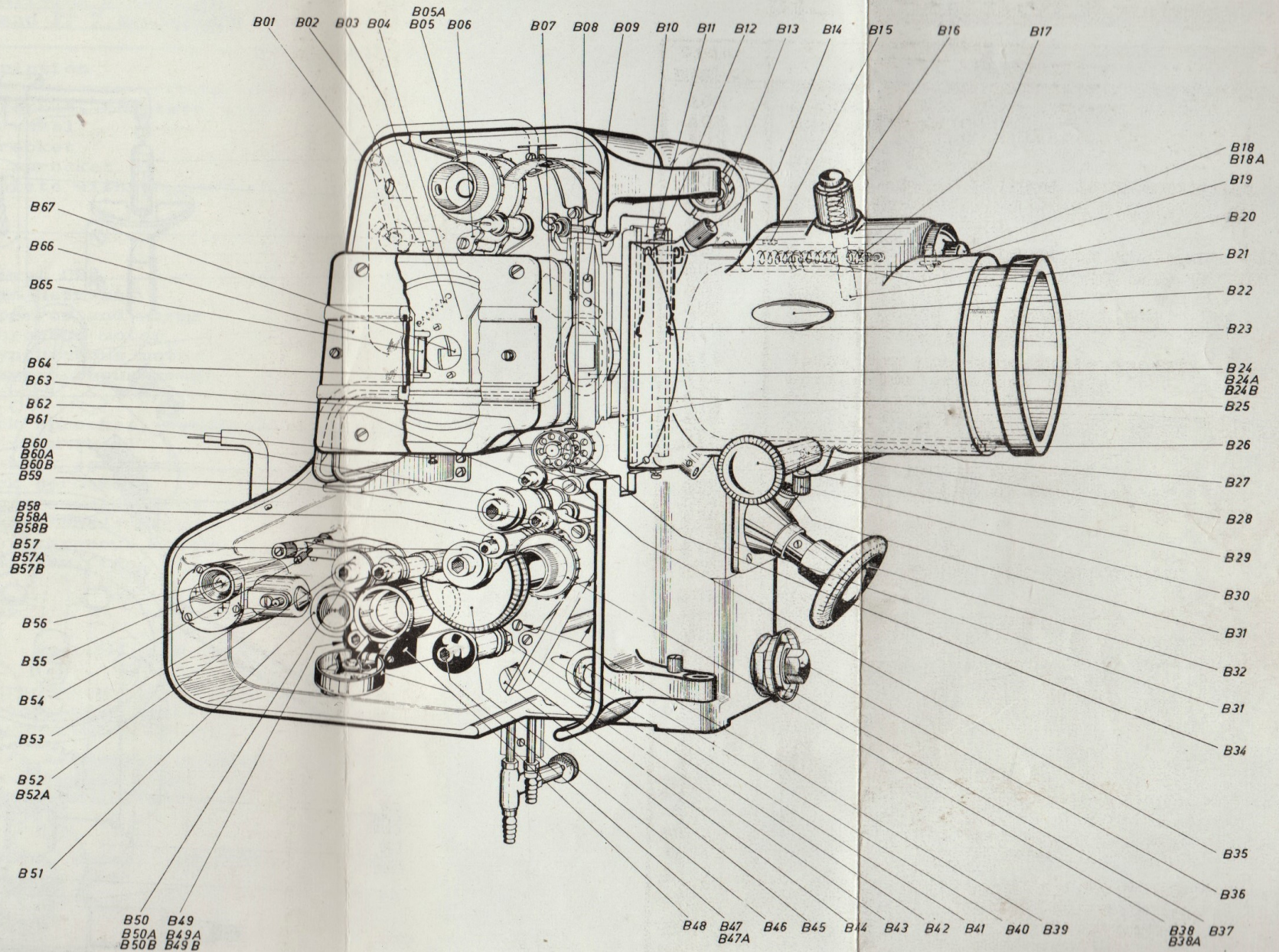
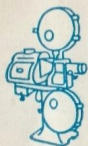
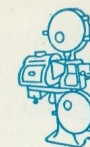


Fig. B



AA-88

AA-89



PHILIPS Cinema

Fig. C - Parts of the driving mechanisms
of the FP 56 and FP 7 projectors

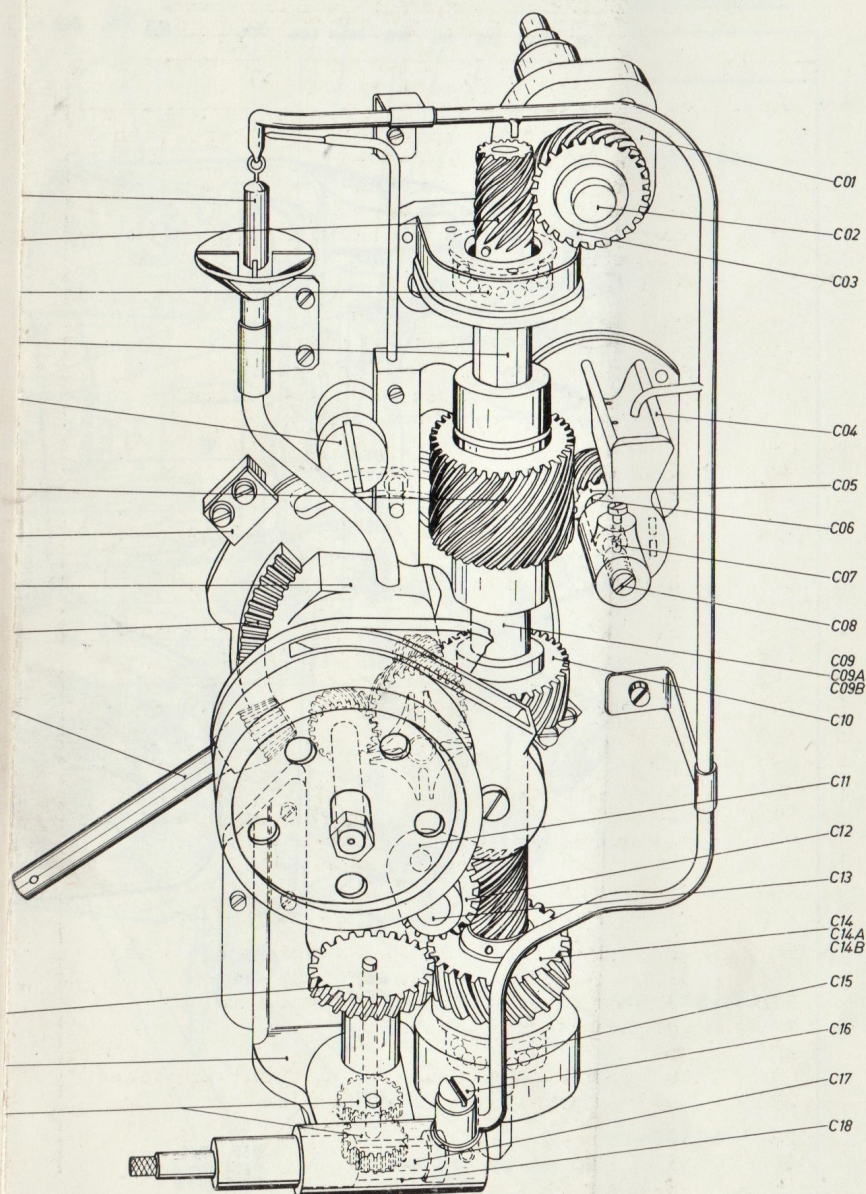


Fig. C

Order number	Description
C01	Spindle of feed sprocket, complete with support and worm wheel
C02	Spindle of feed sprocket
C03	Worm wheel of feed sprocket
C04	Shutter shaft, complete with support and drive
C05	Worm
C06	Shutter shaft
C07	Plug for locking pivot C08
C08	Pivot for shutter adjustment
C09	Main shaft with supports and worms for 50 c/s asynchronous motor
C09A	Ditto for 50 c/s synchronous motor
C09B	Ditto for 60 c/s asynchronous motor
C10	Worm wheel
C11	Spindle of hold-back sprocket, complete with support and worm wheel
C12	Worm wheel of hold-back sprocket
C13	Spindle of hold-back sprocket
C14	Worm wheel for 50 c/s asynchronous motor
C14A	Ditto for 50 c/s synchronous motor
C14B	Ditto for 60 c/s asynchronous motor
C15	Ball-bearing for main shaft
C16	Hollow screw
C17	Magnet of oil filter
C18	Gauze of oil filter
C19	Set of gear wheels, complete with shafts
C20	Complete oil pump for 50 c/s asynchronous motor
C20A	Ditto for 50 c/s synchronous motor
C20B	Ditto for 60 c/s asynchronous motor
C21	Gear wheel for 50 c/s asynchronous motor
C21A	Ditto for 50 c/s synchronous motor
C21B	Ditto for 60 c/s asynchronous motor
C22	Complete framing shaft
C23	Rack
C24	Intermittent mechanism, without sprocket
C25	Plate spring for framing disc
C26	Worm wheel
C27	Stop screw
C28	Main shaft with wedge
C29	Ball-bearing of main shaft
C30	Worm
C31	Magnet

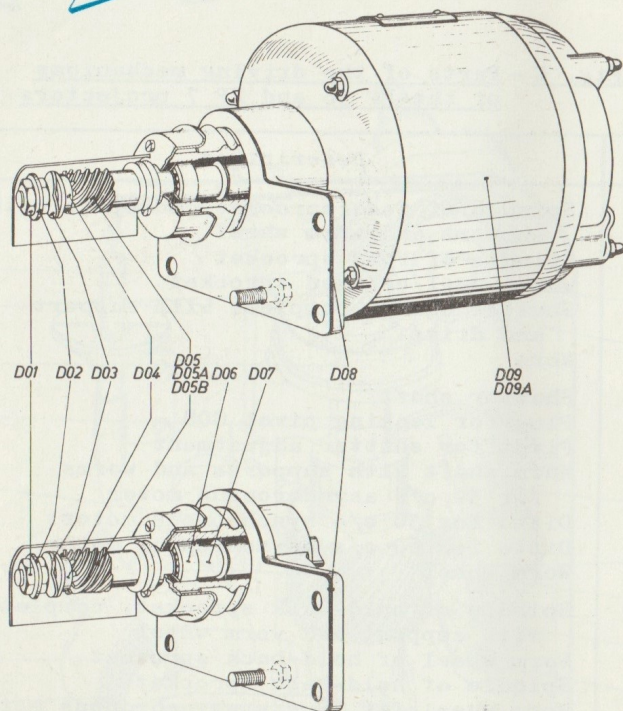
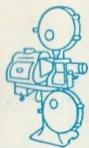


Fig. D - Parts of the flange motor and
of the pulley support
of the FP 56 and FP 7 projectors

Order number	Description
D01	Nut
D02	Disc
D03	Resilient disc
D04	Disc
D05	Worm with oil thrower for 50 c/s asynchronous motor
D05A	Ditto for 50 c/s synchronous motor
D05B	Ditto for 60 c/s asynchronous motor
D06	Ball-bearing
D07	Shaft
D08	Packing plate
D09	50 or 60 c/s asynchronous flange motor
D09A	50 c/s synchronous flange motor

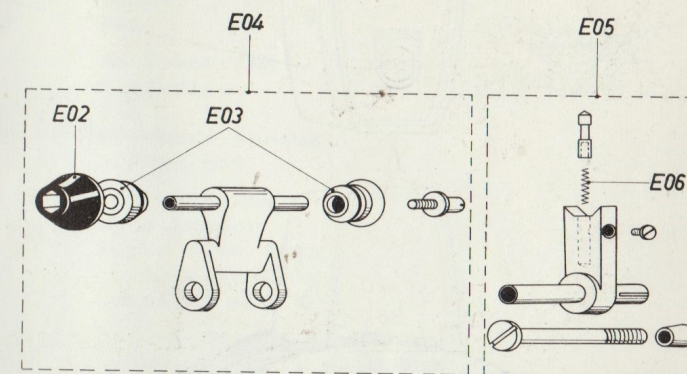
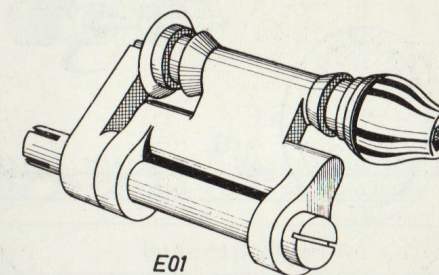
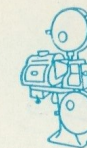
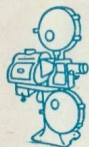


Fig. E - Parts of the pad-roller units
of the FP 56 and FP 7 projectors

Order number	Description
E01	Complete pad-roller unit (= A06 = A46 = B06 = B 59; figs. A and B)
E02	Ornamental screw
E03	Roller
E04	Support with roller
E05	Long roller spindle
E06	Spring



PHILIPS Cinema

AA-92

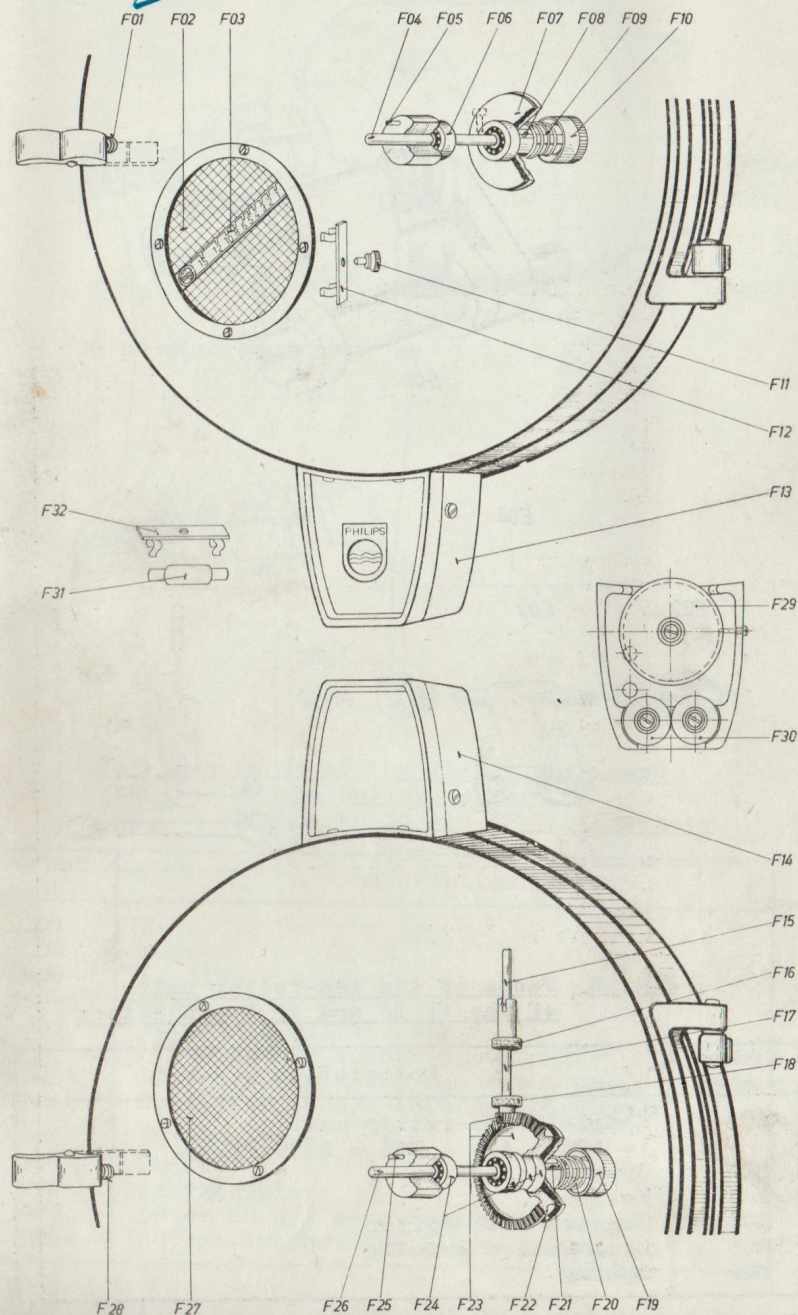
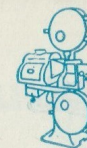


Fig. F

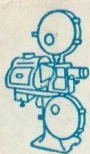
AA-93



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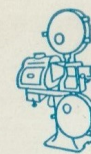
Fig. F - Parts of the spool boxes and fire traps of the FP 56 and FP 7 projectors

Order number	Description
F01	Spring
F02	Gauze
F03	Time scale
F04	Shaft
F05	Pin
F06	Ball-bearing
F07	Felt disc
F08	Pin
F09	Pressure spring
F10	Milled nut
F11	Milled screw
F12	Lamp holder
F13	Upper fire trap
F14	Lower fire trap
F15	Coupling shaft
F16	Ball-bearing
F17	Coupling shaft with bush
F18	Ball-bearing
F19	Milled nut
F20	Pressure spring
F21	Pin
F22	Felt disc
F23	Set of conical gear wheels
F24	Ball-bearing
F25	Pin
F26	Shaft
F27	Gauze
F28	Spring
F29	Roller
F30	Roller
F31	Inspection lamp
F32	Lamp holder



PHILIPS Cinema

AA-94



PHILIPS Cinema

Fig. G - Parts of the mounting table
of the FP 56 and FP 7 projectors

Order number	Description
G01	Arc-lamp switch
G02	Series resistor
G03	Lever switch
G04	Volt and ammeter (moving-coil system + correction resistor)
G05	Push-button
G06	Motor switch
G07	Starting resistor, 4+2 μ F, 380 V
G08	Transformer
G09	Fuse

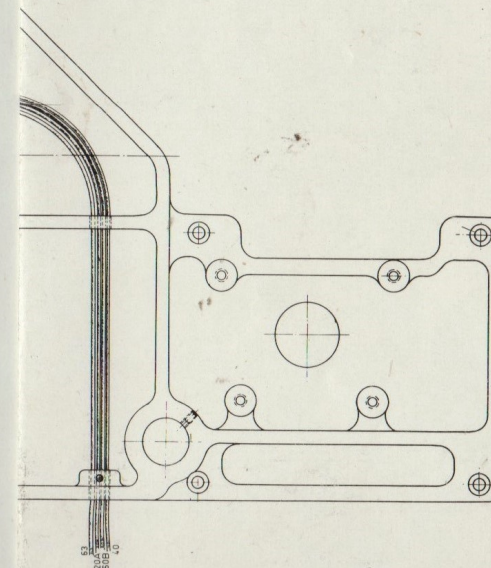


Fig. G

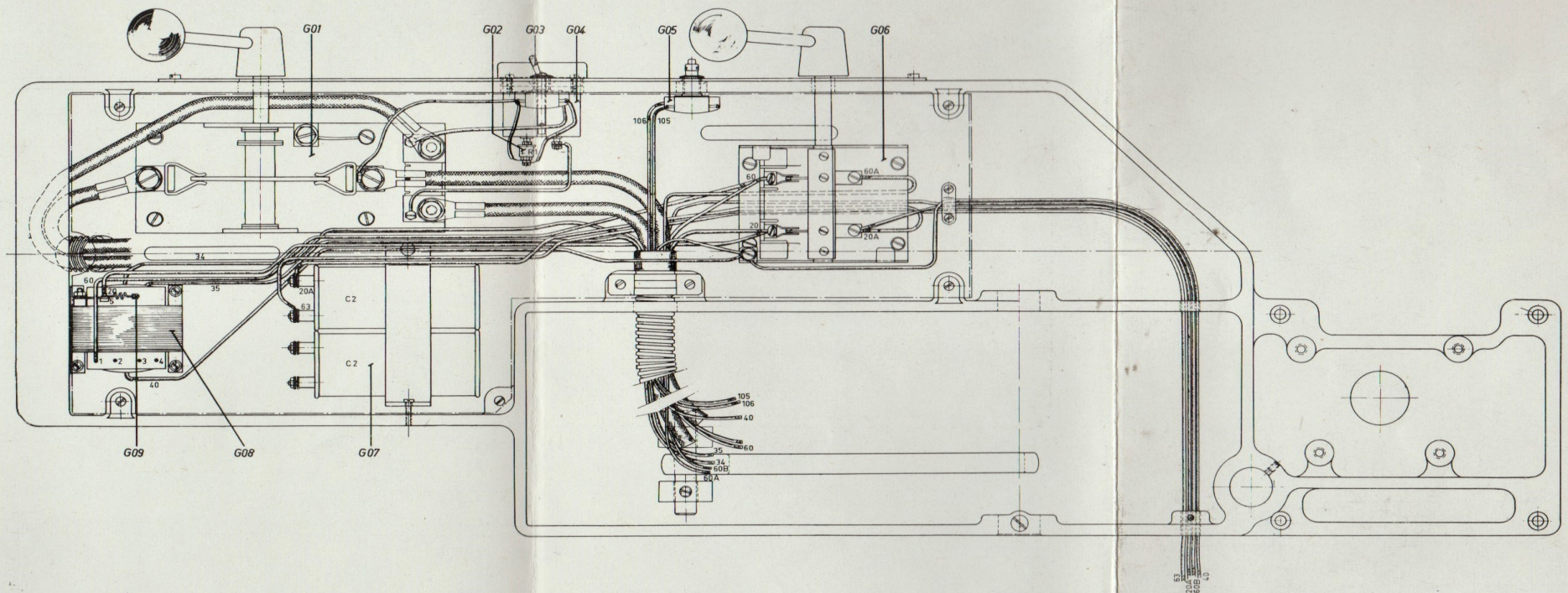
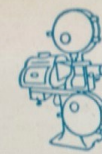
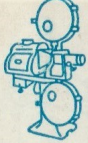
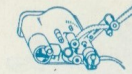


Fig. G



SOUNDHEAD

TYPE 3837



GENERAL DESCRIPTION

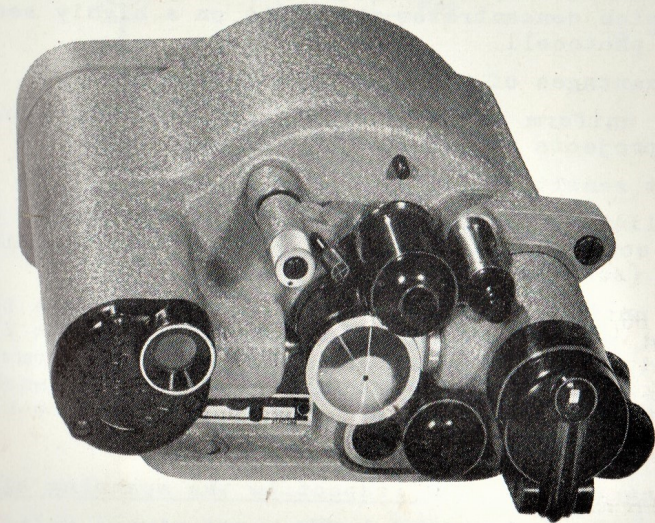


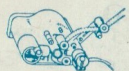
Fig. 1

The built-in soundhead of the FP 7 projector is similar to the type 3837 soundhead of the FP 56 projector. The following description and the indications for adjustment, checking, etc. therefore apply to both.

PRINCIPAL features of PHILIPS type 3837 soundhead

1. Excellent sound reproduction

The soundhead is provided with a rotary sound drum driven by the film. Guide rollers keep the film in close contact with the drum over a large proportion of its circumference. The starting time of the sound drum is only about 3 seconds.



2. Ingenious scanning device

With the aid of a condenser system and a glass rod a very uniform and bright light spot is projected on to the sound track of the film. The strongly illuminated sound track is magnified about 13 times by a micro-lens and projected on to a screen with slit. Immediately behind the slit is a condenser lens which concentrates the light on a highly sensitive photocell.

The advantages of this scanning system are:

- . very uniform light distribution, as the glass rod projects a diffuse light on the film;
- . great sensitivity;
- . facility of checking the correct adjustment of the sound track with respect to the scanning slit (see 3);
- . the pull on the film required for driving the sound drum is so small that the film between the sound drum and the hold-back sprocket forms a slack resilient loop which catches and absorbs any slight shocks caused by the hold-back sprocket and the lower friction coupling.

3. Shifting the film with respect to the scanning slit

As in practice the sound track is not always printed in the correct place, it must be possible to shift the film with respect to the scanning slit. In this soundhead, the pressure roller - and hence also the film - can be shifted laterally with respect to the sound drum with the aid of a milled knob. The position of the sound track with respect to scanning slit can easily be checked, the image of the track, magnified 13 times, on the slitted screen being visible in a window.

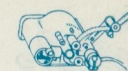
4. Simple operation

Threading of the film is very simple. The knobs of the guide rollers are tapered and rounded, so that the film slides easily between them. It is sufficient to lift the pressure roller, which is spring-loaded and cannot accidentally remain in the lifted position.

5. Quick replacement of the pre-focused exciter lamp and of the photocell

The exciter lamp can be removed after opening a lid. It is provided with a centring disc and is, therefore, automatically focused.

The photocell can be replaced by removing the small cap at the rear of the soundhead. This cap is fixed with only one milled nut.



OPTICAL SYSTEM

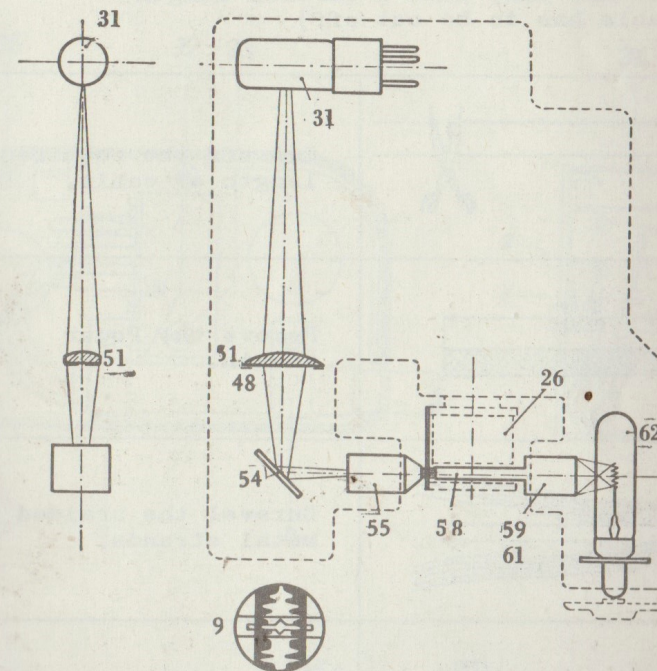


Fig. 2

The optical system (figs 2 and 6) consists of two parts:

1. Illumination part

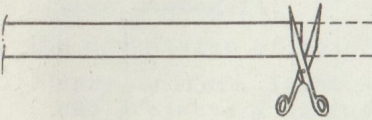
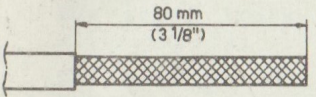
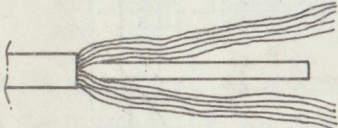
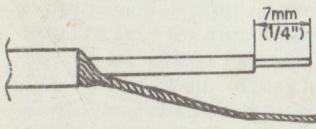
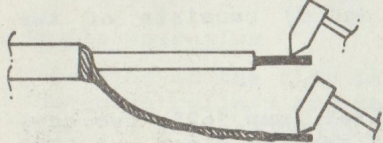
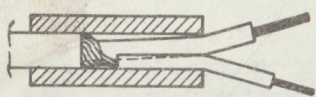
This consists of the exciter lamp "62", two condenser lenses "59" and "61" and the glass rod "58" which casts a very bright and uniform light spot on to the sound track.

2. Scanning part

This comprises a specially corrected micro-lens "55" which projects the illuminated sound track, about 13 times magnified, on to screen "48" with scanning slit; this image can be observed through window "9". Condenser lens "51" concentrates the light rays falling through the scanning slit on to photocell "31".



1. End soldering of photocell cable
(necessary only when a certain length of cable has to be cut off)

	Cut off the required length of cable.
	Remove the Podur sheath.
	Unravel the braided metal strands.
	Strip off the insulation and twist the strands.
	Tin the ends (acid free).
	Fit Podur sheath over the metal strands and fit the sleeve; use sheath and sleeve of cut-off end.

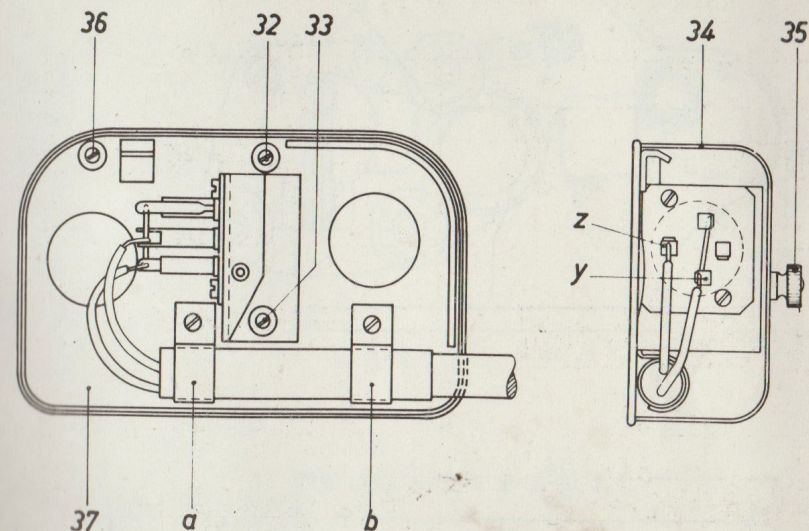
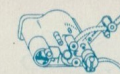


Fig. 3

2. Connection of the photocell cable

- Unscrew milled nut "35" and remove lid "34" of the photocell housing.
- Take out the photocell.
- Solder the cable core to contact "z" of the photocell holder and connect it to terminal "91" at the bottom of the pedestal of the projector; solder the screening to contact "y" and connect it to terminal "90".

N.B. For soldering flux use resin; connections made with fluxes containing acid are a source of noise in the sound reproduction.

- Clamp cable sleeve under brackets "a" and "b".
- Insert the photocell and put lid "34" back again.



PHILIPS Cinema

AB-6

DIMENSIONAL DRAWING

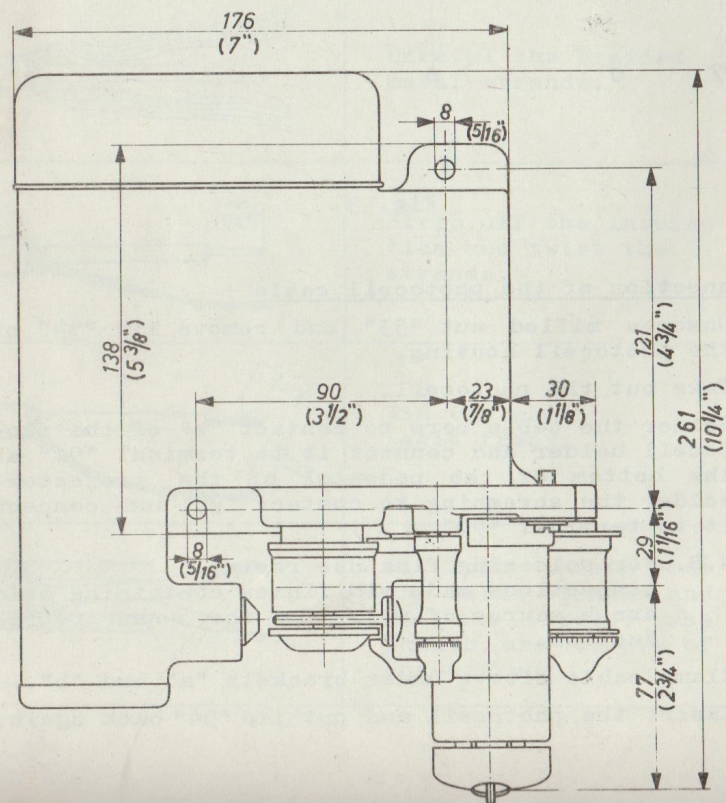
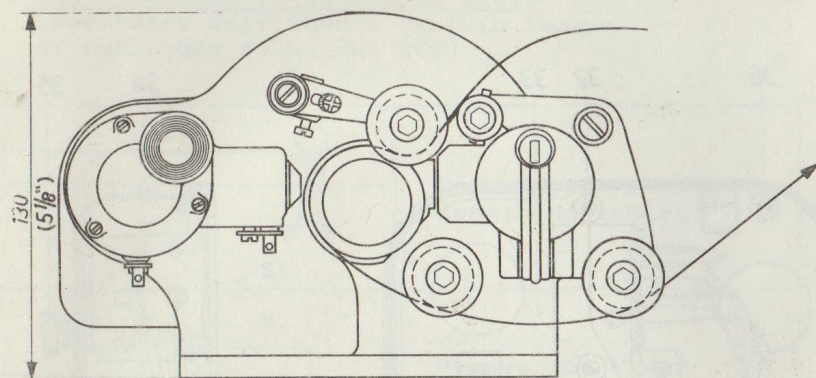
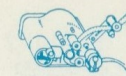


Fig. 4

CHECKING
and
ADJUSTMENTS



SMOOTH RUNNING OF SOUND DRUM AND PRESSURE ROLLER

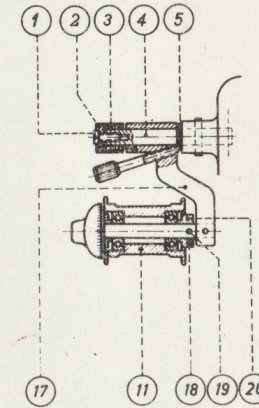


Fig. 5

After the film has passed through, the sound drum and the pressure roller should continue to run for at least 45 seconds and for at most 80 seconds. If they come to a standstill earlier, either the sound drum or the pressure roller are not running smoothly enough, with the result that the sound has a hoarse quality.

Checking the sound drum

Let a film run out of the projector and as soon as the end has passed through, lift the pressure roller. If the now freely rotating sound drum comes to a standstill within 2 minutes, check:

- . whether the flywheel mounted on the sound shaft is being braked by the photocell cable; this cable should lie flat against the inside of the sound-head;
- . whether dirt has accumulated in the groove of the sound drum provided for the glass rod;
- . whether a ball-bearing is dirty; for this purpose remove sound drum and flywheel (see page AB-16).

Checking the pressure roller

The pressure roller should have a slight but perceptible play. It may also fail to run smoothly because of dirt.

Adjustment of the axial play (fig. 5):

- . Loosen screws "18" and "19" and shift ring "20".



PRESSURE AND POSITION
OF THE PRESSURE ROLLER

The pressure roller is properly adjusted in the factory, before the soundhead is delivered.
Re-adjustment should only be undertaken by qualified technicians.

Important for the proper functioning of the pressure roller are:

- . the force with which the roller is pressed on to the sound drum;
- . the position of the roller with respect to the sound drum.

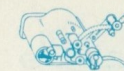
The procedure for re-adjustment is as follows:

Pressure of roller on sound drum

The force with which the pressure roller is pressed on to the sound drum determines the time in which the latter attains its working speed after the projector has been started. This time should be about $3\frac{1}{2}$ sec which corresponds to a pressure of 2 lbs 10 ozs (1200 g). This force must never be exceeded as this would cause damage to the film.

Adjustment (fig. 5):

- . Fix the hook of a spring balance to pressure roller "11".
- . Loosen screw "1" and turn milled ring "2" until the pressure is 2 lbs 10 ozs (1200 g).
- . Tighten screw "1" again.



Position of the pressure roller with respect to the sound drum

If the spindle of the pressure roller were exactly parallel to the sound shaft, the running film might move from side to side between the flanges of the pressure roller. To avoid this, the front end of the roller spindle is given a position 0.0027" (0.07 mm) higher than and 0.004" (0.1 mm) to the right of that it would occupy if it were parallel. This keeps the film against the front flange of the pressure roller.

Adjustment (fig. 6, page AB-19):

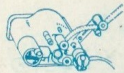
- . Remove roller "13" (see page AB-15).
- . Slide a brass tube with an inner diameter of 0.236" (6 mm) over the entire length of the roller spindle and carefully bend this spindle slightly with the aid of the tube.

Checking of the 0.0027" (0.07 mm) vertical offset:

- . Slide between the pressure roller and the sound drum a strip of paper with a thickness of 0.0027" (0.07 mm); it should be possible to move one paper strip freely but impossible to move a double strip freely between roller and sound drum.

Checking of the 0.004" (0.1 mm) horizontal offset:

- . Measure the clearance between roller spindle and sound shaft with a micrometer gauge. The clearance at the front should be 0.004" (0.1 mm) less than at the rear.



POSITION OF THE SOUND TRACK WITH RESPECT TO THE SCANNING SLIT

- . If necessary, turn screw "10" (fig. 6, page AB-19) until the centre line of the scanning slit, marked on the observation window, arrives in the centre of the sound track.

UNIFORM SLIT ILLUMINATION

When the exciter lamp is on and with no film in the projector, a uniform light spot should be visible through the observation window. Dark spots are usually caused by film dirt having accumulated in the glass-rod holder on the side facing the micro-lens. The dirt should be removed only with a soft brush.

If dark spots remain visible, first check the illumination part of the optical system and then, if necessary, the scanning part.

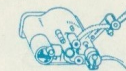
Checking the illumination part (fig. 6, page AA-19)

- . Remove the exciter lamp, loosen screw "12", slide the entire unit "14" backwards and take it out.
- . Inspect the front face of the glass rod through a magnifying glass; if it is damaged, replace the entire unit "14", i.e. the holder with glass rod and the condenser lenses. We would strongly advise you NOT to take unit "14" apart!

Mounting:

- . Check whether the groove in the sound drum provided for the glass rod is perfectly clean.
- . Insert unit "14" so that screw "12" engages in the groove in the holder provided for this purpose.
- . Adjust the clearance between film and front of holder to exactly 0.02" (0.5 mm); a smaller clearance entails the risk of film damage.

N.B. After replacement of unit "14" it is not necessary to re-adjust micro-lens "55" or slit-bush "53".



Checking the scanning part (fig. 6, page AB-19)

Check the scanning part only when absolutely necessary as, when it has been taken out, all the adjustments indicated on pages AB-12 and AB-13 have to be carried out.

If the illumination part has been found to be in good order and dark spots are still visible, then:

Check mirror "54":

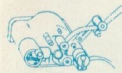
- . Loosen screws "7", "8" and "23" and remove lid "6" to which mirror "54" is fixed; do not touch the mirror with the fingers as it will then be damaged beyond repair.
- . Check the surface of the mirror; if it is damaged, loosen screws "15" and "16" or "19" and "30" and replace the mirror (only in case of emergency!).

Check the micro-lens:

- . Remove pin "25" and screw "24".
- . Take out the micro-lens, examine it and replace it if damaged.

Re-assembling in the reverse order.

Always re-adjust the entire optical system (see pages AB-12 and AB-13).



The optical system is properly adjusted in the factory, before the soundhead is delivered. It should only be re-adjusted by PHILIPS technicians, and then only when absolutely necessary, i.e.:

- a. after replacement of slit-bush "53" or of one of its parts;
- b. after replacement or removal of lid "6" with mirror "54";
- c. after replacement of micro-lens "55".

The optical system has two devices for fine adjustment:

1. for focusing the micro-lens;
2. for adjusting the scanning slit perpendicularly to the direction of film travel.

In the factory, these adjustments take place with the aid of a frequency film, an equivalent resistor and an A.C. voltmeter being connected to the loud-speaker terminals of the amplifier.

Both adjustments take place independently of each other until at a frequency of 6000 c/s and of 9000 c/s the voltmeter gives the maximum deflection.

In case of emergency, these adjustments can be made by ear in the following way:

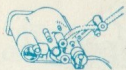
Focusing the micro-lens:

- . Thread a film through the projector and the soundhead (preferably a slightly scratched print).
- . Loosen screw "24" (fig. 6) and turn eccentric pin "25" until with running film, the film noise is as loud as possible.
- . Tighten screw "24" again.



Adjustment of slit-bush "53"

- . Insert a good film with speech on it, loosen screw "21" and turn eccentric pin "22" until the sibilants are as loud as possible. A maximum will be found in two positions of the pin; the correct position is that in which slit-bush "53" is nearest to mirror "54".
- . Tighten screw "21" again.
- . Check the focusing of the micro-lens and, if necessary, correct it as indicated on page AB-12.



PHILIPS Cinema

DISMANTLING
and
RE-ASSEMBLY
OF PARTS



PRESSURE ROLLER AND GUIDE ROLLERS

1. Pressure roller "11" (fig. 5, page AB-7)

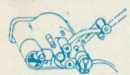
- . Extract the ornamental screw and carefully take the roller with the two ball-bearings off the spindle.
- . If the ball-bearings are dirty, wash them in dust-free petrol and lightly lubricate them with cardan oil (type 8657) before re-assembling.

2. Pressure roller "11" together with fixing arm

- . Loosen screw "1".
- . Remove spring holder "2", spiral spring "3", arm "17" with pressure roller "11" and steel ring "5".
- . Before re-assembling, lubricate pivot of arm "17" with cardan oil (type 8657).

3. Guide rollers "13", "27" and "18"
(fig. 6, page AB-19)

- . Remove the ornamental screw and slide the roller from the spindle.
- . Before re-assembling, lubricate the spindle with a few drops of Esso-Handy oil (No. C1 602 17).



SOUND DRUM AND FLYWHEEL

Dismantling should only take place in a dust-free room by skilled technicians and then only if absolutely necessary.

For dismantling the sound drum and the flywheel, the entire soundhead (and, with the FP 7 projector, the entire projector head with built-in soundhead) has to be removed from the mounting table of the projector.

Then proceed as follows (fig. 6, page AB-19):

- Remove unit "14" and photocell housing "37" (see pages AB-10 and AB-17).
- Put a piece of wood between the arm of the pressure roller and the casting of the soundhead in order to facilitate the removal of the sound drum.
- Clamp the soundhead in a bench-vice, the sound drum pointing vertically downwards.
- Tap pin "39" very carefully out of the flywheel and the shaft.
- Remove the sound drum by pulling it carefully downwards and then remove flywheel "41", spacer "42" and the upper ball-bearing "38".
- Remove one of the rings "56" or "57" (best done with round-nosed pliers with thin jaws) and the lower ball-bearing "62".
- Wash the ball-bearings in pure, dust-free spindle oil; the oil that remains in the bearings will act as lubricant.

Re-assemble in the reverse order, also in a dust-free room.

Checking

- Hold the soundhead in the hands in its normal working position and let the sound drum rotate; it should run evenly and smoothly.
- Check the smooth running of sound drum and pressure roller as indicated on page AB-5.



EXCITER-LAMP HOLDER AND
PHOTOCELL HOUSING

Removal of the exciter-lamp holder
(fig. 6, page AB-19)

- Remove screws "63" and "64".
- Loosen the electrical connections at the rear of the holder.
- Remove the holder.

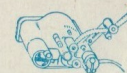
Removal of the photocell housing
(fig. 3, page AB-5)

- Loosen milled nut "35" and remove lid "34".
- Take out the photocell.
- Loosen screws "32", "33" and "36" and remove the photocell housing. Take care that no dust can penetrate into the then unprotected ball-bearing.



PHILIPS Cinema

AB-19



PHILIPS Cinema

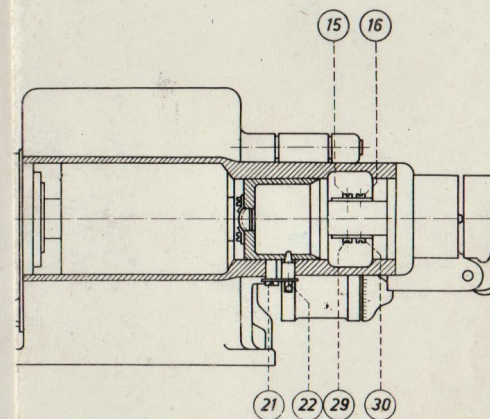


Fig. 6.



PHILIPS *Cinema*

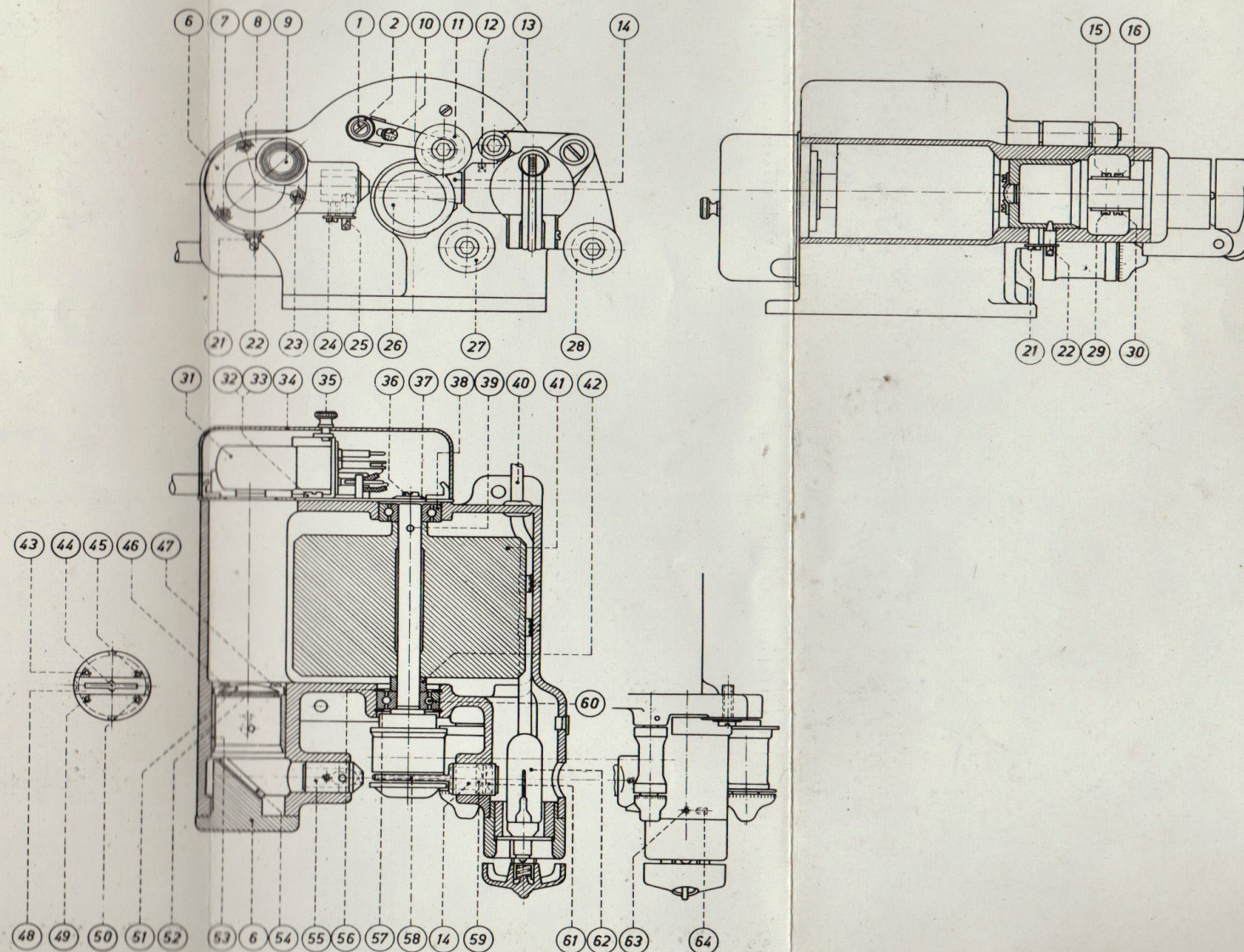


Fig. 6.

SUGGESTED SET OF SPARES

and

ORDER NUMBERS

OF THE PRINCIPAL PARTS

SUGGESTED SET OF SPARES

It is advisable to keep a stock of the principal parts in the projection room, so that in the event of damage they can be replaced immediately.

Suggestions for a smaller and for a larger set of spares are given below.

The various parts are indicated in the drawing bearing the initial letter of their order number.

Small set of spares for type 3837 soundhead

Number	Description	Order number
4	Exciter lamps	3874C or 7251C
2	Photocells	3533

Larger set of spares for type 3837 soundhead

Number	Description	Order number
4	Exciter lamps	3874C or 7251C
2	Photocells	3533
1	Holder with glass rod and condenser lenses (unit "14")	H35
1	Mirror "54"	H39
1	Micro-lens	H36
1	Spring for the pressure roller	H02

ORDER NUMBERS OF THE PRINCIPAL PARTS

When ordering parts, quote order numbers and also state:
 with the FP 56: the type and the serial number of the soundhead;
 with the FP 7: the serial number of the projector; this number stands at the rear and to the left of the motor or on the pulley support.

Order number	Description
H01	Photocell cable, length 6.5 ft (2 m)
H01A	Photocell cable, length 8 ft (2.5 m)
H01B	Photocell cable, length 66 ft (20 m)
H02	Spring for pressure roller
H03	Steel ring
H04	Set screw
H05	Locking screw
H06	Arm
H07	Dust ring
H08	Ornamental screw
H09	Dust ring
H10	Ball-bearing
H11	Milled nut
H12	Pressure roller
H13	Ball-bearing
H14	Spindle
H15	Guide roller
H16	Ornamental screw
H17	Exciter-lamp cable
H18	Grommet
H19	Guide roller
H20	Ornamental screw
H21	Lamp holder, complete
H22	Contact cap + flex
H23	Lid of lamp housing, complete
H24	Pawl spring
H25	Pawl
H26	Guide roller
H27	Pressure spring
H28	Sound shaft
H29	Adjusting pin
H30	Observation window
H31	Lid
H32	Photocell (type 3533)
H33	Photocell holder
H34	Exciter lamp (type 3874C or 7251C)
H35	Illumination unit
H36	Micro-lens
H37	Condenser lens
H38	Slit-plate
H39	Mirror