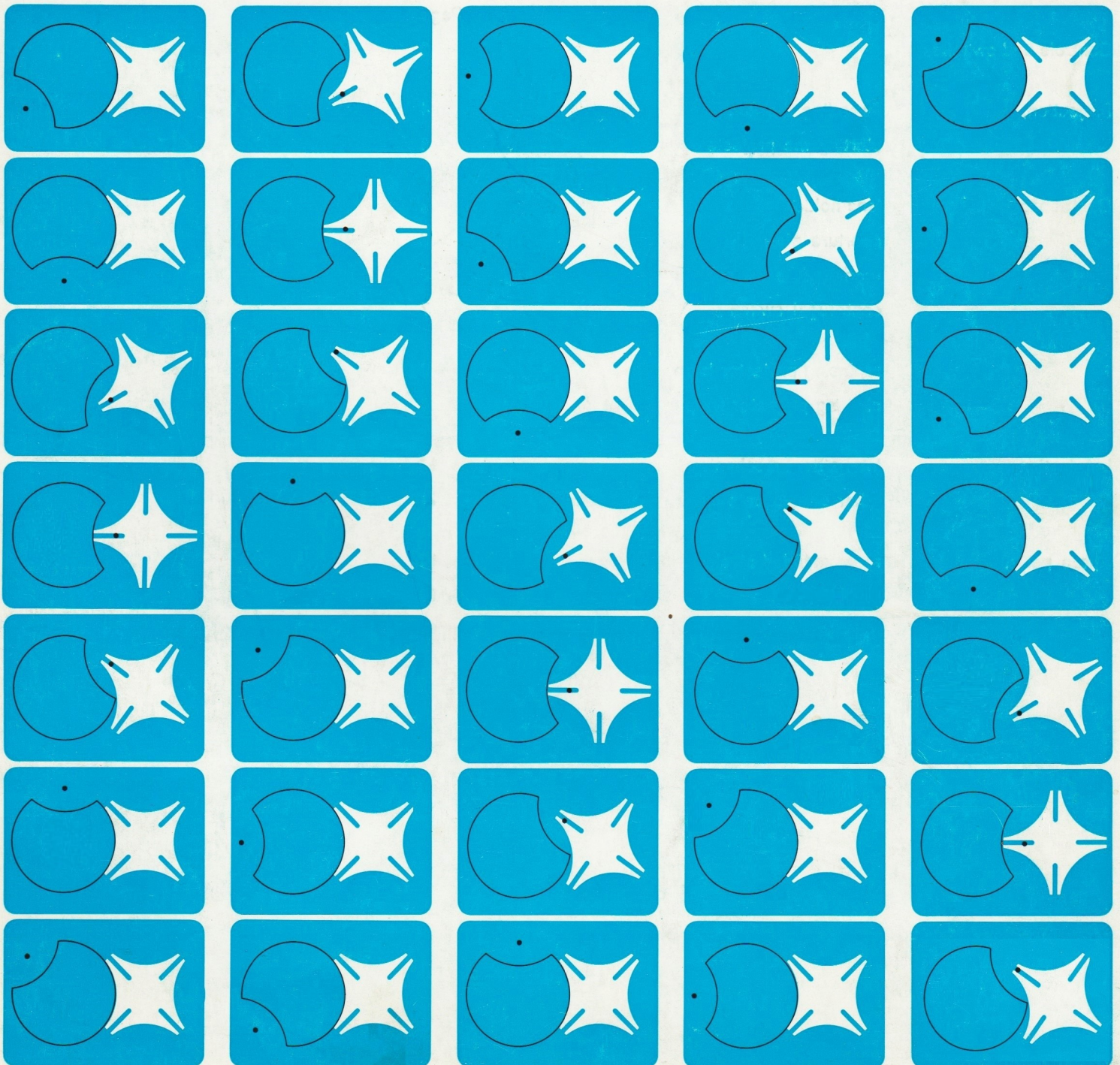




Use and Maintenance Instructions for Projector FP 20 X



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Controls and switches

The FP 20 X version of the well proven FP 20 projector has a special lamphouse for the new 500 watt Xenon arc lamp and its controls. This lamp provides the smaller cinema and studio user with the high light output, optical efficiency and light quality of an arc source without the bulky extra equipment and installation of normal arc illuminants. The Xenon lamp requires only a rectifier unit, and as it does not release ozone a special exhaust system is not necessary.

Lamphouse (Fig. 2)

12. Lamp holder to which the lamp is inserted
13. Lamp holder to which the lamp is inserted
14. Lamp holder to which the lamp is inserted
15. Lamp holder to which the lamp is inserted
16. Lamp holder to which the lamp is inserted
17. Lamp holder to which the lamp is inserted

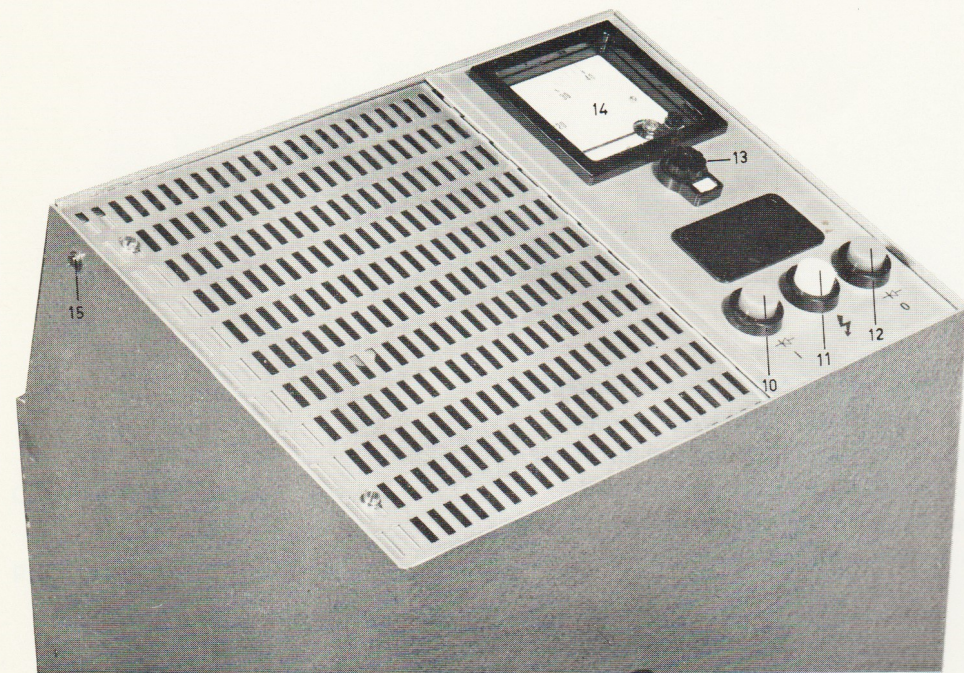
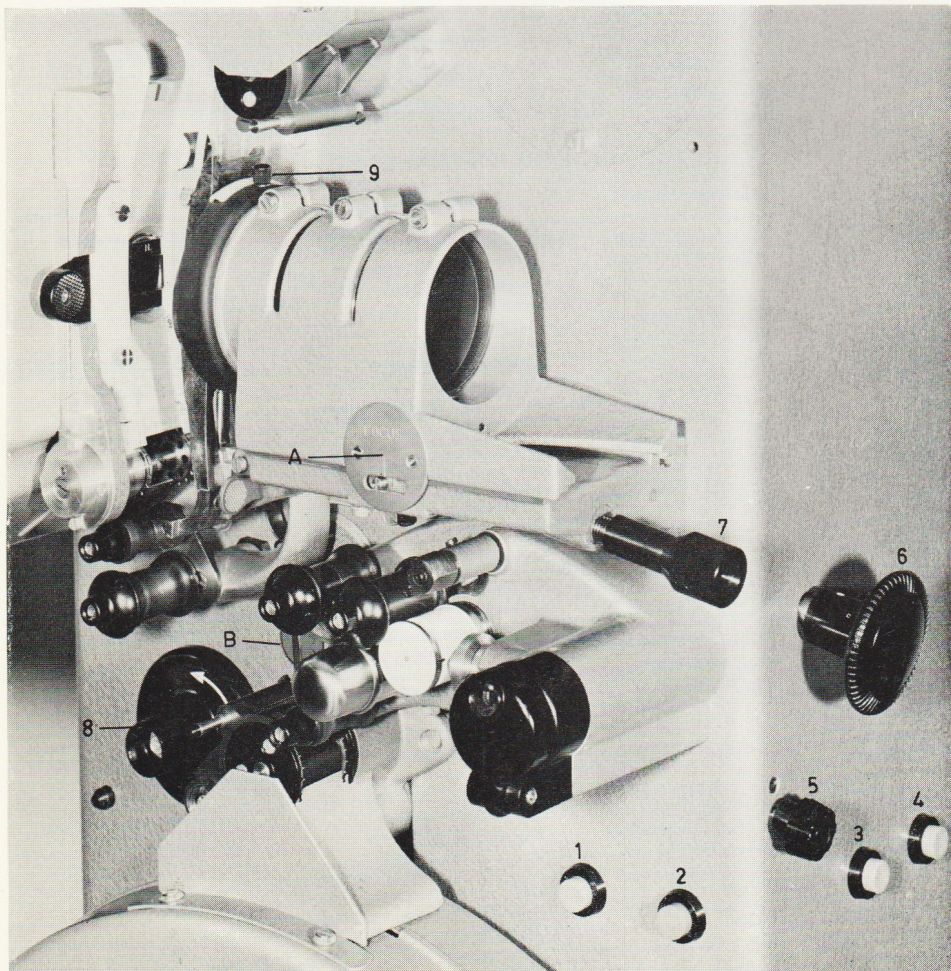


Fig. 1

Fig. 2



Projector (Fig. 2)

1. push-button to start film transport (green)
2. push-button to stop projector (red)
3. push-button to switch on picture and sound (green)
4. push-button to switch off amplifier (red)
5. skate pressure adjusting knob
6. framing knob
7. lens focusing knob
8. inching knob
9. knob for operating light-spill baffle
- A. reference scale for lens focus
- B. scale for adjustment of skate pressure

Lamphouse (Fig. 1)

10. push-button to switch on (green)
11. push-button to ignite projector lamp (white)
12. push-button to switch off lamp (red)
13. mains fuse
14. ammeter for lamp current
15. screws for removing lamphouse cover

Threading the film (Figs. 3 and 4)

- Turn on the main switch on the inside of the projector rear door, a red dot indicates the 'on' position.
- Set the framing device to its centre position by turning the knob A until the white dot is on top.
- Check that the lens required is fitted (changing lens and lens holder unit, see page 6).
- Check that the correct aperture plate is fitted (see page 6).
- Open the pressure skate with the thumb grip B.
- Open the doors of the upper and lower spool boxes.
- Place the spool with film in the upper spool box, NOTE that the film should be wound emulsion side out.
- Place an empty spool in the lower spool box.
- Pull off about 6 ft (2m) of film from the upper spool and thread the film, for projectors with:
 - optical** soundhead only ... as Fig. 3
 - optical and magnetic** soundheads as Fig. 4,
 following the **continuous** line for films with optical track, following the **broken line** for films with magnetic track.
- (magnetic only) Tension the film over the roller 1 so that the spring 3 is pulled forward until it coincides with the guide line on bracket 2.
- Make sure that a complete frame is in the gate, then close the pressure skate.
- Check that the upper film loop (between the feed sprocket and the film gate) is the correct size. If too large it will rattle during projection. If too small there will not be enough slack to allow the movement of the film required for framing.

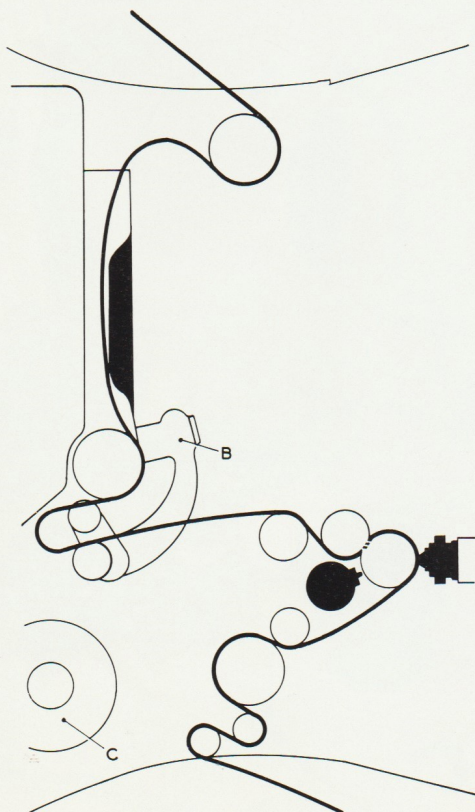


Fig. 3

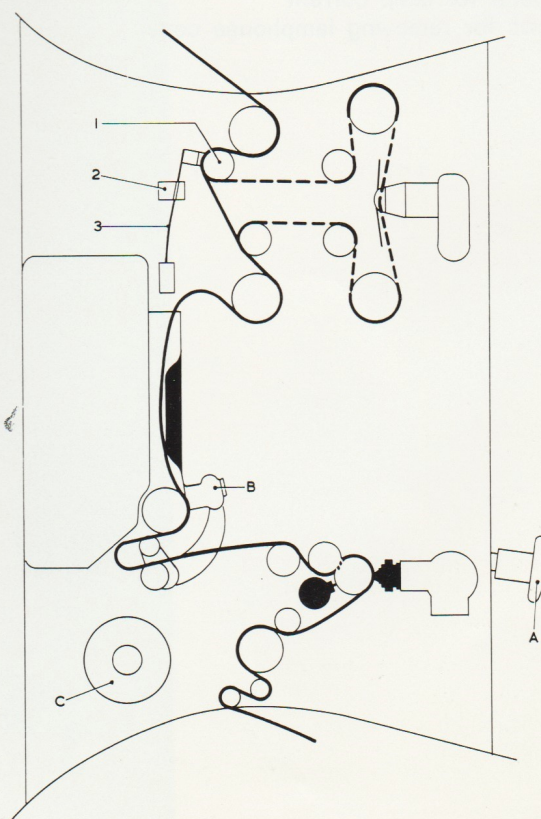


Fig. 4

- Close the upper and lower spool box doors.
- Turn inching knob C to check whether the film is correctly threaded, especially:

the size of the upper film loop,

the running of the film through the magnetic soundhead,

the running of the film through the optical soundhead.

- Inch (knob C) until the required start number appears in the gate and the intermittent sprocket has just completed a movement.

The projector is now ready for projection.

Starting the Projector (Figs.1 and 2)

- Press the green button 10 on the lamphouse.
- Press the white button 11 for a second or two, the lamp will ignite as it is released.
- Check ammeter 14 is reading correct value.
- Start film transport by pressing green button 1.
- Open safety shutter by pressing green button 3.
- Focus the picture with the knob 7.
- Correct framing if necessary with knob 6.
- Adjust skate pressure as follows:

first turn knob 5 anti-clockwise (decreasing pressure) until the projected picture shows unsteadiness,

then turn knob 5 clockwise (increasing pressure) until the point is just reached where the picture is steady again.

Always keep the skate pressure as low as possible.

Operation

Lens Holder

The lens holder accepts lenses with mount diameters up to 2.78 in. (70.6 mm). It slides on its support which is mounted on the projector column. A fine adjustment screw, working in conjunction with a pressure spring, gives a backlash free focusing movement. The lens with lens holder forms a unit which is easily removed from the support. The individual lenses are set and locked to focus in their holders when the projector is installed. Thus another unit is quickly fitted when changing aspect ratio, as it will be focused except for the small adjustment sometimes necessary due to variation in the film itself.

Changing the Lens and Lens Holder Unit (Fig. 5)

To remove:

- Close the pressure skate 1.
- Push the lens holder 2 back as far as it will go towards the film gate.
- The pin 3 under the support 4 will then spring towards the projector column (into the arm of a 'T' slot).
- The lens holder can now be lifted off the support, first tilting outwards to disengage the focus scale pin.

To replace:

- position the lens holder on its support 4, sliding it towards the film gate.
- Then, gripping the holder firmly, swing out the pin 3 until vertical and let the holder move forward gently with the spring pressure until it comes to rest.
- Turn the focusing knob until the pin lines up with the scale.

Aperture Plates (Fig. 5)

Four aperture plates are supplied with the projector:

for normal film,
aspect ratio 1 : 1.37 marked N

for CinemaScope,
aspect ratio 1 : 2.34 marked C.O.

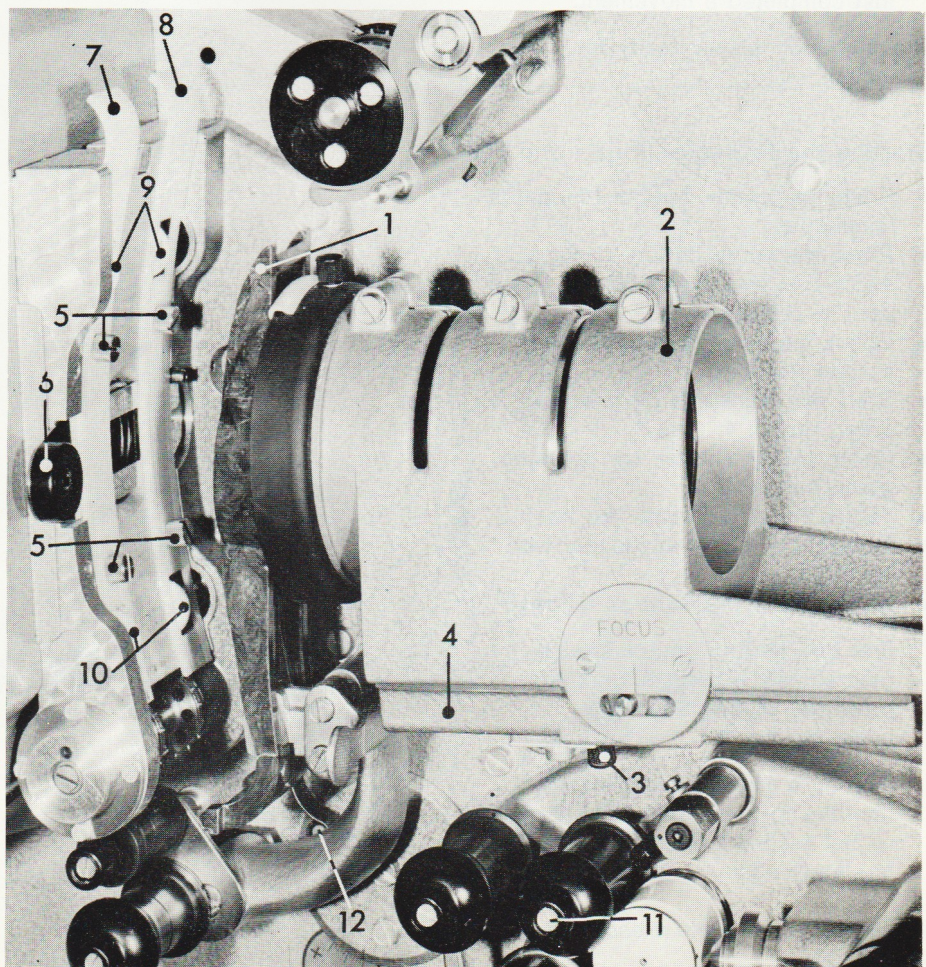
for wide screen,
aspect ratio 1 : 1.85 marked 1 : 1.85
and one blank aperture plate.

The aperture plates are inserted, with the aspect ratio identification facing the film, through a slit just behind the running faces 7 and 8. They should be pushed firmly home to be held by a snap-in device. The knob 6 on the aperture plates enables easy removal and replacement, even while the projector is running.

The Runner Plate (Fig. 5)

The curved runner plate used in the

Fig. 5



FP 20 X projector ensures an extremely steady picture, and moreover prevents the film from buckling so that focus is always maintained over the whole width of the screen.

The running faces are formed by the strips 7 and 8, and removing the screws 5 enables them to be replaced, or changed over if wear occurs on one side only. These strips are of Delrin to which neither dirt nor emulsion adheres, so very old or new prints may be safely projected without the need to fit a velvet-lined runner plate.

Lateral Pressure Rollers

For correct tracking of the film through the gate there are a pair of sprung rollers at each end of the runner plate, viz. guide rollers 9 at the top and guide rollers 10 at the bottom.

The rollers are easily removed to enable them and their running wells to be cleaned; being located by ball catches they need only a firm pull towards the lens holder to remove. To replace, simply push back into position.

Centrifugal Switch

The projector is fitted with a centrifugal switch which has two 'fail safe' functions:

- to prevent the projector from starting when the light shield is open, thus preventing light and heat from the lamp falling on the film before the projector has run up to its rated speed.
- to stop the projector (the light shield then closes) in the event of a film break, or if the film is not being taken up correctly into the lower spool box.

Lamphouse

It is not possible to accurately prefocus the 500 watt Xenon lamps in manufacture, so the alignment of each individual lamp for optimum illumination must be carried out in the projector lamphouse.

Replacing the Projector Lamp (Fig. 6)

Important. If the previous lamp has been in use, at least ten minutes should be allowed for cooling before removing the lamphouse cover.

Important. Leather gloves and a face mask must always be worn when handling Xenon arc lamps which are pressurised.

- Loosen screws 15 (Fig. 1) and remove lamphouse cover.
- Disconnect the lamp leads at terminals 4 and 5.
- Remove thumbscrews 1 from each side and lift out the lamp holding frame 2 complete with lamp.
- Remove lamp from frame by easing it against the retaining spring and tipping it out of the locating blocks.
- Fit new lamp into the holding frame, anchoring the front lead in the spring clip on the frame.
- Return the holding frame with the lamp to its position in the lamphouse and refit thumbscrews 1.
- Connect front lead to terminal 4.
- Connect rear lead to terminal 5.
- Replace lamphouse cover and cover screws.

Alignment of the Xenon Lamp

To make it possible to observe the screen illumination without film in the projector, the action of the centrifugal switch can be temporarily cancelled by stretching an elastic band of suitable size from the take-up sprocket to the roller of the centrifugal switch (behind the lower spool box door).

To start the lamp (Fig. 1)

- Press the green button 10 on the lamphouse.
- Press and release the white button 11 so that the lamp ignites.
- Adjust the potentiometer on the rectifier unit so that the recommended lamp current is indicated on the ammeter 14.

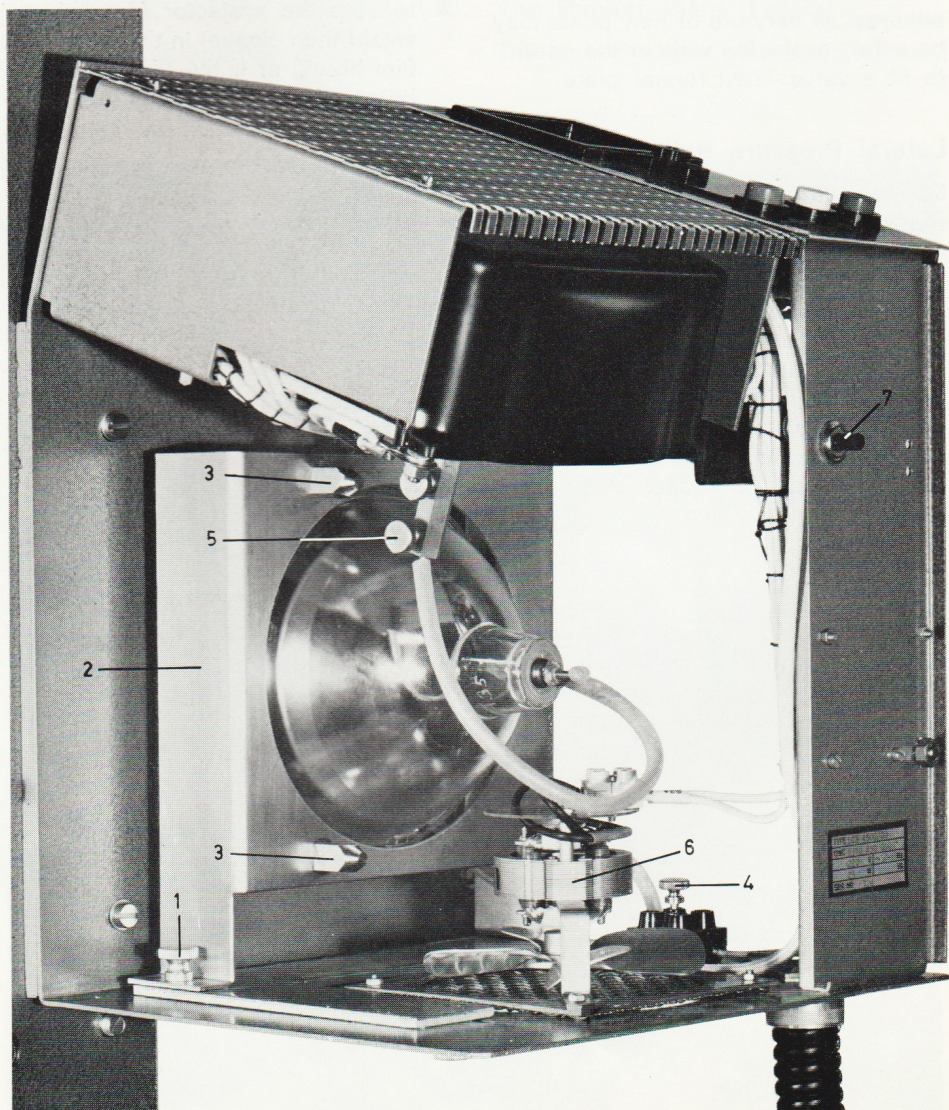


Fig. 6

To **align the lamp** (to centre screen illumination).

Remove the plugs 1 (Fig. 7) from the lamphouse cover and insert the adjusting tools to engage the aligning bolts 3 (Fig. 6).

- for horizontal adjustment, turn both bolts equal amounts in the same direction.
- for vertical adjustment, turn both bolts equal amounts in opposite directions.

Turning the bolts individually gives adjustment across the diagonals of the frame.

To **focus the lamp**. (It is not normally necessary to alter the focus setting when replacing a lamp).

- Loosen the two thumbscrews 2 (Fig. 7).
- The lamp can now be adjusted forward or back on its focusing slide by holding the thumbscrews.
- Tighten the thumbscrews.

Replace the plugs 1 when alignment procedure is completed.

Spare Lamp

If a new lamp is aligned in a spare lamp holding frame, this can be stored complete with the lamp, so that in the event of a lamp failure it can be fitted into the projector without further adjustment, and without the necessity of having to remove the film from the projector.

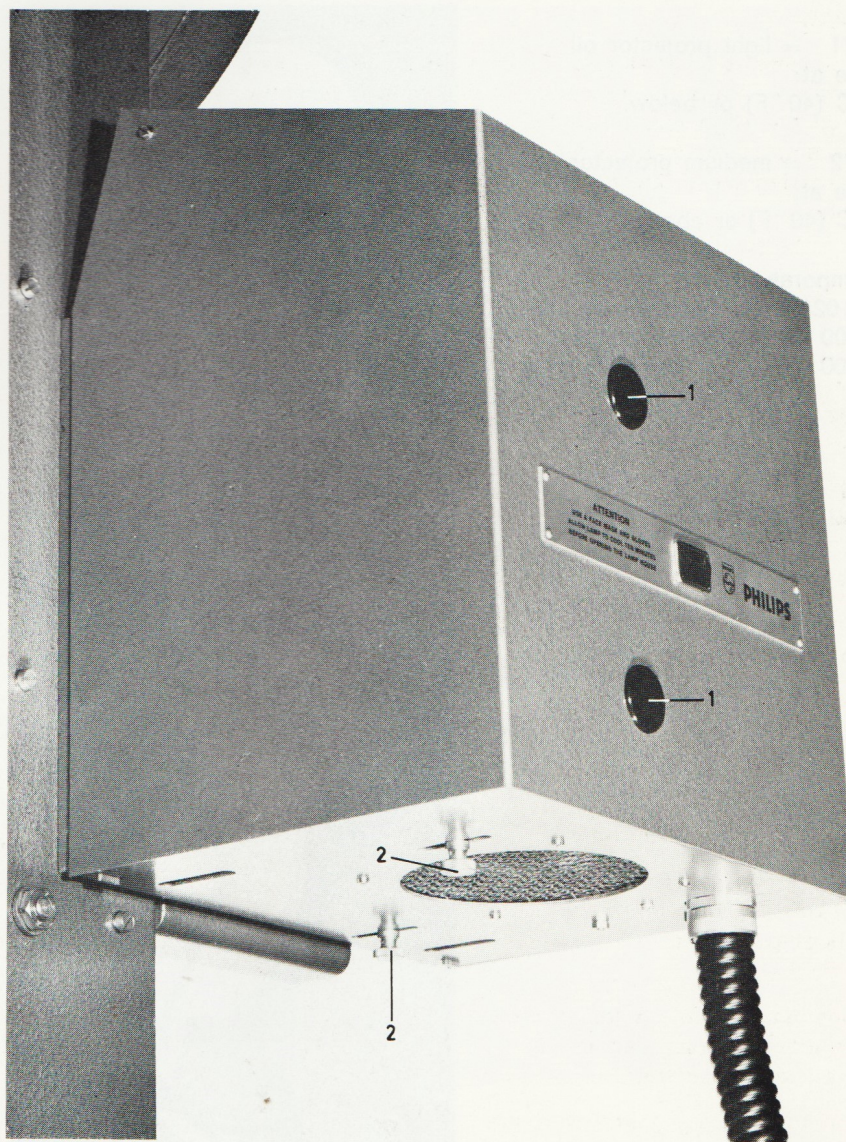


Fig. 7

Lubrication

Note

type 3671 = light projector oil
for use at:
+ 5 °C (40 °F) or below.

type 3672 = medium projector oil
for use at:
+ 5 °C (40 °F) or above.

at all temperatures

3922 836 02170 = Esso Handy Oil
EL 4854/00 = guide grease
EL 4855/00 = universal bearing
grease

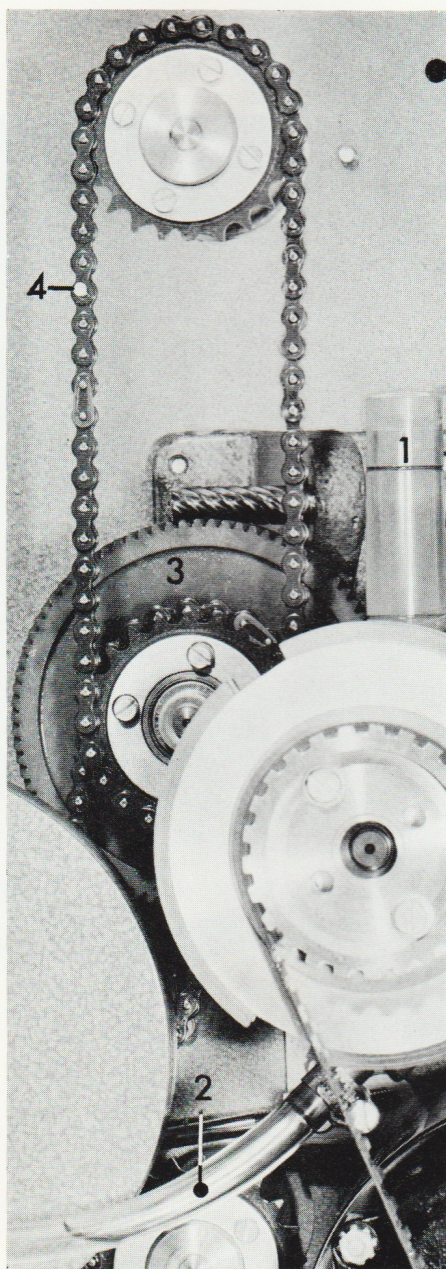


Fig. 8

Intermittent Mechanism (Fig. 8)

The mechanism is totally enclosed in an oil bath. The oil level is checked by the gauge 1, the green line shows the highest and the red line shows the lowest permissible levels. Check the oil gauge regularly to ensure that the oil level is between the lines and top up with projector oil when necessary.

To drain oil bath:

- take tube 2 from its clamp* and lower it to allow the oil to drain completely from the intermittent mechanism.
- push the tube back into the clamp.

To refill the oil bath:

- remove lid of oil level gauge 1.
- fill with projector oil until level is just below the green line and replace lid.

When to change oil

Where the projector has just been installed, or a new intermittent mechanism fitted,

1st oil change after
25 running hours,

2nd oil change after further
50 running hours,

3rd oil change after further
100 running hours,

then change oil every
250 running hours.

* In a newly delivered projector the tube has a plug which is for transit purposes only and **must be discarded**.

LUBRICATION OF THE OTHER COMPONENTS

Component	Fig.	Oil or grease (see page 10)	Quantity
Once a week			
Front bearing of intermittent shaft	-	Esso Handy	a few drops
Transmission gear 3	8	EL 4854/00	lubricate
Chain 4 and sprockets	8	Esso Handy	a few drops
Stop for film spool in both spool boxes	-	EL 4854/00	sparingly
Once a month			
Sliding faces under lens holder 2	5	EL 4854/00	lubricate
Sliding faces at the top of support 4	5	EL 4854/00	lubricate
Guide roller spindles (remove the rollers)	-	Esso Handy	one drop; spread with finger
Ball-race of pressure roller 11	5	3671 or 3672	a few drops
Pivot of pressure roller 11	5	EL 4854/00	sparingly
Once every three months			
Pin and spring of support 4	5	EL 4854/00	sparingly
Threaded spindle of focusing knob 7	2	Esso Handy	a few drops
Pivot 12 for adjusting the skate pressure	5	Esso Handy	one drop
Felt discs of the friction drives on both spool shafts	-	EL 4855/00	thoroughly
Hinges of rear door	-	Esso Handy	a few drops
After each overhaul			
Ball-race of capstan	-	Esso Handy	lubricate

Spare parts

RECOMMENDED SPARE PART STOCK *

A set of the most frequently needed spares should be held on the cinema premises to avoid as far as possible any programme hold-ups due to wear or damage of projector components.

quantity	description	order number
2	lateral guide roller (ceramic)	4822 532 50362
1	torsion spring	4822 492 40001
1	torsion spring	4822 492 40002
1	intermittent sprocket, with fitting material	4822 522 30119
1	sprocket	4822 522 30104
1	microswitch	4822 271 30008
1	toothed belt	4822 358 20006
2	Delrin running face	4822 463 10021
3	fuse, 2A	4822 253 30025
3	fuse, 6A delayed	4822 253 30031
2	exciter lamp	6 V, 1.48 A
		9222 440 11600
		or 3874 C
		5 V, 4 A
		9222 470 08200
		or 7251 C
1	Solar cell	8990 244 02009
2	framing lamp	4822 134 40113

The spares set listed above may be ordered complete as EL 4818/00 (8990 248 18009) from Comm. ELA Department.

Also required, and available from Comm. ELA Department,

1 500 W Xenon projector lamp, type EAR 500.

* Orders for separate items, apart from projector lamps, should be placed with the Central Service Department.

SPARE PART ORDER NUMBERS

(abridged parts list)

When ordering components, please always state:

- the type of projector (LCB 0023/...),
- the serial number of the projector, which is found inside the rear wall of the machine,
- the order number of the component as given in the following pages.

1	frame	4822 451 20121
2	scale	3922 313 00450
3	gauze	3922 323 01560
4	hinge	4822 417 10172
5	catch	4822 417 60045
-	pin for 5	3922 834 11050
-	spring for 5	4822 492 50067
6	shutter housing lid	3922 313 00460
7	cap nut	4822 505 10188

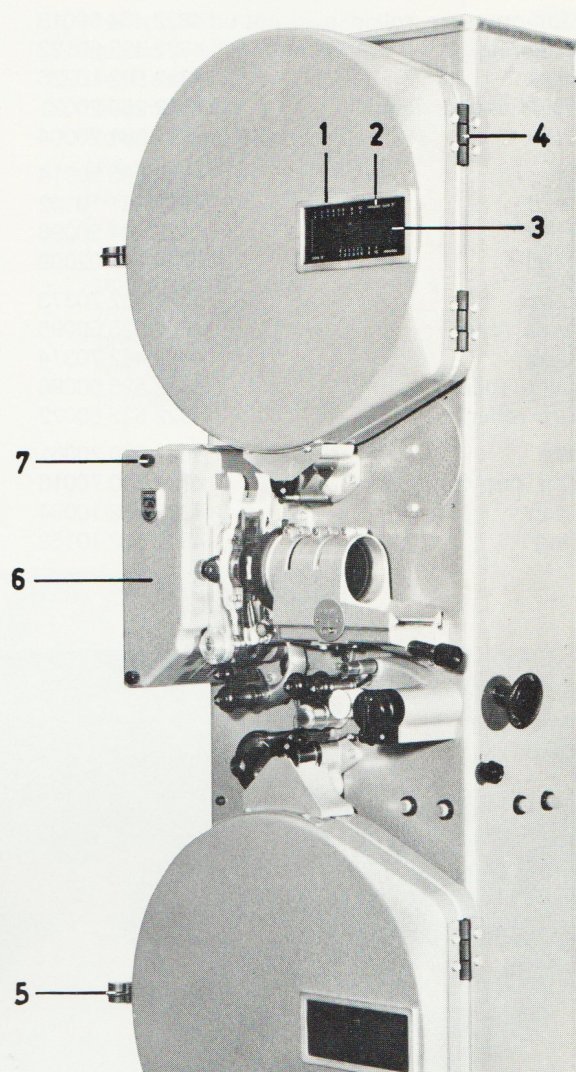


Fig. 9

1	lever for pressure roller	4822 404 50018
2	torsion spring	4822 492 60122
3	set screw	4822 502 10225
4	holder for exciter lamp	4822 255 20021
5	slit lens	4822 381 20004
6	capstan	4822 595 50014
7	glass rod	4822 381 10162
-	holder for 7	4822 404 50098
8	Solar cell	8990 244 02009
9	trim knob	4822 462 70373
10	half guide roller	4822 525 60095
11	trim knob	4822 462 70374
12	half guide roller	4822 525 60096
13	pressure roller	4822 525 60022
13A	ball-race	4822 520 20061
-	retaining ring for 13A	4822 530 70018
-	front ring	4822 532 10094
-	rear ring	4822 532 10168

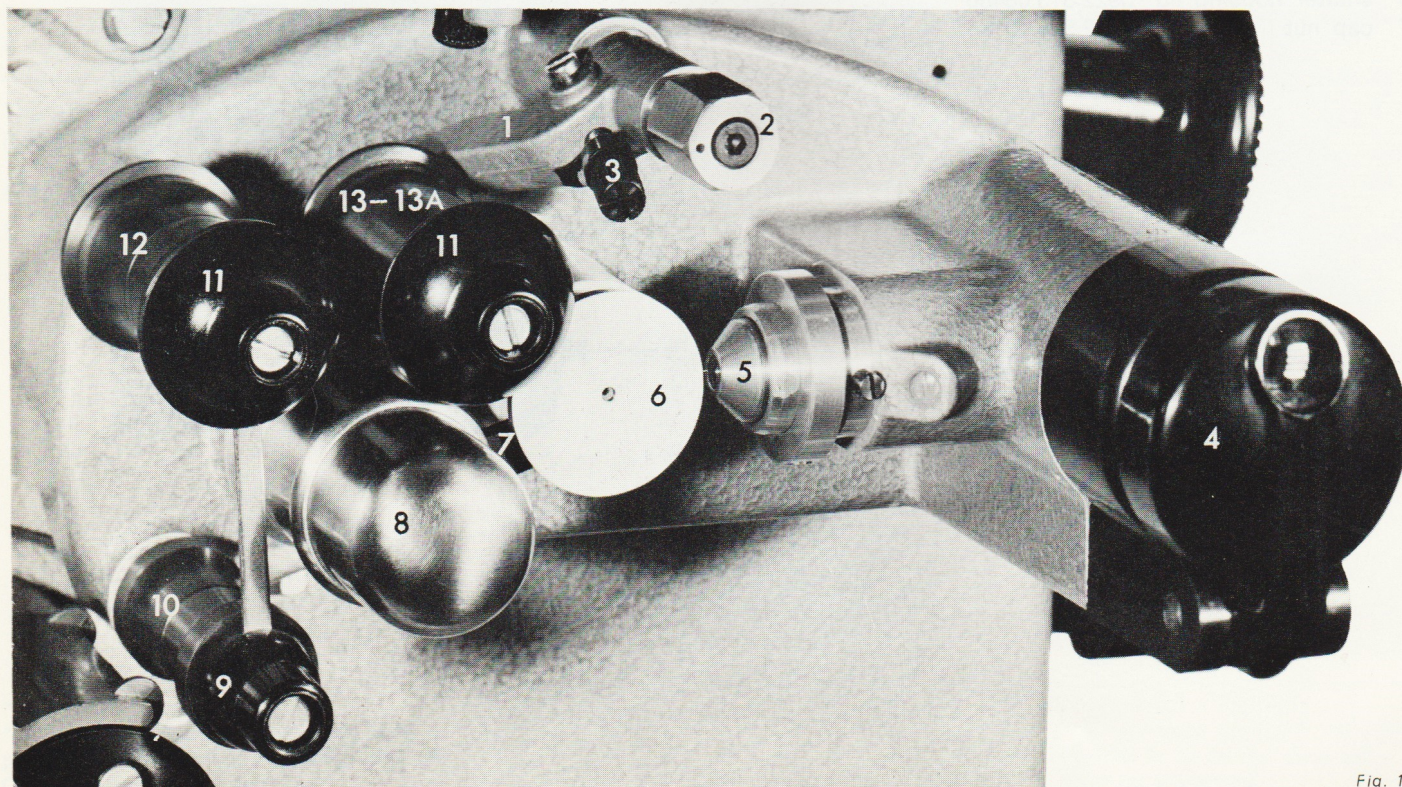


Fig. 10

1 sprocket, complete	4822 522 30104	10 } red push button switch	4822 276 10134
- set of toothed sprocket discs	4822 522 30466	10 } green push button switch	4822 276 10114
2 adjusting nut	4822 462 50027	11 half roller	4822 525 60095
- spring	4822 491 40001	12 inching knob	4822 413 60036
3 guide shoe	4822 525 30003	- lower spool shaft	4822 535 70027
4 cap-nut	4822 505 10188	13 { framing lamp	4822 134 40113
5 standard lens holder	8990 240 29009	13 { lampholder	4822 256 30098
- 4 inch lens holder	8990 240 29004	13 { relay	4822 280 60107
6 scale	4822 450 30018	13 { light shield	4822 463 50016
7 focusing knob	4822 413 40152	- upper spool shaft	4822 535 70024
8 framing shaft	4822 522 30824	- friction coupling	4822 528 20011
- extension rod with knob for 8	4822 413 10007	- pressure spring	4822 492 50064
9 knob for skate pressure	4822 413 40176	- felt disc	4822 532 50028
- shaft for 9	4822 535 80016	- knurled nut	4822 505 10049

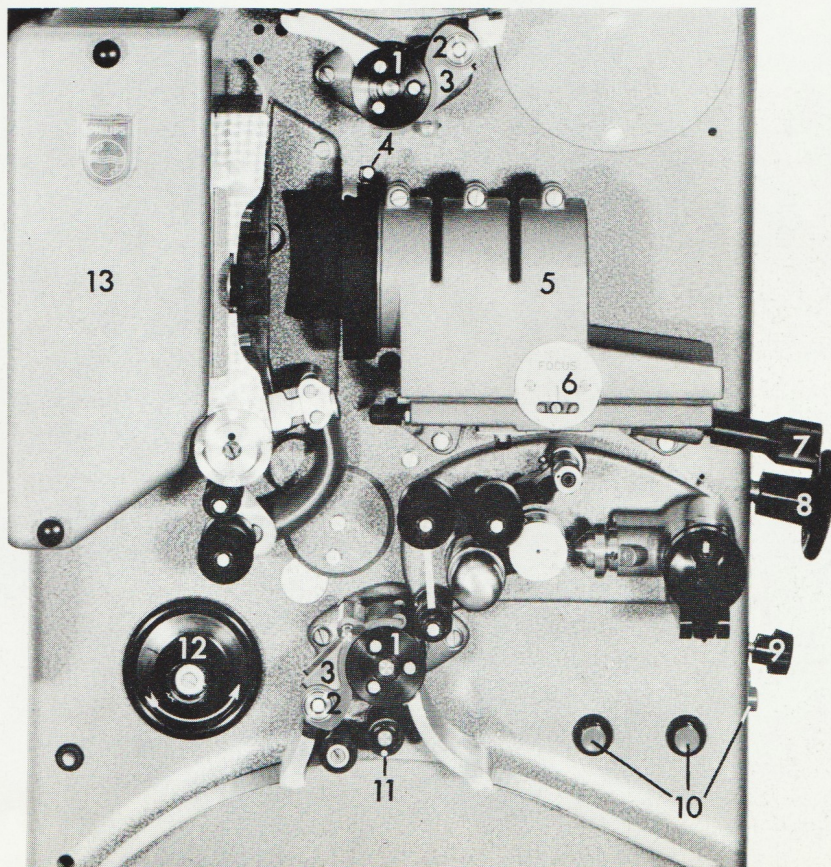


Fig. 11

1	cover plate	3922 313 00290	-	intermittent sprocket for	
2	pin	3922 837 07080	-	accelerated maltese cross	4822 522 30327
3	stop pin	4822 535 80089	-	shaft for 13	4822 522 30407
-	cap-nut	4822 505 10188	14	ceramic guide roller	4822 532 50362
4	lens holder support	3922 837 06050	15	screw	4822 502 10336
5	spring	4822 492 40036	16	aperture plate, normal 1 : 1.37	4822 451 10011
6	cover plate	3922 313 00300		C.S. 1 : 2.34	4822 451 10009
7	half guide roller (large)	4822 525 60096		W.S. 1 : 1.85	4822 451 10012
8	trim knob	4822 462 70374		blank	4822 451 10013
9	half guide roller (small)	4822 525 60095	17	Delrin running face	4822 463 10021
10	trim knob	4822 525 70373	18	pressure skate	4822 463 10019
11	bearing	4822 520 10025	19	pin	4822 535 80184
12	screw	4822 502 10304	20	spring	4822 492 60122
13	intermittent sprocket, normal	4822 522 30119	21	lever arm	4822 404 50048

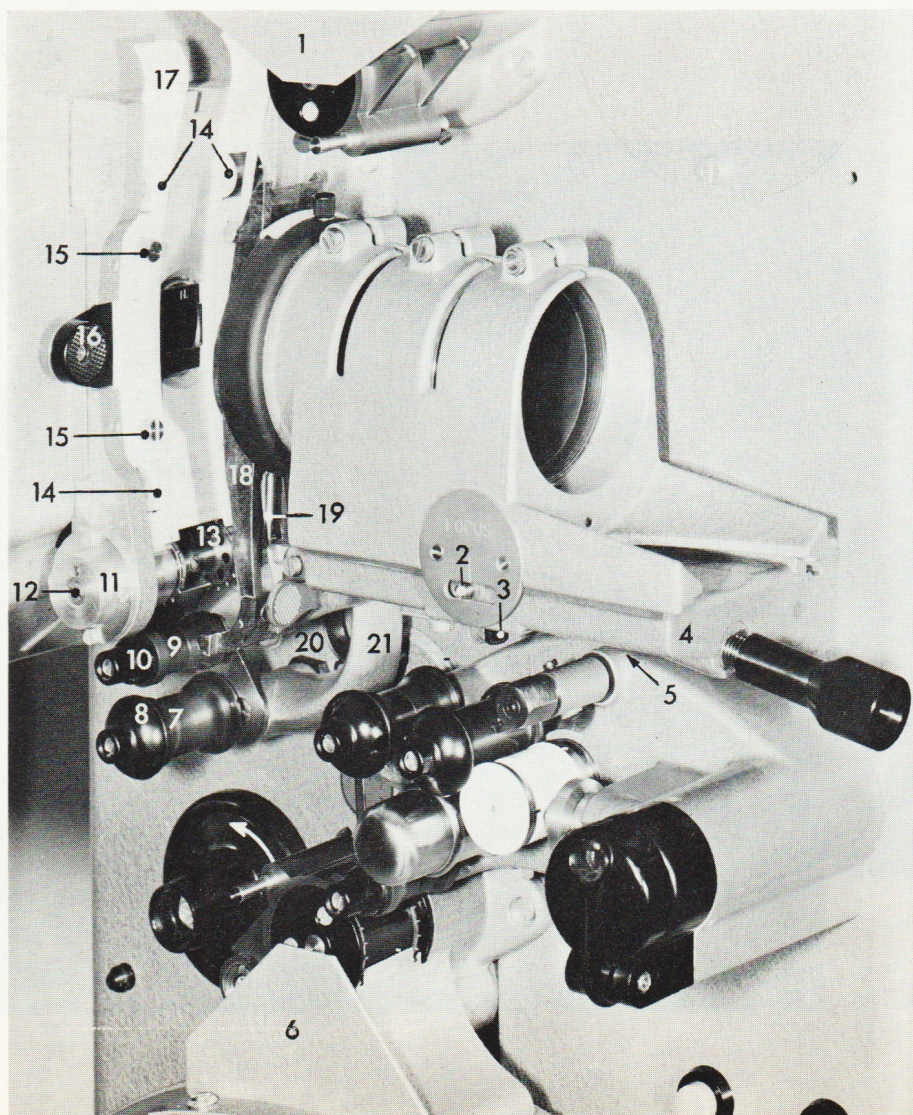


Fig. 12

1	sprocket shaft	4822 535 90485
2	chain wheel	4822 522 30088
-	ball-race	4822 520 20032
3	spring	4822 492 30016
4	terminal strip	4822 290 60044
5	drive chain for magnetic head	4822 358 50008
6	drive chain	4822 358 50007
-	link for 5 or 6	2622 855 21002
7	oil level gauge	4822 532 70114
-	lid for oil level gauge	4822 800 09342
8a	intermittent unit, normal	4822 525 20017
8b	intermittent unit, accelerated	4822 525 20002
-	coupling bush for 8a or 8b (between the maltese cross and sprocket shafts)	4822 525 60074
-	spring for coupling bush	4822 492 61368
-	shutter for 8a	4822 515 20015
-	shutter for 8b	4822 515 40057
-	shutter shaft for 8a or 8b	4822 535 50009
9	toothed belt	4822 358 20006
10	motor shaft pulley 10 tooth	4822 522 30739
	motor shaft pulley 12 tooth	4822 522 30741
11	synchronous motor	4822 361 60057
12	microswitch with wiring	3922 316 00580
-	plunger spring	4822 492 60789
-	nylon plunger	4822 532 60293
-	centrifugal weight	3922 313 00580
13a	chain for 2000 ft spool box	4822 358 50009
13b	chain for 6000 ft spool box	4822 358 50011
-	link for 13a or 13b	2622 855 21002
14	chain wheel	4822 522 30105
15	pressure spring	4822 492 50064
16	knurled nut	4822 505 10049
17	felt disc	4822 532 50028
18	flywheel disc	3922 833 17320
19	oil tube	4822 530 20236
20	intermittent mechanism pulley	
	24 tooth	4822 522 30743
	25 tooth	4822 522 30742
21	gear wheel	4822 522 30089
22	lampholder	4822 255 10061

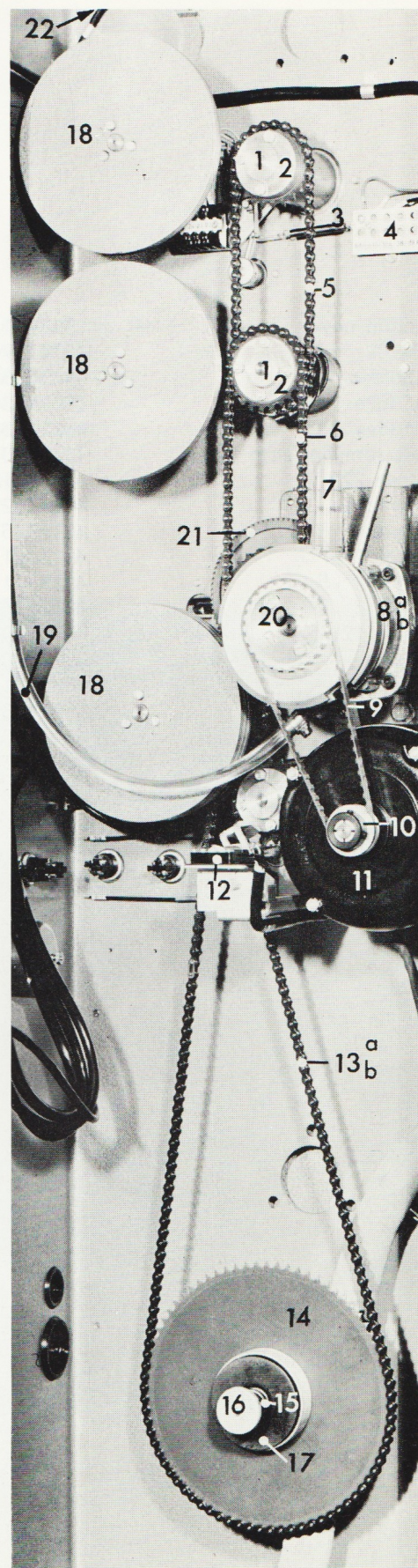


Fig. 13

- 1 protection cover
- 2 switch
- 3 fuse holder
- 220 V fuse
- 110 V fuse
- 4 12 pole terminal strip
- 5 relay coil 220 V
- 6 thermal fuse
- 7 transformer
- 8 capacitor 1 μF
- 9 capacitor 4 μF
- 10 capacitor 8 μF
- 11 capacitor 12 μF
- 12 6 V relay
- relay coil
- lower contacts
- 13 capacitor 700 V, 0.47 μF
- 14 capacitor 1300 V, 4700 pF

3922 311 00220
4822 277 10014
4822 256 30098
4822 253 30025
4822 253 30028
4822 290 60044
4822 281 60089
4822 252 20004
4822 146 20239
4822 121 10268
4822 121 10261
4822 124 50012
4822 069 01115
4822 280 40106
4822 281 60081
4822 278 90214
4822 120 50178
4822 121 20028

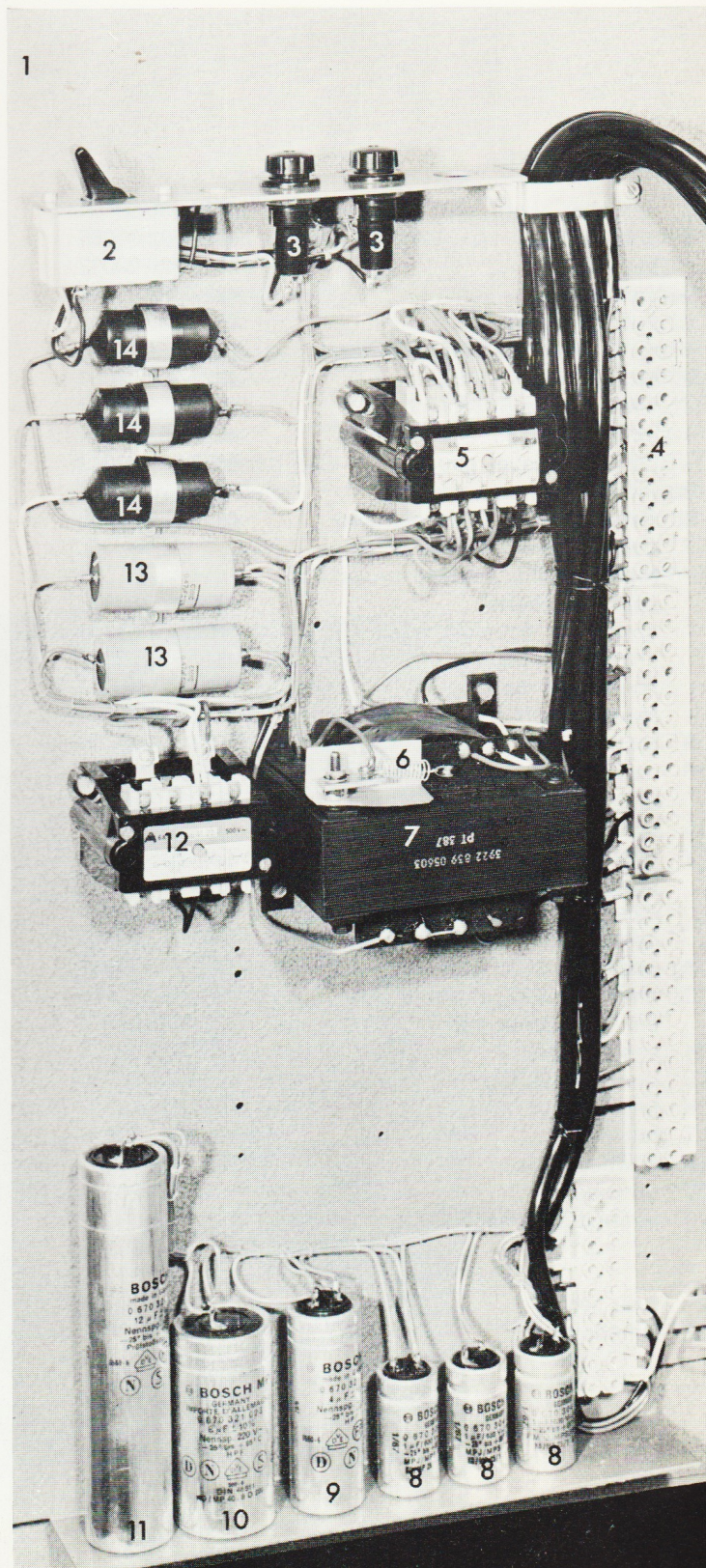


Fig. 14

1	capstan	4822 535 50033	-	Mu metal cap for 4	3922 833 18000
-	capstan ball-race	4822 520 20003	5	lever arm	3922 833 17920
-	retaining ring	4822 530 70022	6	half guide roller	4822 525 60096
2	guide roller	4822 525 60082	7	leaf spring	4822 492 60114
3	trim knob	4822 310 20019	8	film stripper	4822 404 50084
4	magnetic cluster (four channels)	4822 249 30016			

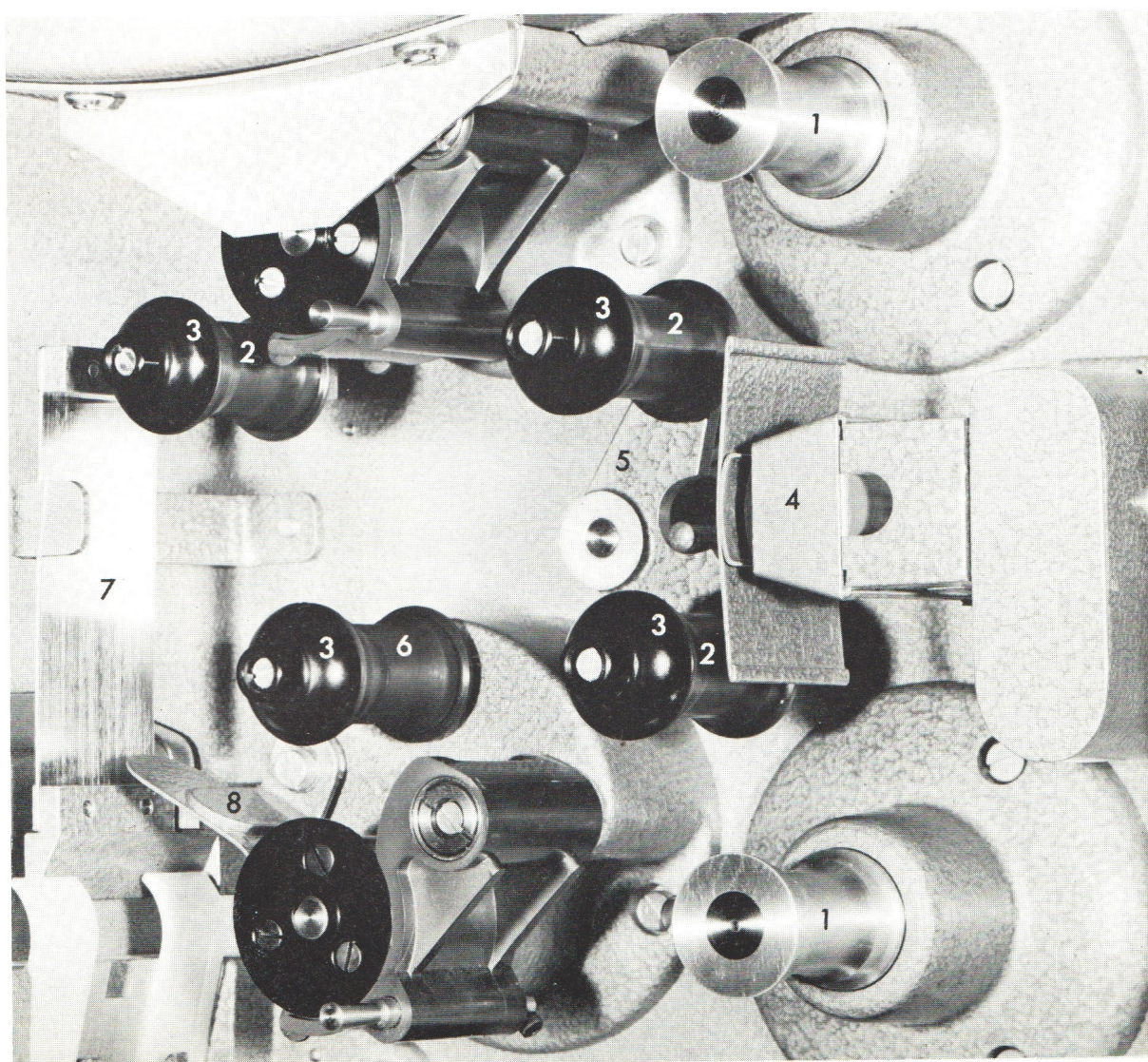
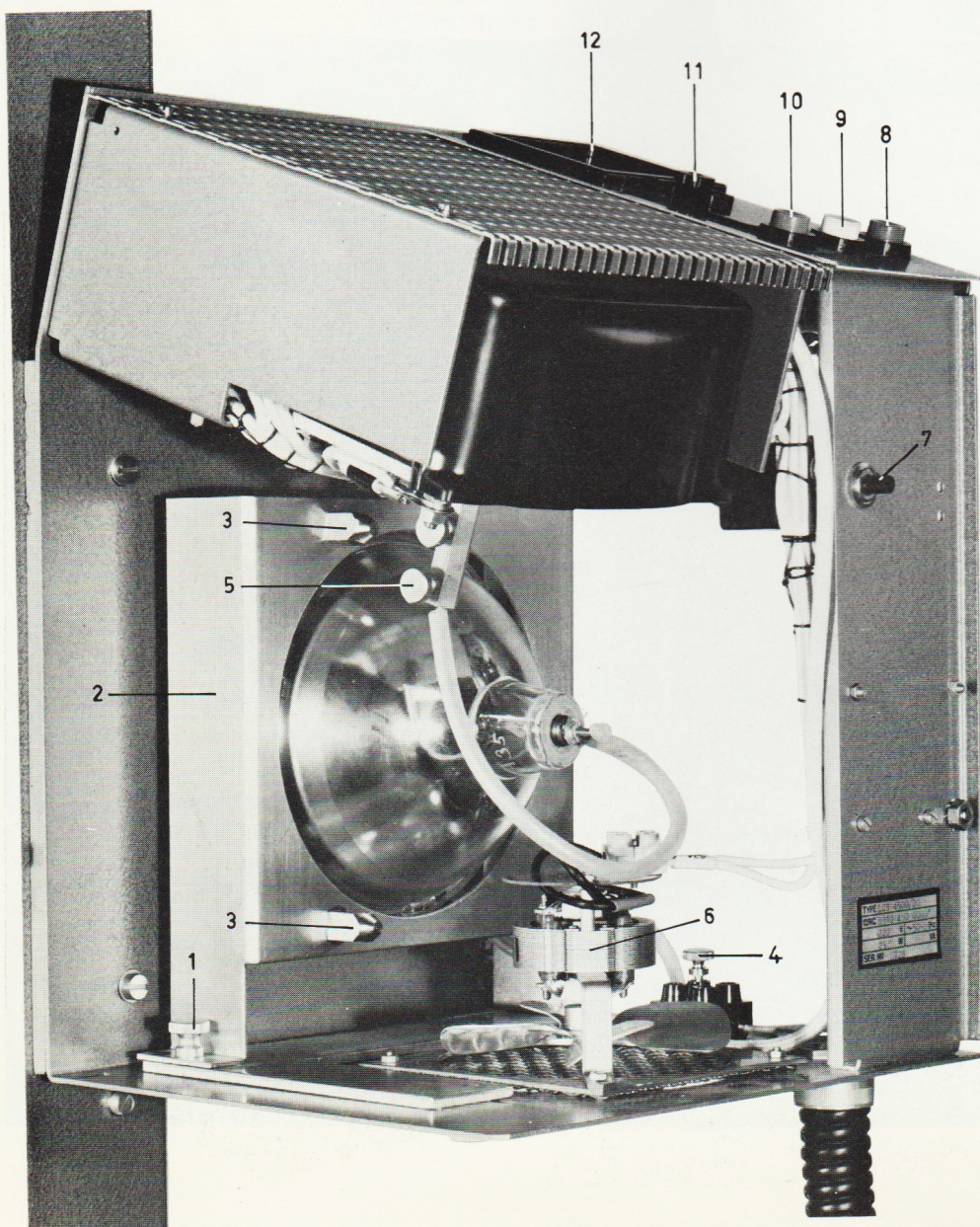


Fig. 15

- | | | | |
|-------------------------------|----------------|-------------------------------------|----------------|
| 1 thumbscrew, lamp frame | 4822 502 10994 | 9 push button switch, white | 4822 276 10114 |
| 2 lamp holding frame complete | 3922 393 01420 | 10 push button switch, green | 4822 276 10114 |
| - lamp retaining spring | 4822 492 61519 | 11 fuse holder | 4822 256 40012 |
| 4 front lead terminal screw | 4822 502 11005 | - fuse 2A delayed | 4822 253 30025 |
| 5 rear lead terminal screw | 4822 502 10993 | 12 ammeter | 4822 346 20078 |
| 6 fan motor | 4822 361 70212 | thumbscrew (Fig. 7, 1) | 4822 502 10994 |
| - fan blade | 4822 515 40075 | cover plug (Fig. 7, 1) | 4822 462 70624 |
| 7 safety switch | 4822 276 10064 | - adjusting tool for lamp alignment | 4822 532 80214 |
| 8 push button switch, red | 4822 276 10134 | | |

Fig. 16



- | | | |
|---|---|----------------|
| 1 | ignition unit complete,
for 500 W Xenon lamp | 3922 074 00760 |
| 2 | spark gap unit | 4822 252 60013 |
| 3 | autotransformer | 4822 142 60118 |
| - | relay | 4822 280 80341 |
| 4 | circular protection glass | 3922 391 00390 |
| 5 | retaining spring | 4822 492 61518 |

Fig. 17

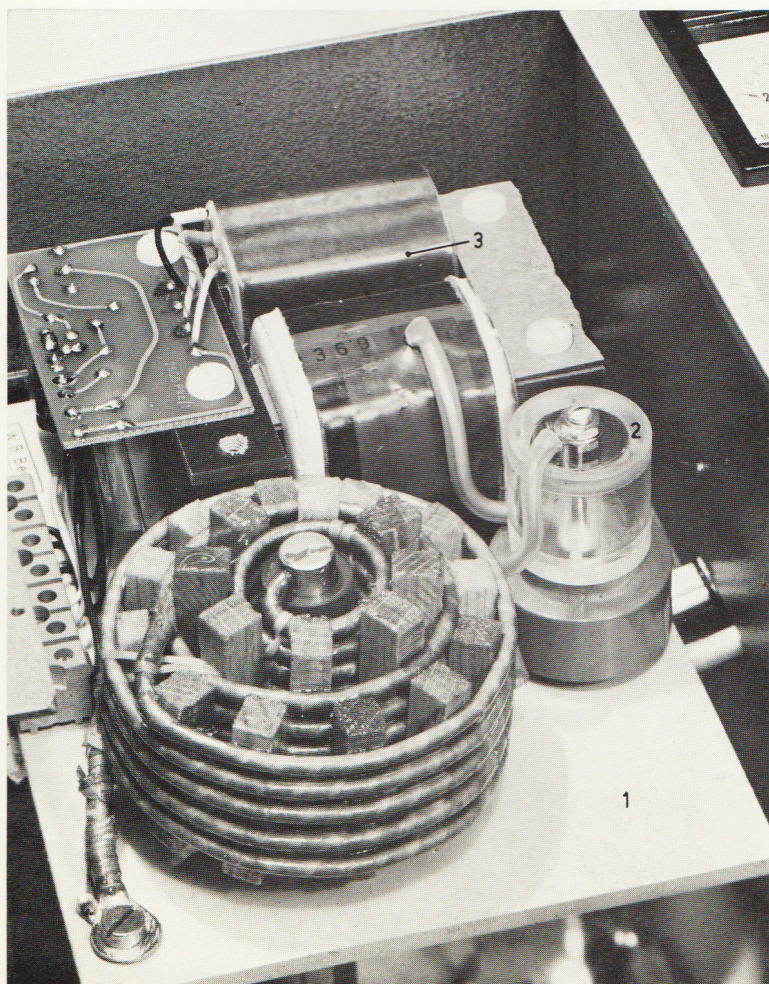
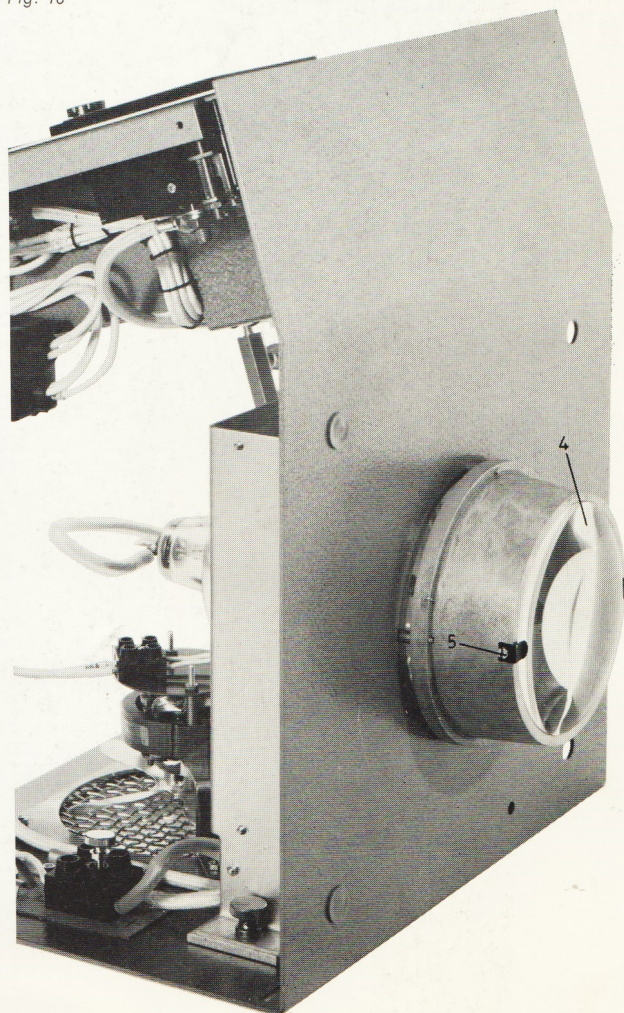


Fig. 18





FILM PROJECTION EQUIPMENT