INSTRUCTION MANUAL

FOR

KALEE PROJECTORS

Models SP and ST

Manufactured by
A. KERSHAW & SONS LTD
LEEDS

Distributed by
KALEE LIMITED
60-66 Wardour Street
LONDON W.I

KALEE PROJECTORS

MODELS SP & ST

(Figs. 1—5.)

INTRODUCTION

The basis of these projectors is a substantially constructed mechanism designed in accordance with regular theatre practice and provided with a 1,000 watt, 100 volt incandescent lamp as illuminant.

Auxiliary equipment includes a Pyrene automatic fire extinguisher installation and a $1\frac{1}{4}$ K.V.A. Transformer tapped to suit 200/250 v. 50 cycle A.C. input and to provide 110 v. output for the projection lamp and 230 v. for a 1/6 H.P. 230 v. A.C. single phase driving motor.

The controls other than the lamp switch and a "master" switch associated with the Pyrene equipment (which operates to cut off all power in event of fire) are grouped on an independent control panel. They comprise two sets of double pole fuses (15 amp and 10 amp) in lamp and motor circuit respectively, motor switch and a rheostat with voltmeter and push button voltmeter switch for control of lamp voltage.

THE AMPLIFIER

(Portobel Projectors only)

The amplifier is an independent, self-contained "A.C. Mains" unit with its own built in transformer, tapped for 200-260 volts, 50 cycles supply, mains switch and fuses. It provides exciter lamp current and P.E. cell voltage and is arranged for plug and socket connection to the exciter lamp and P.E. cell leads which are brought out from the back of the sound head, and also for connection to the A.C. mains and the loud speaker. The latter is a further independent unit. The plug connections are non-interchangeable and cannot be wrongly inserted. It is important to see that they are firmly connected before the Amplifier is switched on.

THREADING

Threading the Projector is done in the conventional manner in accordance with the chart displayed on the machine. (See also Fig. 6). Swing the lens up out of the way and open the gate. Set the masking knob central. Avoid excessive upper and lower loops since these result in flutter and film noise.

Before starting the motor, check that all sprocket teeth are correctly engaged and turn the machine over by hand (using the knob at the rear end of the shutter shaft or the main drive pulley) to see that everything is working correctly.

RACKING AND INTERMITTENT MOVEMENT

Threading of the film "in frame" is facilitated by a framing aperture in the gate above the projection aperture. This is illuminated by a 110 volt 10 watt lamp A.P. 16116 (shown withdrawn in Fig. 2). This is electrically interlocked with the projection lamp and controlled by the same switch so that it automatically switches "on" when the projection lamp is "off," and vice-versa.

The intermittent mechanism comprises a full size standard theatre type cam and cross motion and is built as a complete detachable unit. The working parts run in an enclosed oil bath.

Framing of the picture during projection is accomplished by rotation of this unit as a whole around the axis of the intermittent sprocket. This advances or retards the picture relative to the gate aperture, correct synchronisation with the shutter being maintained by automatic simultaneous sliding of a spiral gear on the shutter shaft.

This adjustment is made by turning the Masking Knob.

LAMP

The mechanism is fitted with a standard 100 volt 1,000 watt Monoplane Projector Lamp Pattern No. 7529.

The lamp house is fitted with an independent motor driven blower. The lamp holder is provided with universal adjustments for accurate focussing, so arranged that it can be unclamped and swung out to facilitate changing the lamp, without disturbing the adjustments. The lamp house door opens in two sections, enabling focussing adjustments to be made while shielding the operator from the dazzle of the lamp.

The projection lamp is controlled by a switch behind the lamp house and is electrically interlocked with the blower so that this is automatically switched on with the lamp. An adjacent smaller switch enables the blower to run or stop as desired when the lamp is switched off.

The voltage applied to the lamp should be checked by the voltmeter and adjusted by the rheostat provided on the control panel. The lamp is rated at 100 volts and to secure the maximum life should be run always at this voltage. The voltmeter reading should be taken with the lamp switch on.

Focussing the Projection Lamp. The lampholder proper is carried in a cup adjustable for height and rotation in a saddle which can slide and turn about a horizontal circular post. The saddle is located endwise against an adjustment screw through the front of the lamphouse, and rotationally by an adjustment screw in the back of the saddle which rests on a second shorter post. The saddle is normally clamped to its supporting post with these two adjustments in contact, but can be released and swung out to facilitate insertion and removal of the lamp.

Before inserting the lamp, check that it is of correct voltage (i.e., 100 volts). Screw it down firmly into its holder. Do not force it, but make sure that it is fully engaged. A spring wire in the side of the threaded holder engages with the lamp cap to hold it firmly and prevent it shaking loose. Occasionally, difficulty may be found in screwing the lamp past this. If necessary, first ease the spring by pressing it back with the blade of a screwdriver.

Adjust the lamp holder as necessary to bring the lamp filament square to and approximately central with the optical axis and set the saddle so that the lamp is as close as possible to the fire shutter consistent with a fair working clearance. Check that this shutter rises and falls quite freely without fouling the lamp, a minimum clearance of $\frac{1}{8}$" is essential.

Run the projector with the lamp switched on but without film or projection lens, a well defined image of the lamp filament should then be thrown on the screen by the condenser. Adjust the lamp as necessary, vertically and laterally until the filament image is seen to cover the whole illuminated area of the screen.

Next run the machine with projection lens but still without film. Focus the lens to give a sharp image of the gate aperture. Probably the screen will be seen unevenly illuminated with dull patches and coloured bands. Adjust the lamp backwards or forwards as necessary to obtain an even white illumination, but take care not to bring the lamp so far forward that it fouls the fire shutter. For the best result, it may be necessary slightly to readjust the centring of the lamp or to twist the lamp so that its filament is not more than 10° out of square with the optical axis.

When making these adjustments keep the upper half of the lamphouse door closed, thus avoiding dazzle from the lamp.

Set and lock the adjusting screws to locate the lamp in the best position and clamp it there, taking care that it is, in fact, supported by the adjusting screws and not merely retained in position by the clamping screw alone.

SHUTTER AND LENS

The projector is fitted with an unequal bi-convex lens, the slighter curvature of which faces the light source, and a two-bladed "front" shutter running in a fixed guard in front of a 2" focus projection lens.

A governor operated gravity controlled safety shutter (Fig. 4) working between the lamp and the condenser cuts off light and heat from the gate when the mechanism is stationary, opening automatically when the machine is running at speed.

FOCUSSING

The projector lens is carried on an arm with an independent focussing adjustment. This arm with the lens can be swung up without disturbing focus, giving access to the gate when threading.

PICTURE GATE

Control of the film in the gate is maintained by a split spring-loaded guide roller and by two sets of independently sprung light steel skates. The mask plate withdraws for examination and cleaning.

To remove the gate for cleaning, swing the lens up out of the way, open the gate, and then release and detach it by turning the release lever into a horizontal position. To remove the masking plate, simply slide it upwards. When replacing the gate, check that the number engraved on it is the same as the Serial Number engraved on the projector.

SOUND GATE AND OPTICAL SYSTEM

(Not fitted to Projector incorporated in cinema laying and training teacher).

The sound drum round which the film passes, forms a housing for the P.E. Cell and at the same time maintains the film in accurate relationship to the Optical system.

The shape of the Sound Aperture prevents the collection of emulsion or dust at this point which would otherwise impair sound reproduction.

The Optical System is pre-set and locked so that apart from general cleaning to remove dust from the outside lenses it will not need adjustment. When it is necessary to clean the lenses the whole unit may be removed by withdrawing the two screws shown at A in Fig 7. A saddle device ensures correct replacement of the Optical System without alteration to the critical focussing of the whole assembly.

A standard 8 volt 32 watt Exciter Lamp A.P.7637 is used, carried in a pre-set holder (Fig. 8), designed to facilitate quick replacement and correct setting. The Photo-Electric Cell adopted is type CMG.25 Pattern No. 7508. Both exciter lamp current and P.E. cell voltage are supplied from the amplifier.

Setting the Exciter Lamp.

With the Exciter Lamp burning, make sure that the sound aperture shown at C in Fig 7 is perfectly clean and free from dust. Remove the cell cover from the enclosing cylinder when it will be seen that a circular disc of light is formed on the back wall inside the Photo-Electric Cell (B Fig 7). The formation of this image is controlled by three adjustments provided on the Exciter Lamp Carrier and the correct setting is obtained when the brightest circular image is formed on the wall of the cell. On referring to Fig. 8, it will be seen that the screw D, which is provided with a locking nut, controls the lateral adjustment of the lamp, while the knurled nut E is used for vertical movement. The clamping screw F must be slackened when it is necessary to slide the lampholder on the guide rails to alter the horizontal position. Care must be taken to see that the whole width of the sound track is uniformly illuminated and that the image brightness does not vary from the centre to the edges.

AMPLIFIER

(Portobel Projection only).

Fig. 9 is a schematic wiring diagram of the Amplifier and shows the layout of the controls and valve positions.

The operating controls comprise a double-pole main switch at the lower right hand corner of the front panel, and a centre Zero type fader mounted on the right hand end of the top of the amplifier and controlling the sound volume. This is operative clockwise from the centre zero.

The amplifier is protected by a pair of 3 ampere fuses carried in a box at the right hand end of the connecting strip with a high tension fuse of 500 MA capacity in a single open type fuseholder to the left of the main fuses. All these parts are accessible when the cover is removed from the amplifier, after having unscrewed the four chromium plated milled head fixing screws.

Tone correction is obtained by adjusting set screws on either side of the milliammeter.

FIRE EXTINGUISHER

Pyrene Automatic Fire Extinguisher Equipment (Fig. 6).

A trigger device situated above the film gate controls a spring loaded piercing mechanism to which it is coupled by a flexible shaft. This piercing mechanism is mounted behind the machine and carries a cylinder of compressed CO_2 (Cylinder, CO_2, 8 oz. for fire extinguisher, Pattern No. 7535).

The trigger is held against the pull of a spring by a celluloid link (Cine, auto celluloid bands, for fire extinguisher, Pattern No. 7536) which burns through in event of a film fire releasing the trigger and tripping the piercing mechanism thus perforating the seal of the gas cylinder.

The released gas discharges via a pipe line through a series of nozzles along the film path, part being piped into the spool boxes and to a plunger operated master switch which cuts off the motor and the projection lamp.

To ensure immediate operation in event of a fire in the gate a quick burning "secondary fuse" (Cine., Auto fuse for fire extinguisher (in bottle) Pattern No. 7537) is arranged to convey the fire to the celluloid link. This is carried in a detachable fuse-holder comprising a length of wire coiled to enclose the cotton fuse string; bent to suit the machine and held in spring clips. Since fire tends to burn upwards the horizontal section of the holder across the top of the gate is armoured to ensure transmission of the fire along it.

A spare secondary fuse-holder is supplied with the equipment and should always be kept ready threaded so as to avoid loss of time in resuming operation after a fire.

To thread Fuse Holder. Remove existing wire clip from fuse. Threaded through the holder is an inner wire; withdraw this and tie a length of fuse string to its looped end. Do not pull the knot tight or the string will break; leave about 1" of string as a short end beyond the knot. Push the wire and string through the holder, knotted end first. Cut off the string that extends at the free end leaving sufficient to reach into the slotted guard enclosing the trigger mechanism.

Setting up the Extinguisher Equipment.

WARNING. Never insert the gas cylinder until the rest of the equipment is set or it will be prematurely pierced during the setting. When resetting always remove the spent cylinder *first* thing, reset and finally replace with the new cylinder. Keep the fuse string away from heat and naked light.

1. Remove slotted guard from trigger mechanism. Press back the trigger plunger and give it one quarter turn to the left. Slip celluloid link over the trigger pins so that plunger cannot spring back. Loosely pack the slotted guard with fuse string and replace over trigger mechanism.

2. Fit secondary fuse holder threaded with fuse string into place in its retaining clips, with free length of fuse string leading into trigger guard.

3. Pull down handle of piercing mechanism to full extent thus setting piercer. Check that indicator remains at "set."

4. Check that the sealing disc of the gas cartridge is intact and screw it into the fitting provided in the piercing mechanism. It is not necessary to use force—screw in by hand but be sure that it is screwed fully home.

5. Check that the plunger of gas switch is in the "up" position; if not, push up.

Maintenance Instructions.

Always keep available a spare gas cylinder, celluloid link and secondary fuse carrier, ready threaded as described above.

Replace fuses at once, should cotton be oily or discoloured.

Supplies and replacements should be ordered through normal Naval Stores channels.

Monthly.

1. Check weight of gas cartridges. These are stamped with their "gross" and "tare" weights. Full cylinder should always weigh at least 8 ozs. more than its tare or empty weight. An under-weight cylinder should be immediately returned for replacement.

2. Test piercing mechanism by unscrewing gas cartridge, removing trigger guard and cutting the celluloid band. The indicator of the piercing mechanism should return from "set" to "off." Reset with new celluloid band, finally replacing cylinder as described above.

3. Check that the plunger of the master switch works freely. After testing leave in the up position.

After operation of Extinguisher.

1. Wipe off moisture condensed on the machine due to the low temperature resulting from the discharge of the high pressure gas; also any deposit resulting from the fire.

2. Remove the discharged gas cylinder before re-setting equipment. Apply two or three drops of oil to the piercer through the screw top of the mechanism and work setting handle up and down a few times, then reset, inserting new cartridge last thing.

3. Return pierced cylinder at once for replacement.

ROUTINE MAINTENANCE I.

(LUBRICATION AND CLEANING).

Regular lubrication and cleaning are important but do not over oil. Always wipe off any excess and NEVER clean the projector while it is running—a rag caught in the shutter or other moving part may result in serious damage to the projector and injury to the operator.

DAILY:

(A) *One* drop of oil to the following oiling points:—

(i) Nine points grouped in a block at the top of the machine frame behind the top spool arm.

(ii) Idle and guide rollers as necessary to keep them running freely.

(iii) Spool box spindles.

(iv) Sound Head. 4 points on top of sound head, behind projector.

(B) Thinly smear with oil all bright metal parts to prevent rust.

(C) Check the level in the oil bath of the intermittent unit. This has a sight glass visible through the large window in the rear cover of the machine. Turn the masking knob to bring the cross box of the intermittent unit vertical, when the oil level should be visible in the lower half of the sight glass. Check with the mechanism stationary. If low remove the rear cover of the machine and add oil through the oil plug in the top of the cross box. Do not fill above the centre of the sight glass or the excess oil may find its way along the intermittent spindle on to the film.

When replenishing, take the opportunity of the mechanism rear cover being off to give a few drops of oil to the teeth of the gear train and to the shuttle which carries the sliding spiral gear on the shutter shaft. Note two oil holes provided.

(D) i. Clean the gate and masking plate, removing any film emulsion or dirt. An old toothbrush is a convenient tool, the end of the handle filed up square serving as a scraper to remove any hard deposit. Never use a hard metal scraper since scratches are an immediate cause of emulsion build-up and film wear.

ii. Clean the sprockets, especially their teeth, also the pad rollers and fire traps, using a toothbrush as brush and scraper, as described above, to remove any accumulated deposit, taking great care not to damage the sprocket teeth. If necessary, a little carbon tetrachloride can be used to remove dirt, but this should be used with caution, carefully wiped off, and the pad roller spindles relubricated.

iii. Clean the projection lens, taking care not to scratch or fingermark the glass surfaces.

Do not take the lens out of its support (since this would necessitate refocussing) nor attempt to dismantle it. Carefully remove any dust with a clean camel hair brush, following which the glass can be wiped with a damp chamois leather, finishing with a piece of well washed cambric.

Any grease can be removed with a cotton wool pad moistened with alcohol—use a minimum of solvent lest this get inside the lens.

iv. Thoroughly clean down the whole machine. Use a rag moistened with carbon tetrachloride and polish bright metal parts with an oily rag.

MONTHLY:

Remove the rear cover. Check the oil level in the intermittent unit and lubricate the gear teeth and shuttle on shutter shaft as described above.

EVERY THREE MONTHS:

Remove the intermittent unit, following the instructions below. Drain the old oil out of this and flush with clean paraffin. Do not allow the unit to soak in paraffin, but flush round quickly, drain it out thoroughly, and leave for half an hour before refilling. Replenish with clean oil and replace, following the instructions carefully to ensure correct timing.

DO NOT USE OR STORE PARAFFIN IN ANY COMPARTMENT WHERE CINEMATOGRAPH FILMS ARE PROJECTED, REWOUND, OR STOWED, OR IN WHICH THERE IS ANY ELECTRICAL EQUIPMENT.

ROUTINE MAINTENANCE II.
(ADJUSTMENTS).

To remove the intermittent sprocket.

1. Open and detach the gate and take out the mask plate. Remove the stripper around the intermittent sprocket (this is secured to the bottom of the gate bracket by a 2 B.A. countersunk screw).

2. Remove the screw in the end of the intermittent spindle securing the intermittent sprocket. Note there are two washers interposed between the screw-head and the sprocket—(1) a key washer having a projecting square gib engaging a slot in the end of the sprocket with a corresponding slot in the end of the spindle, and (2) a floating washer with a spherical seat in which the screw head fits. Take care not to lose these. The sprocket is a light push fit on the spindle and should be withdrawable by hand. Should it be necessary to prise it off take great care not to bend or damage the spindle.

To remove the intermittent unit.

1. First remove the sprocket as above.

2. Remove the rear cover of the machine, thus exposing the gear train and the intermittent unit as shown in Fig. 3. The intermittent unit is secured by a single $\frac{3}{8}$" nut threaded on a post passing through a lug in the side of the cross box, and when this and the sprocket have been removed the unit can be withdrawn backwards out of the machine.

WARNING. Under no circumstances should the intermittent unit itself be dismantled. If any adjustments or replacements are required the complete unit should be returned to the nearest Maintenance Depot.

Replacing and Re-Timing the Intermittent Unit.

It is important to ensure that this is correctly "timed" in relation to the shutter. Faulty timing results in appearance of travel "ghost" on the screen.

To enable correct timing to be maintained a line is marked on the fly-wheel of the intermittent unit. A similar line is marked on the flange clamping the shutter blade and the shutter blade itself marked with a white dot which should be in alignment with this line.

The following procedure must be followed:—

1. Set the masking knob central.
2. Turn the mechanism by hand to bring the line marked on the shutter flange vertical.
3. Engage the intermittent unit in its mounting, but do not yet mesh its gears with those of the projector.
4. Turn the fly-wheel so that the line engraved on it is to the top and parallel with the rear edge of the projector frame. Maintaining this position, push the unit home, engaging the gears and secure it with the clamping nut.
5. Replace the intermittent sprocket.

It will probably be necessary to turn the fly-wheel slightly to permit the teeth of the gears to engage. Further, since spiral gearing is employed, the fly-wheel will turn slightly as the unit is finally pushed clear, thus slightly disturbing the setting. Correct timing is obtained only when the unit is so engaged that when the masking knob is in the central position and line marked on the fly-wheel in alignment with the rear edge of the machine as described, the line on the shutter clamping flange is simultaneously vertical the dot marked on the shutter being aligned with this; and a few trials may be necessary to secure this condition.

Check by running the machine and examining the picture on the screen, paying special attention to the top and bottom of lettering in titles.

If necessary, final adjustment can be made by loosening the shutter flange and adjusting the shutter as required.

To adjust motor belt tension. Watch the tension of the driving belts from the motor. This is adjustable by tilting the motor about the shaft on which it is mounted. Tension should be just sufficient to drive without slip, in which condition the belts feel appreciably slack. Excessive tension not only increases wear, but may result in uneven running and vibration and in failure of the motor to pick up speed.

To adjust take up and take off tension. See directions under "Possible Faults (Projector)", (5), below.

POSSIBLE FAULTS (PROJECTOR)

Possible operating difficulties.

1. *Equipment "dead."* Main switch "off" or main fuses (15 amp) "blown." Pyrene master switch "off." If motor alone or lamp circuit alone are "dead" check corresponding fuses (10 amp and 15 amp respectively).

2. *Projector runs slow or stops.* Turn the mechanism over by hand. If "free" and motor O.K., belt tension at fault—too slack or too tight.

3. *Fireshutter does not rise or sluggish.* Shutter fouling projection lamp. Machine running slow (belts too tight?) Governor mechanism sticking due to oil/dirt.

4. *Gate does not open freely.* Pad roller adjustment wrongly set allowing roller to bear on intermittent sprocket. Should be set to clear by twice the thickness of film.

5. *Slack take-up to bottom spool or excess film from top spool.* To increase tension, release knurled thimble on spool spindle, turn clockwise and relock. Tension should be increased only as much as will ensure smooth winding of the film on to the take-up spool to prevent over-running from the top spool. Excess tension will damage film.

6. *Noisy running.* Too large film loops. Faulty adjustment of pad rollers—these should be set to clear sprocket diameters by twice thickness of film. "Hard running" suggests lack of oil which should be checked immediately. Do not over-oil; little but often is preferable. A pronounced high speed clicking may be due to faulty adjustment or wear in the intermittent unit. Do not attempt to adjust this but refer to nearest Maintenance Depot.

7. *Unsatisfactory picture.*

a. *Pronounced flicker.* Machine running slow (belts too tight?)

b. *"Ghost"* i.e., shadow effect especially noticeable at either top or bottom of lettering and titles. Faulty timing of intermittent unit with respect to shutter—to correct see instructions above.

c. *"Jump."* Poor or worn film. Faulty adjustment of intermittent sprocket pad roller (should be set to clear sprocket by twice thickness of film). Gate skate tension incorrect—too much or too little. Should be the minimum consistent with satisfactory projection, since excessive tension leads to rapid wear of both machine and film. Is determined by light spring fingers in the gate. These are set to give suitable tension for ordinary operating conditions and are not adjustable. Each is secured by two screws. Reset or replace. Teeth of intermittent sprocket worn. To remove see instructions above. Examine and reverse on spindle or replace. Bent intermittent spindle. Do not attempt to straighten, but refer to nearest Maintenance Depot.

d. *"Weave."* i.e., sideways motion of picture. Poor or worn film. Film guide roller at top of gate misplaced or sticking due to oil/dirt. Guide roller or mask plate worn. Note the guide roller is split and one flange spring loaded. Alignment of the "fixed" or guiding flange with the gate is very important; if disturbed re-align to a steel rule inserted in the gate.

8. *Film damage.* Damaged spools (bent flanges). Machine carelessly threaded. Excessive lower loop, so that the film rubs underside of light box. Build up of emulsion on mask plate or guide rollers, which must be kept clean—see maintenance instructions above. Pad rollers sticking due to dirt or lack of oil.

9. *"Creep" of Masking Adjustment.* This results from wear of the locking rollers in the clutch built into the masking knob. The cure is to replace the rollers, which should be done by a Service Engineer. The operator is warned against dismantling this himself on account of the probability of losing one of the small rollers or springs and the difficulty of reassembling correctly.

POSSIBLE FAULTS (SOUND)

Checks on Sound System.

The meter in the centre of the amplifier panel should read 120/165 MA. when the amplifier is in operation.

A quick check of the sound system can be made by inserting the edge of a knife blade or card in the beam of light between the exciter lamp and the optical unit. When the light is interrupted sharply by moving the obstruction up and down, corresponding "plops" will be heard in the loudspeaker.

1. *Exciter lamp does not light.* Amplifier not connected, not switched on or amplifier main supply fuses blown. Exciter lamp burned out.

2. *Exciter lamp lights but no sound, or souna very weak.* Fader knob at zero or turned too low. Speaker not connected. Exciter lamp displaced from focus—see focussing instructions above. Amplifier H.T. fuse blown.

RUNNING SPARES—PATTERN NUMBERS

Projector Lamp, 100 volts, 1,000 watts	A.P. 7529
Pilot Lamp, 6 volt, 3 watt, S.B.C.	A.P.16024
Masking Lamp, 110 volts, 10 watt, B.C.	A.P.16116
Exciter Lamp, 8 volt, 32 watt, S.C.C.	A.P. 7637
Photo-Electric Cell, Type C.M.G. 25	A.P. 7508
Valve, Rectifier Full Wave Type 5U4G or U.52	C.V.1071
Valve Output Type K.T. 66	C.V.1075
Valve Type D.H. 63	C.V. 587
Valve, Double Diode Type E.C.C. 31	C.V.1285

Fuses for Main Amplifier:—

3 amp.	A.P.5342
500 Milli-amp	A.P.7148

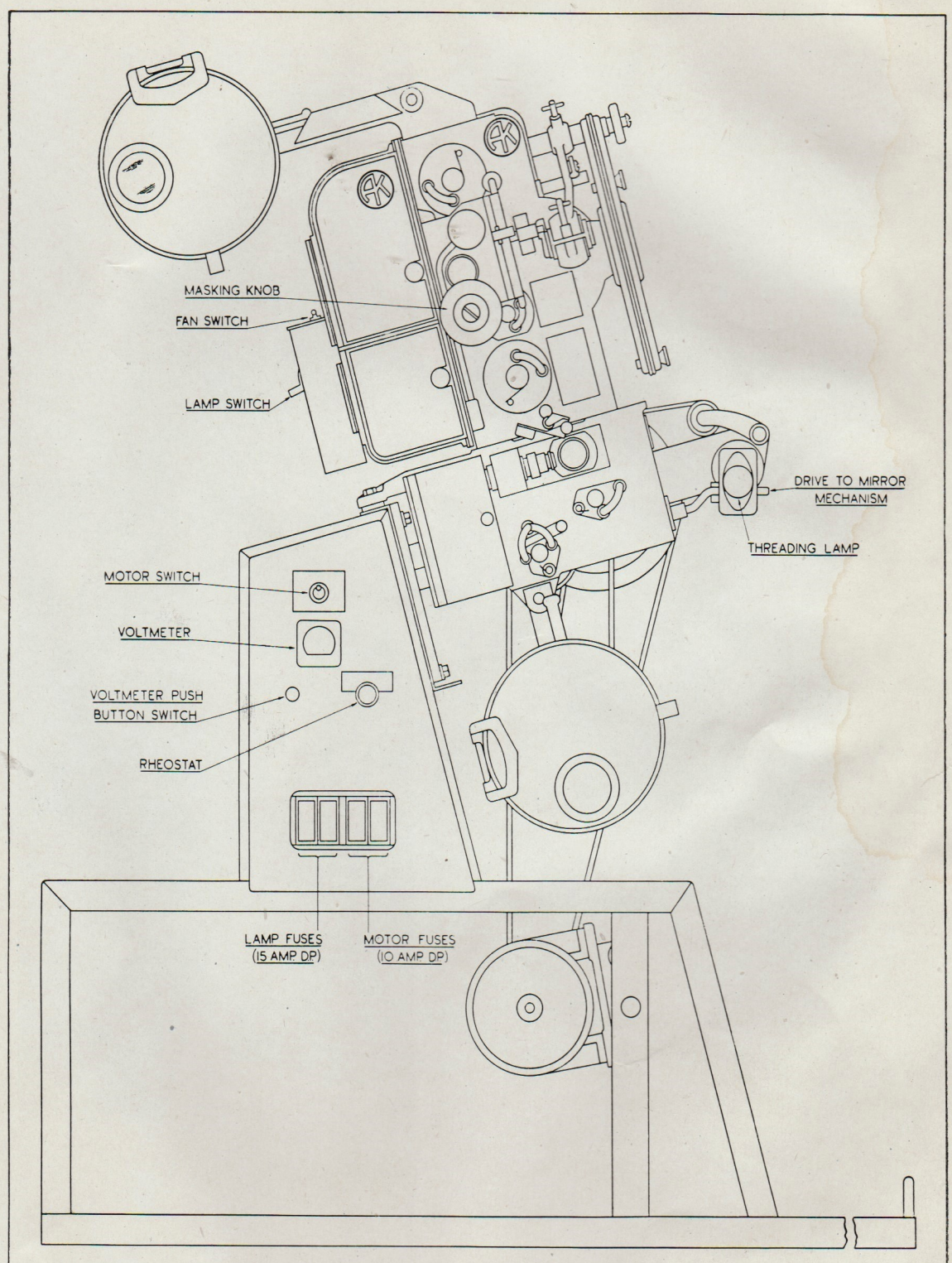


FIG.1

KALEE S.P. INVICTA SOUND FILM PROJECTOR
ARRANGED TO SUIT PORTOBEL A.A. TEACHER

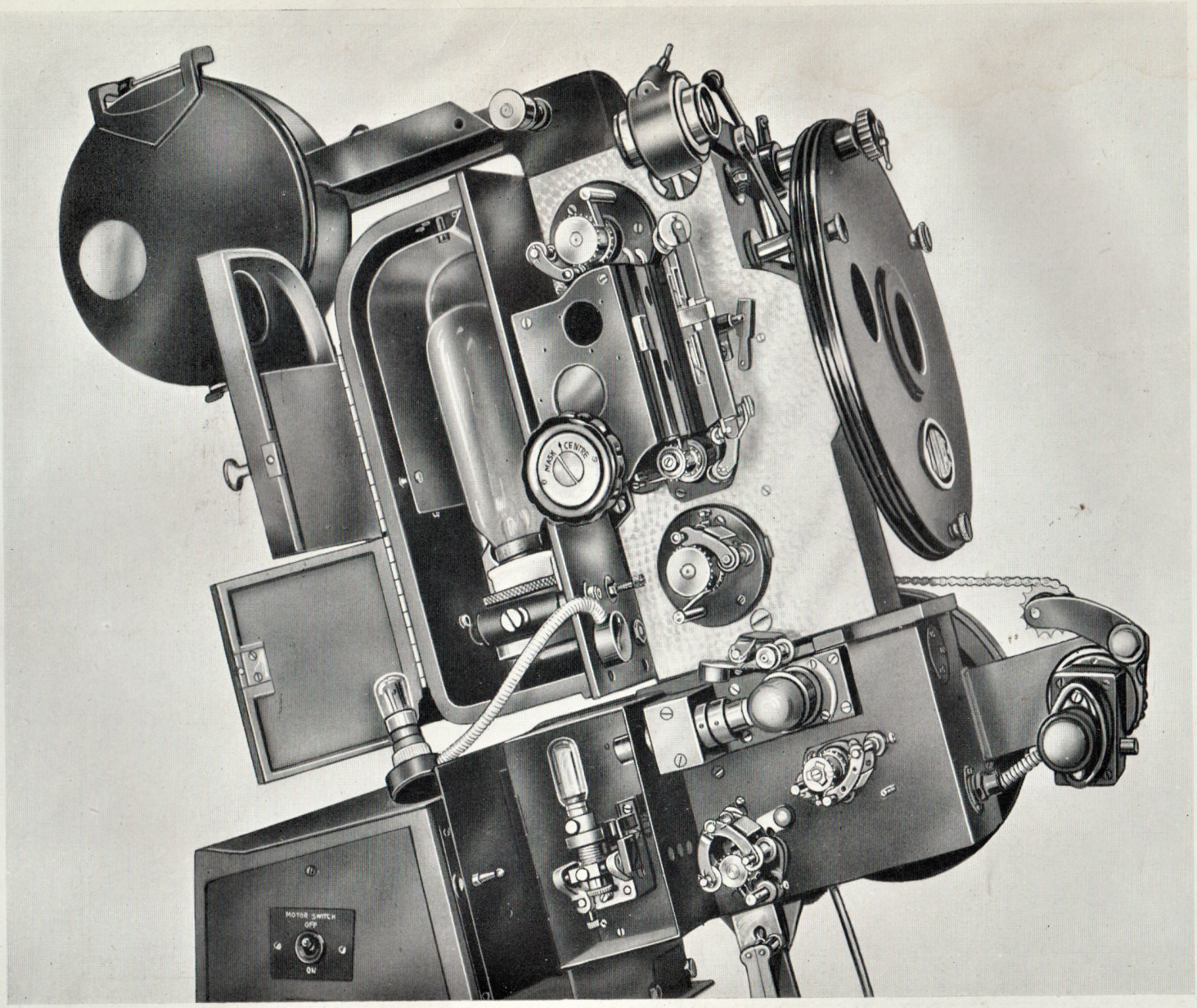


FIG. 2 KALEE S. P. INVICTA SOUND FILM PROJECTOR
ARRANGED TO SUIT PORTOBEL A.A. TEACHER OPERATING SIDE

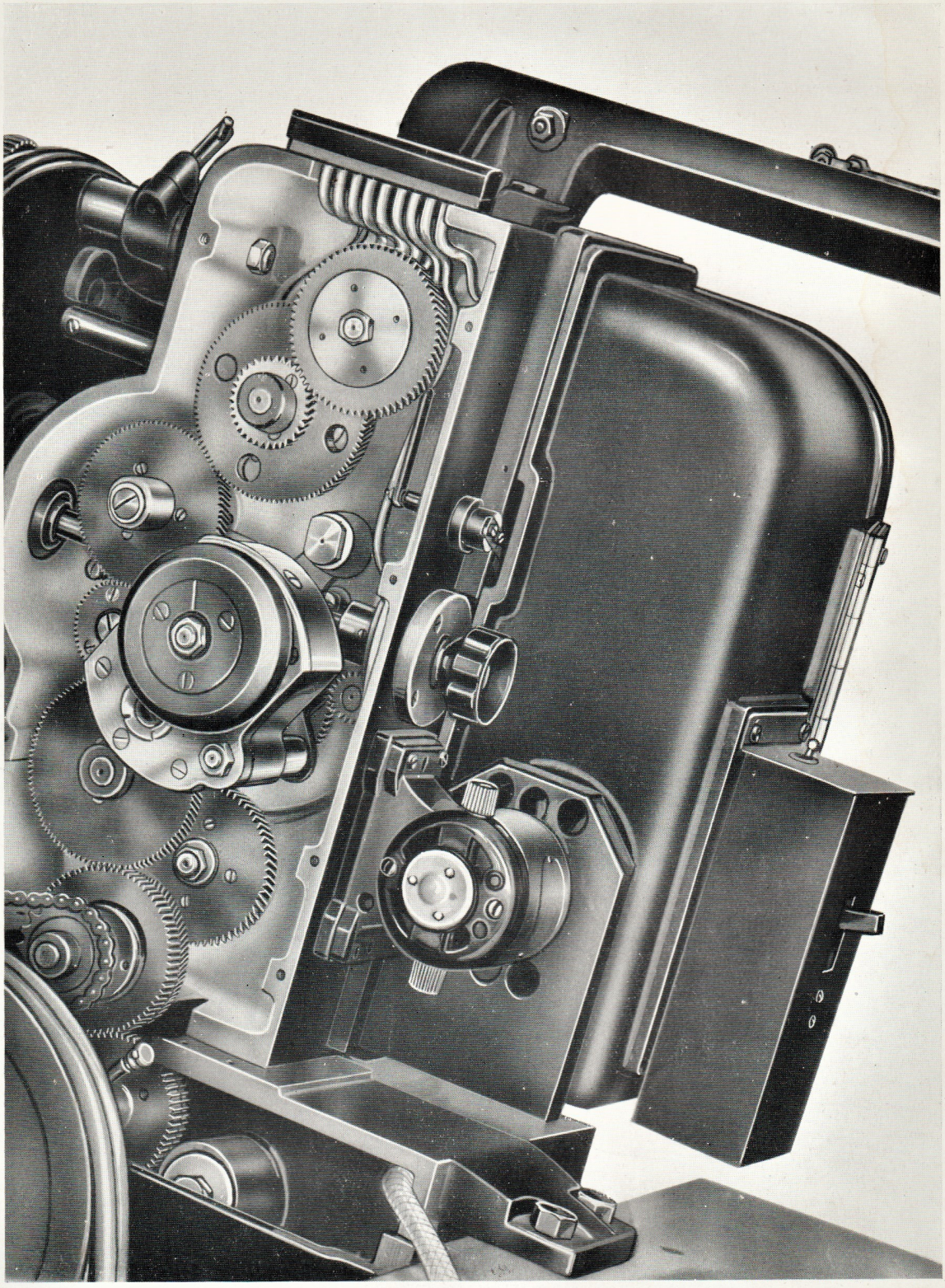


FIG. 3 KALEE S. P. INVICTA SOUND FILM PROJECTOR
REAR OF PROJECTOR WITH COVER REMOVED

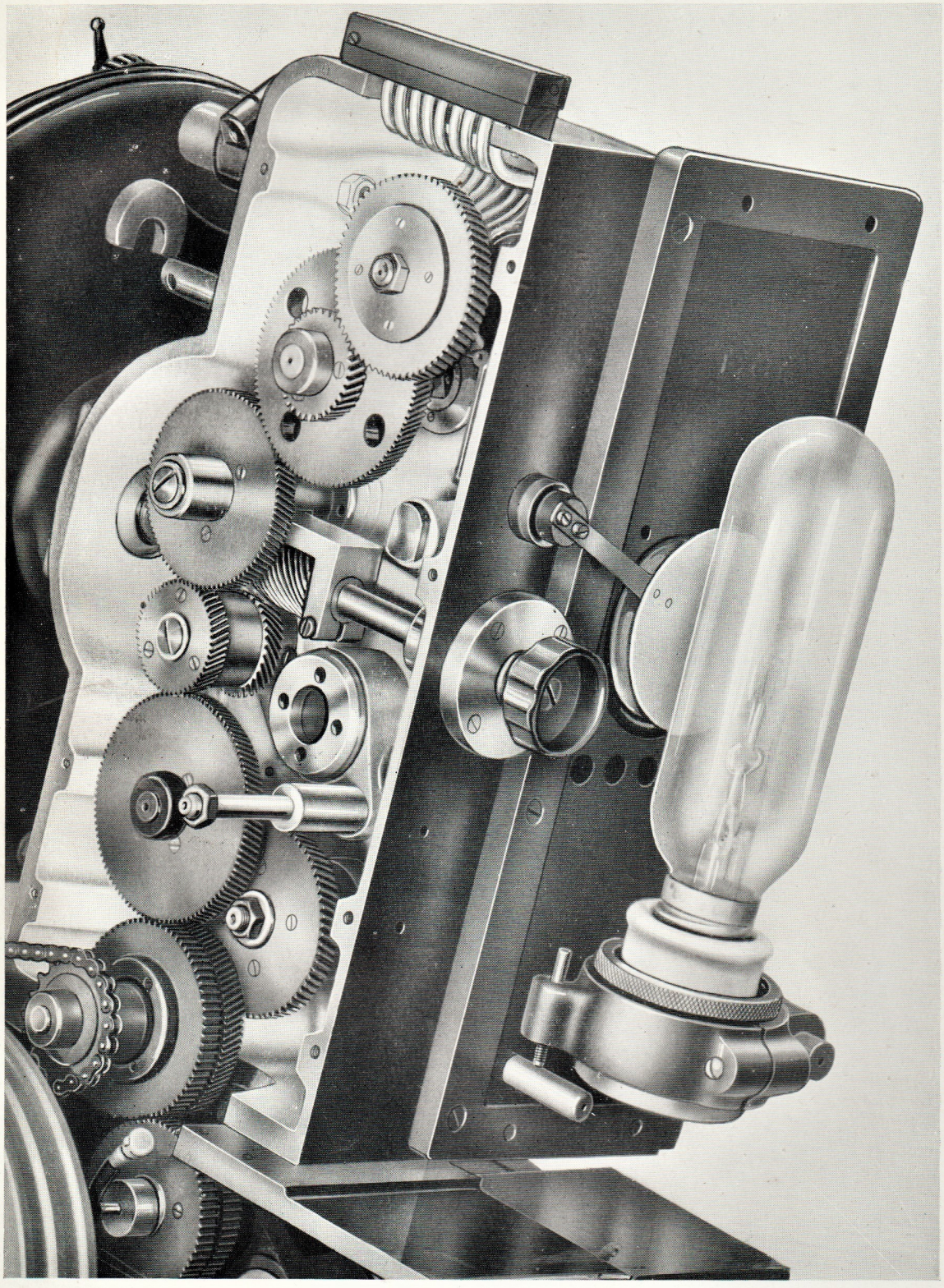
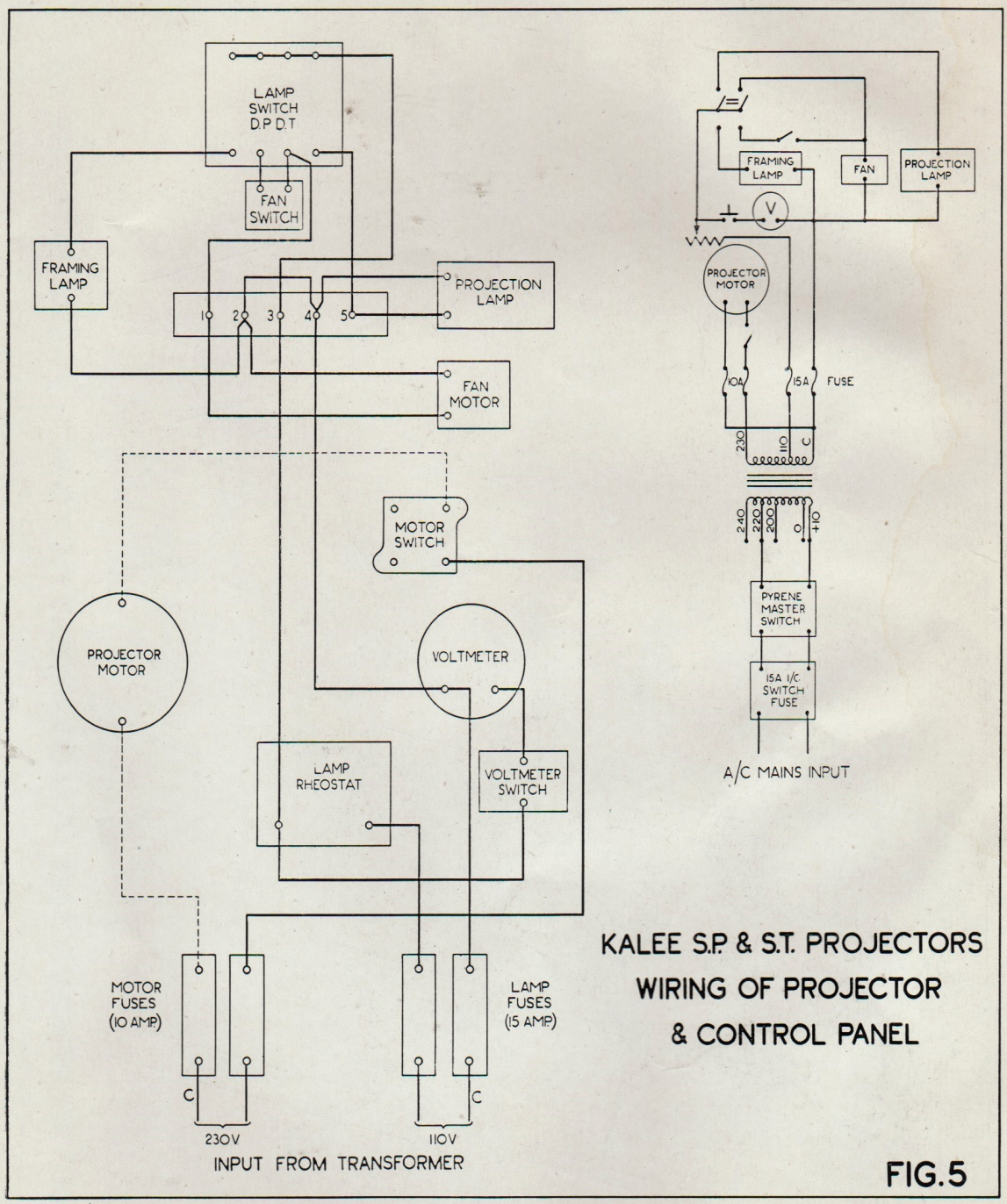
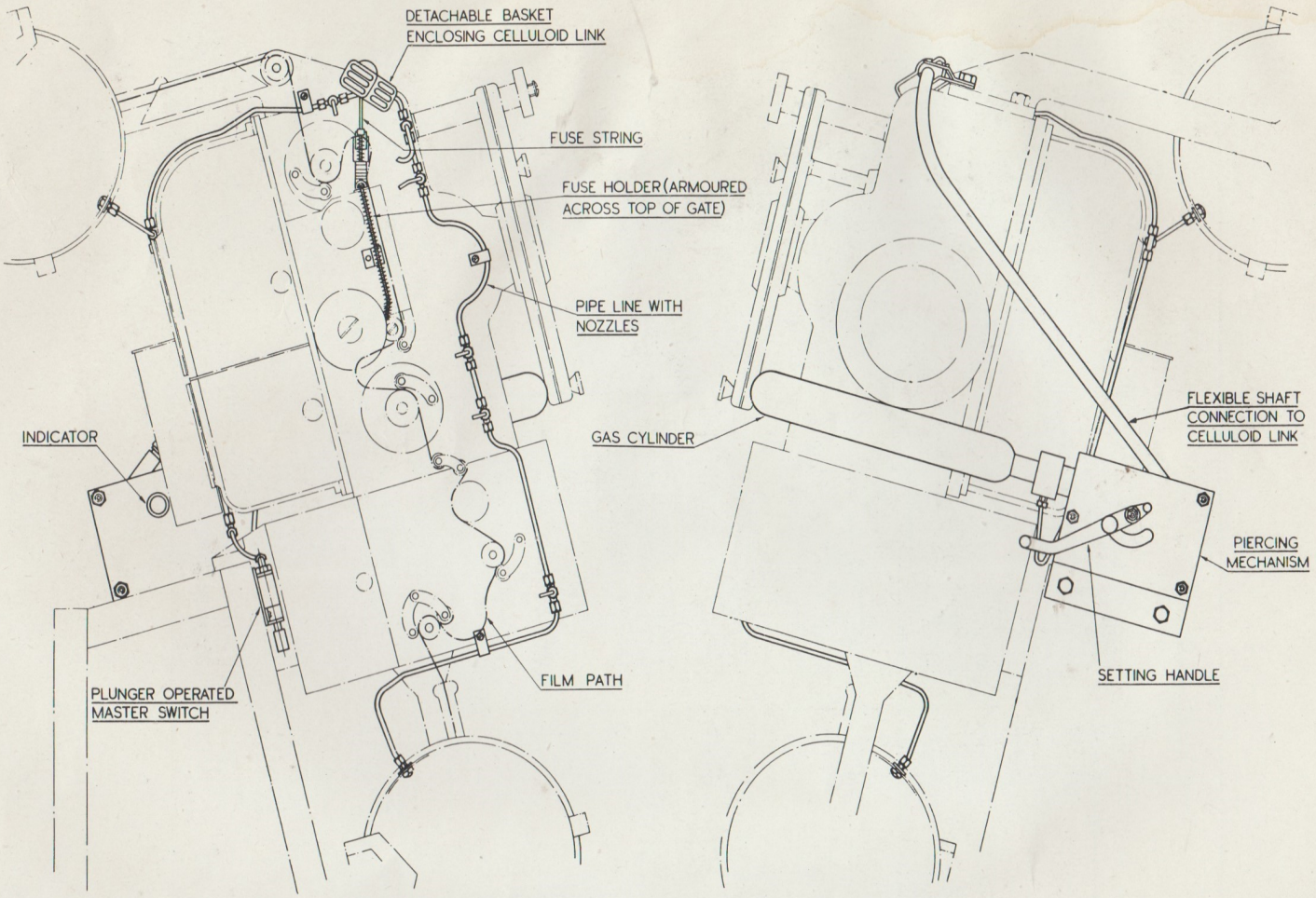


FIG. 4 KALEE S. P. INVICTA SOUND FILM PROJECTOR
REAR OF PROJECTOR WITH LAMPHOUSE, BLOWER,
REAR COVER AND INTERMITTENT UNIT REMOVED



KALEE S.P. & S.T. PROJECTORS
WIRING OF PROJECTOR
& CONTROL PANEL

FIG.5



KALEE S.P. INVICTA SOUND FILM EQUIPMENT FITTED WITH "PYRENE" EXTINGUISHER

FIG.6

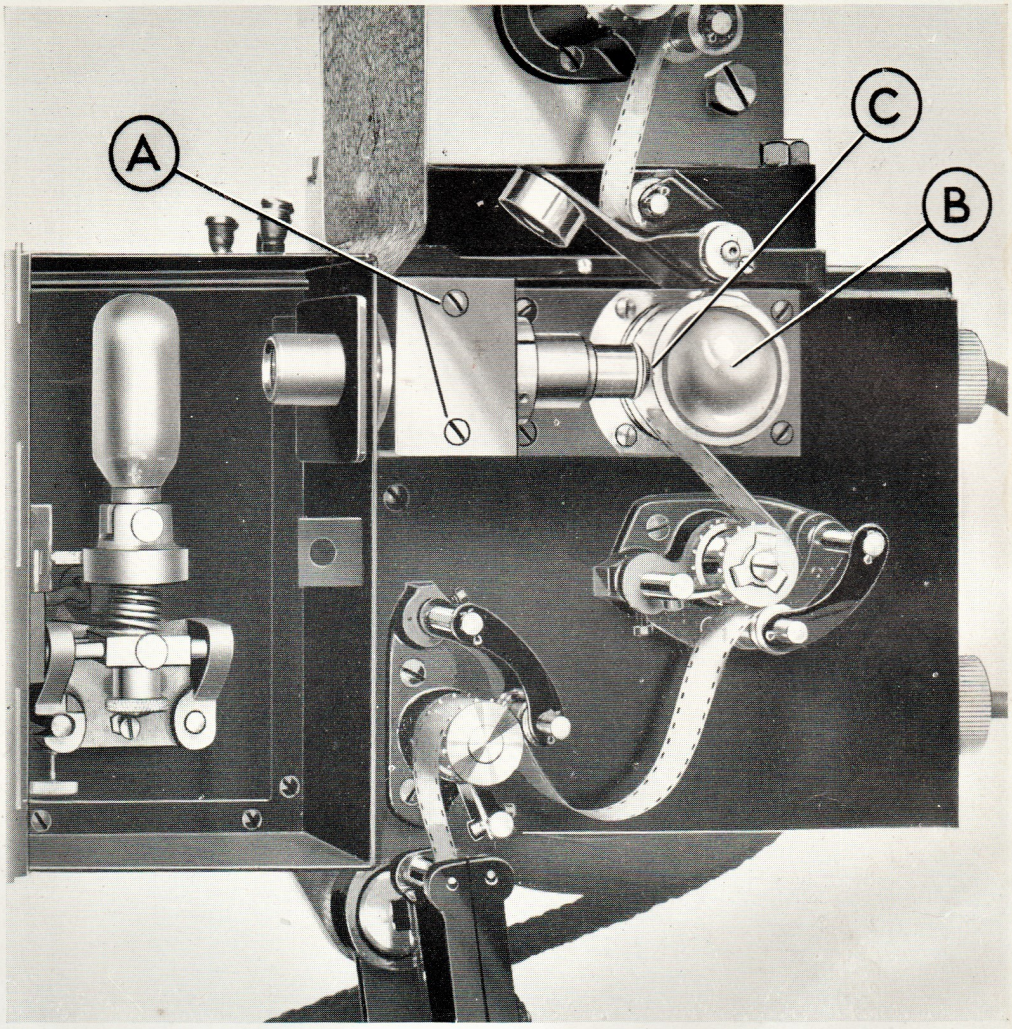


FIG. 7

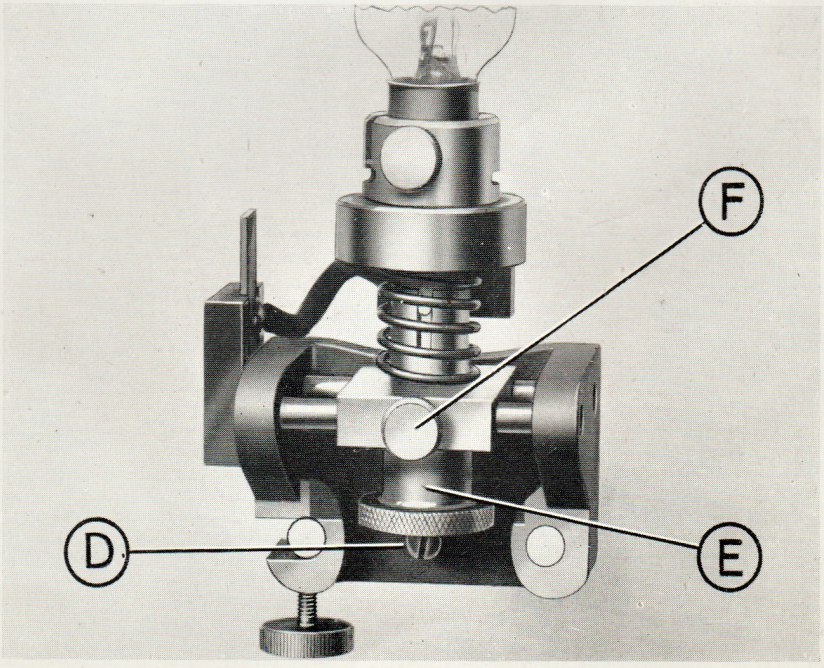
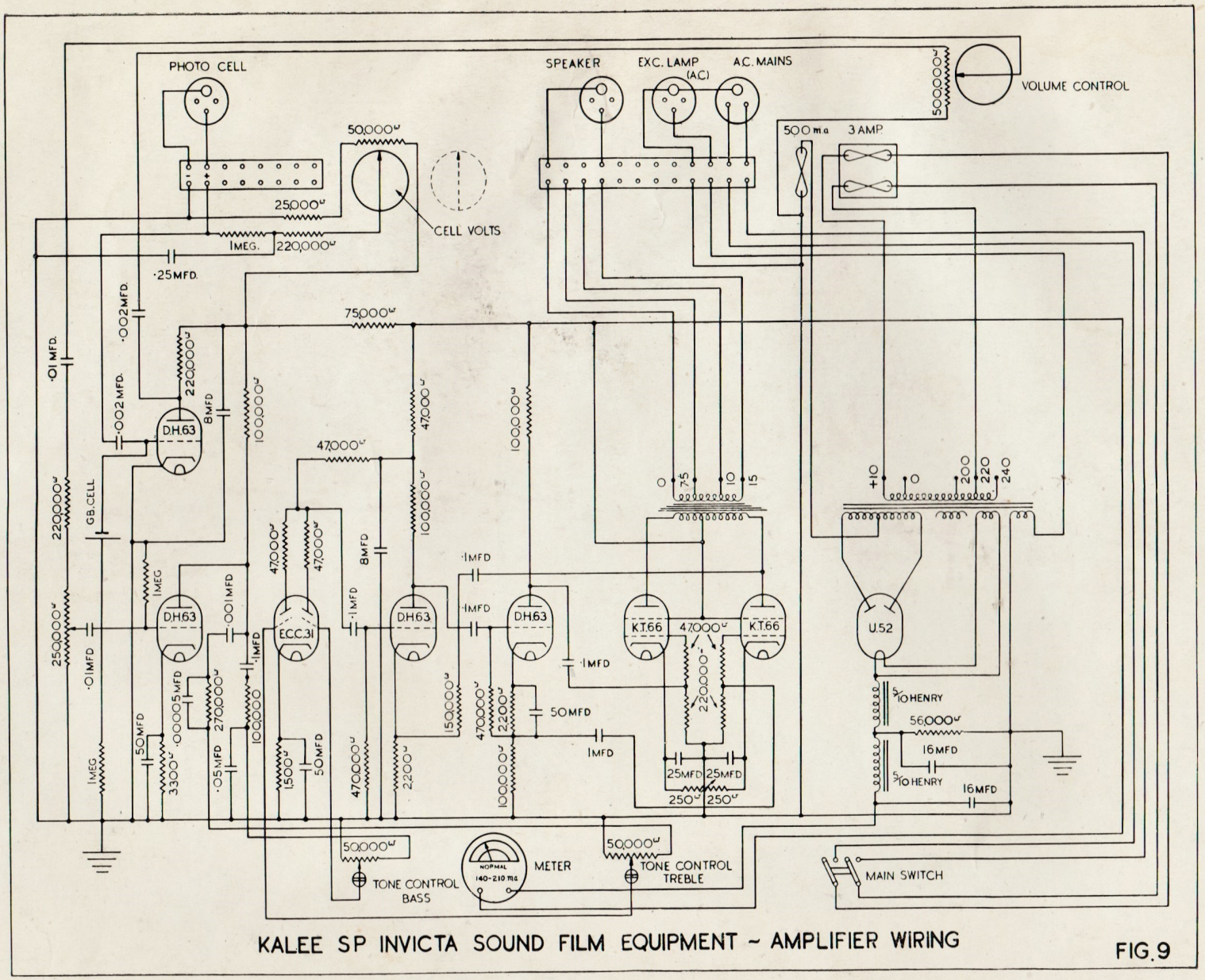


FIG. 8



KALEE SP INVICTA SOUND FILM EQUIPMENT ~ AMPLIFIER WIRING

FIG. 9