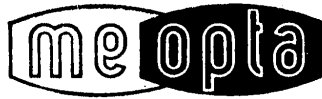


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**DESCRIPTION AND OPERATING INSTRUCTIONS FOR THE**

# Meopton

**III**

**35 mm SOUND FILM PROJECTOR**

STAT

**1956**

STAT



**Driving members.**

The projector is driven by a three-phase synchronous motor with an asynchronous start, suitable for 3x220 V or 3x380 V A. C. and 50 c/s. The output of the motor is 230 W, 1500 r. p. m. It is connected to the main drive shaft of the soundhead by an elastic clutch.

**Film gate.**

The film gate consists of two parts: a permanent and a folding one. On the stationary part there are three interchangeable electric pressure rollers covered with wear-resisting pressure rollers or rollers made of plastics. The pressure of these rollers on the film can be adjusted by means of a screw. The folding part of the film gate has solid guide runners of highly polished and hardened steel.

In the stationary part of the film gate there is an aperture of standardized dimensions (20x8x15) mm. The film track is air-cooled by means of a turbine ventilator driven by a separate synchronous motor of 122 V, 50 W output and 2,850 r. p. m. The motor with the turbine fan is hung on a spring in the upper part of the motor pedestal.

**Sound head.**

For recording the optical sound track the macrooptical system has been employed. The light of the exciter lamp is centred by means of a condenser and of a glass rod on the sound track of the film.

The lighted image of the sound track appears (magnified 10.5 x) in the slit, which determines the correct limits (length and width) of the recorded portion of the sound track. This slit is projected through the condenser on to the photocell.

The slit and the enlarged picture of the sound track projected on to it can be viewed through the glass window of the sound head and the operator can at any time check their respective positions. The slit can be adjusted longitudinally by means of the sound head adjusting knob.

Before leaving the factory the sound head is adjusted accurately so that the position of the macrooptical slit is in perfect alignment with the sound track of a correctly processed film. The red mark on the sound head regulating knob stands opposite the track. If the projectionist finds that the sound track has been printed in the wrong place on the film, he can by turning the knob, reset the mechanical slit in the correct position against the sound track in order to get the best quality reproduction.

The exciter lamp (type A. S. A. G. type 8313) is provided with an adjusting ring which guarantees the optimal position of the bulb in relation to the sound head optical system and insures the optimal illumination of the slit.

The bulb with the adjusting ring is set into a special socket (two-pronged plug supply socket) mounted in the sound head on two contacts (lead plugs).

The replacement of a burnt-out bulb can be done very quickly and easily by merely slipping a reserve socket with a new bulb on to the lead plugs.

The gas-filled photocell (e. g. a Haval) is mounted in a cover provided with a three-pronged plug. Such a photocell is housed in its housing from which it can easily be taken out after the cover has been removed.

**The safety device.**

The Meoson III projector is equipped with a perfect safety system, which prevents damage should the film loop shudder and in the case of ignition in the projector head it prevents further spreading of the fire.

When the perforation of the film is so damaged that the intermittent sprocket cannot transport the film further, the upper loop grows in size and raises the cover. The machine immediately stops. Simultaneously, the safety shutter, placed behind the film gate, drops and when the machine comes to a stop, the safety valve of the folding shutter closes as well. Through interruption of the current in the chokes, the light beam of the arc lamp is covered and the exciter lamp goes out. At the same time the lower (optical) safety device is shut.

At the side wall of the projector head a switch-button appears, the red colour of which indicates the stopping of the machine, i. e. the breakdown of the upper loop. If by chance the film in the closed area of the projector head catches fire, a narrow strip of inflammable (nitrate) film threaded in the upper part of the head burns down, thus interrupting at once the function of the mechanism. At the same time the apertures of both magazines are closed, so that the flame cannot reach the film. The light-beam of the arc lamp is interrupted, the exciter lamp is switched off, the fire shutter of the projection-gate is closed and the emergency lights in the showroom are switched on. When the machine stops functioning, the safety valve of the rotating shutter shuts down. If the glass door of the projector head is shut, the magazine lids cannot be opened which contributes to the safety of operation.

**The arc lamp.**

The arc lamp is a high intensity lamp (working with the so-called Beek effect) designed for operation on D. C. (of maximum intensity of 60 A).

The double-walled lamp house is partly made of light metal casing partly of sheet metal. On its upper part there is mounted a chimney connected to the exhaust pipes which conducts the heat and gaseous products of burning. The chimney is provided with a fire-insulating joint construction.

Both side-walls form folding doors. On the right side there is mounted a window which permits the position of the carbons to be controlled. In the middle of both doors there are small observation ports (coloured glass plates, 5 W of low transparency being used). The lamp house is completed with a 12 V, 3 W pilot lamp illuminating the inside of the housing, which is automatically switched on after the right hand door has been opened.

The output circuit of the light cone is provided with a shutter controlled by means of a handle from the outside end by an electromagnetic discharging device from the bottom. The shutter mechanism is connected to a mirror-guard of fire-proof insulating material protecting the mirror against injury when the arc is struck.

The spherical mirror, 300 mm in diameter, 110 mm, can be swivelled round both its axes by means of ball-joints located on the rear lamp house wall.

The carbon holders are carried by motionless wheels which are controlled either manually by turning-knobs or automatically by means of a control device driven by an electromotor.

For quick and rough adjustment of the carbon holders use the handles fixed on the right top of the lamp house. On this side of the housing there is

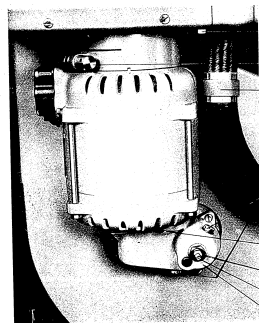


Fig. III

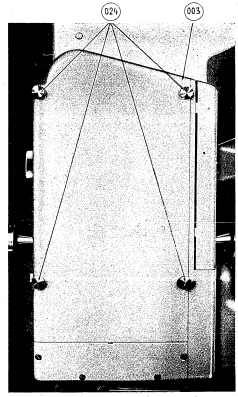


Fig. IV

also mounted an ammeter indicating the intensity of the current flowing through the arc and a voltmeter showing the tension on the arc.

The speed of the electromotor of the automatic regulation system can be continuously varied on a broad scale, changing simultaneously the rate of both carbons. It is equally possible to change the rate of feed of each carbon separately by adjusting the respective regulating turning-knobs (screws) on the rear side of the lamp house.

When using the so-called high intensity carbons, the motor of the automatic regulation system functioning at the same time as the arc is struck.

When the arc is interrupted, the safety relay stops the regulation motor so as to prevent it from an overload.

When using normal carbons which both vary slowly, the automatic regulation motor must be turned off by means of a lever switch.

The full length limit at the lowest of the carbons is 210 mm. At their limit positions the carbon feed is automatically switched off.

The automatic regulating device is designed as a self-contained unit which can be easily removed from the lamp housing.

As a rule, high intensity carbons are used (i.e. copper-coated and with a special filling) ① 4-9 mm. However, it is also possible to insert normal carbons into the 14 mm diameter holder so that the present lamp can be used for lower intensity currents as well.

The carbons are fastened into vertically and laterally adjustable holders. The jaws of the holders are pressed against the carbons by the exertion.

Both carbons are prepared near the holder in order to ensure their exact position and to avoid faulty adjustment. An electromagnet serves for stabilizing the arc, the winding of which is made up by the conductor of the positive carbon. A source of power for heating the arc lamp is constituted by a 50 V - 50 ampere rectifier (A), for instance, a discharge lamp rectifier (A 654) which is connected to the three-phase net (3 x 300/220 V). The rectifier is equipped with two Testa T 1249 discharge lamps.

**Amplifier and loudspeaker combination.**

To the Mospion III projector there has been adapted the Testa control panel of 15 or 20 W power output. The control panel consists of panels which are independent of each other and which can be put together as required in different numbers and orders. In the control panel consists of 4 panels at most, it can be hung on the wall when a larger number of panels must be used, the rear panel set is provided with a caution label to ensure stability.

The basic set of the control panel consists of a pre-amplifier, a 15 W audio-amplifier, a 6 V 5 A rectifier and a control device. To these assemblies reserve units can be added. The changing of the different panels is very simple. All the necessary apparatus and control-elements are located so conveniently that the servicing of the whole mechanism is limited to switching the volume of sound.

For Testa panels a loudspeaker combination has been used. It consists of a low-frequency system placed in a resonant housing and a high-frequency system with a light steel diaphragm and with an aluminium ribbon which terminates in a of a fold exponential horn. Both systems are divided by an electronic apparatus but for every system a separate amplifier and a separate loudspeaker combination with a separate circuit must be employed.

Every combination comprises the whole audio frequency. The high-frequency loudspeaker can be fitted, so as to ensure the correct setting. The speaker combinations are made with great precision and guarantee good reproduction in the whole auditorium.

The Testa four-panel 214724 can be connected to the Testa control panels over a matching transformer. The connection of the panel to the exact lamp circuit, the connection of photonic leads, gramophone pick-up, going to a Testa microphone 214002 is shown in the Testa panel prospectus.

**Installing the projector in the projection room.**

1. **Transport of the projector.** During transport the projector is packed in three cases specifically adapted for the purpose. One case contains the head of the machine and the magazine, the second contains the arc lamp and the third the pedestal with the plate, a sound head flywheel, and a small box with the equipment and a bottle of oil.
2. **Preparing the projector for operation.**
  - a) The pedestal with the platform is screwed to the ground floor of the projection room by means of 5 fix-screws. The arc oil base plate, pitch and dimensions of the screw holes are given in fig. II.
  - b) The location of the projectors in the projection room is shown in fig. I.
  - c) The projector head is fastened on the platform by means of three nuts. It must be ensured that the knife mounting ribs through which the head is connected to the plate are correctly set. Then connect the screw heads of the cooling air ducts (fig. III-177). After mounting the projector head set the rear picture regulator knobs and fasten it by means of a plug.
  - d) After loosening the four-nutted screws (fig. IV-024) the rear cover of the projection head (fig. IV-025) is removed. The two screws (fig. V-055) are unscrewed and the transparent cover (fig. V-056) taken off. The flywheel (fig. V-058) is then slipped on to the spindle of the sound head fastened with safety pad (fig. VI-546) and lightened by means of a screw (fig. V-054).
  - e) The reservoir in the lower part of the head is filled with oil so that during the run of the machine its level remains within the limits of the lower oil-sight (fig. VII-131) circle mark. If the optical axis of the projector is to be fitted during the run, the oil reservoir must be filled so that the oil pump (fig. VI-330) always remains below the oil level.
  - f) By means of 4 nuts screw the arc lamp on to the plate. Then slip the plate-cover (fig. VIII-131) on to the spindle and the aperture in the upper part of the stand and fit the clamping bracket (fig. VIII-131), according to the colour marks (red, blue) marked on the stand (fig. VIII-131). Fit the nuts in the lower part and remove the front cover (fig. IX-054). Through the oblong opening in the bottom of the lamp house (fig. IX-054) adjust the lamp (marked yellow) and two supply-leads of the bulb illuminating the interior of the lamp (marked brown). Fasten the leads marking the coloured marks on the terminal clamp bracket (fig. X-344). Through a circular opening in the bottom of the arc lamp slip two pairs of changeover leads marked white and violet and fasten them on to the second clamping bracket (fig. X-344), having the connector

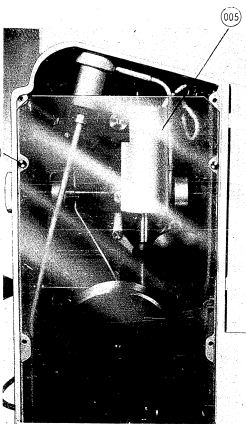


Fig. V

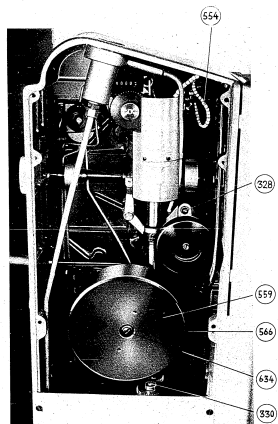


Fig. VI

all these leads screw down the front cover (Fig. 18-59A). When loosening the arc lamp the head of the projector must be connected to the arc lamp by means of a tube (Fig. 18-104) inserted into the rectangular opening of the distributor cover (Fig. 18-110) and fastened by means of a grooved screw (Fig. 18-104).

1) Lead wires entering the interior of the pedestal either through the side or through an opening in the front side must be connected to the main distributor (Fig. 18-113) marked X, Y, Z, O. To lead to the main distributor a shield conductor should be connected. The reaction lead wires must be connected to the clamp bracket (Fig. 18-121) marked not set aside. By unscrewing 4 screws restore the lateral ledge (Fig. 18-113) in the pedestal which supports the ventilator during transport.

2) Installation of the second machine is done in the same way. Now connect the clamp bracket in the pedestal (clamp marked ABC — X L) (Fig. 18-113A). To make clamps connect the exciter lamp supply leads which serve to power both machines, the conductors controlling the projection room shutters, etc. These connections should be effected according to the central circuit diagram (Fig. 18-113).

3) If the main current-switch on the control panel of the projection room is switched on, the control lights in the upper right-hand (Fig. 18-13) is turned on, indicating that the machines are under current. At the same time the valve of its lower magazine safety-trap automatically opens (Fig. 18-100).

**3. Starting the machine.**

After opening the doors of the projector head, depress the lever (Fig. 18-510) with the fingers of the left hand during which the signal button (Fig. 18-519) (marked red) is automatically drawn in. Keeping the lever (Fig. 18-519) depressed, lightly depress the safety valve with the fingers of the right hand (Fig. 18-516). If the safety mechanism of the machine is in functioning order, the upper button (Fig. 18-519) remains drawn in. If it is pushed out, it indicates a fault in the mechanism that is impossible to operate. Make sure that in the upper part of the projector head the wax film strip (Fig. 18-521) has been fastened on the pin (Fig. 18-523) and on the lever (Fig. 18-523) of the safety equipment. It is 6-7 cm long strip of inflammable film engaging by its perforation the pin and the lever, so that the latter is as near as possible to the pin. By pushing the back button (Fig. 18-518) on the side of the plate, the mechanism of the machine can be put in motion. Check in the upper right-hand if oil is flowing down, which indicates the correct functioning of the lubrication system. Light the arc lamp in the way already known. When the lever (Fig. 18-522) is depressed the valves closed, the light beam of the arc lamp opens and the charge-over is set in motion.

**Adjusting the projecting axis.**

Follow this procedure:

- After loosening the nuts of the base bolts the projector can be laterally adjusted by means of setscrews (Fig. 18-106).
- Stop the projector by pressing the upper red push-button (Fig. 18-115).

and having loosened 3 screws (Fig. 18-113) and 2 nuts (Fig. 18-113) by means of a special key (Fig. 18-104) adjust the projection angle of the optical axis. Open the lid of the upper magazine, unscrew 3 screws (Fig. 18-938) and take off the lid (Fig. 18-977). Adjust the position of the five device mercury switches (Fig. 18-938) after first loosening the screw (Fig. 18-956) by giving the holder a turn, so that mercury contacts both contacts. Adjust in the same way the device mercury switch (Fig. 18-938) located in the upper right corner of the projector head. Start the machine and adjust exactly the direction of the optical axis, if — as a result of further filing — the machine stops, adjust the mercury switches once more. The switches must turn off the current securely should the upper lamp happen to get too loose, or when the narrow strip of inflammable film burns down.

**Adjusting the rotating shutter.**

The rotating shutter has been adjusted by the manufacturer in the best possible way. But should its position happen to be disturbed, e.g. during transport, adjust it once more as follows:

Loosen the 3 screws which hold the helical gear (driving the shutter-shaft) to the main shaft. Now turn the distributor so that at the moment the Maltese cross starts to move the projector aperture must be completely covered by the blade. After adjusting the blade, tighten the screws again. Note that no clearance must occur between the Maltese gear and the blades.

Therefore when the main power supply switch on the board is turned on, the upper oil-right control light of the lubrication control is switched on as well as the lights in the film gate and in the upper magazine. This proves that the machine is under current. At the same time the valve of the lower magazine safety device automatically opens.

**Severing.**

Before starting the projector fill the oil reservoir. After loosening 4 grooved screws (Fig. 18-124) remove the rear cover of the projector head (Fig. 18-123). Unscrew 2 screws (Fig. 18-123), take off the transparent cover (Fig. 18-122) and fill the lower part of the head housing with lubricator, marked "MILWAUKEE" (low solidification point oil) which is supplied with each projector.

If the machine has been set up in such a way that the projecting axis is absolutely horizontal, the oil level should stay during the run within the circle of the lower oil-gauge (Fig. 18-137), which corresponds to approx. 580 cm. of liquid.

If the machine proper is tilted, the projector head oil cup should be filled to such an extent that the oil pump draw always remains submerged. Thus the suction of air and foaming of oil are prevented. Even then the oil level usually remains within the circle of the oil-gauge.

As the Maltese III projector is a permanent stand machine, its installation in the projection room must be perfect. That is why the conductors (four-line leads, machine wires, gramophone wires) going wires connecting microphone to the amplifier, arc lamp to the rectifier, projection lamp ports to the rectifier and motor, etc.) are permanently connected and their terminals located on the switchboard.

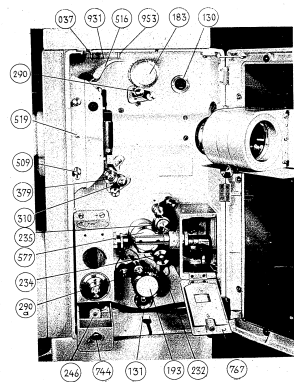


Fig. VII

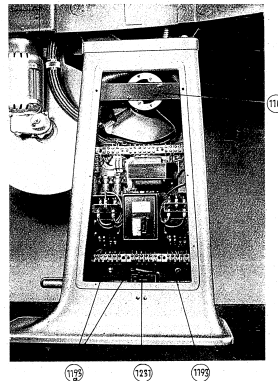


Fig. VIII



**Striking the arc, checking the burning and switching off the lamp.**

Make sure that the shutter (Fig. X1318) in the lamp house output orifice is shut and consequently that the mirror (shutter) is set correctly which projects the mirror of the lamp during the ignition. By means of the turning-knob (Fig. XXIV410) bring the negative carbon within the distance of 3-5 mm from the positive one. Shut the door of the lamp house, switch on the rectifier and wait for about 2 minutes.

Then turn one of the hand levers (it does not matter whether it is the upper or the lower one) to the right till the carbons touch each other, which can be verified partly by observing the lamp in the sight window (Fig. X1481) and partly by deviation of the ammeter pointer (Fig. X1743).

At this moment quickly reverse the switch and, giving it at the same time a turn to the left, withdraw the carbon to a certain distance, thus striking the arc. The lamp current during the strike is meant by the gap between the carbons, is 4-5 mm (for the intensity of about 10 A it is 5-6 mm). The most convenient distance between the carbons or, in other words, the relative position of the carbons and the mirror must be tested once and for all with regard to the brightness and equal distribution of light on the projection screen.

The correct position of the arc can be obtained once and for all by means of the image of the carbon tips and the arc projected by a small projecting device (Fig. X1219) on the sheet of paper, which is usually fastened to the front wall of the projection room near the observation ports. The projected picture of the carbon is focused at the correct distance by moving the objective lens (Fig. X1559) secured by screws (Fig. X1627) forward or backward.

The whole projector mechanism can be turned through 360° maximum, after closing the covers from the arc, so that it is possible to project the image of the carbons and arc in any required direction, e.g. on to the ceiling of the projection room etc.

After each further striking of the arc it is only necessary to set the carbons exactly in the marked position so that the light in the picture is well and equally distributed. The operator must check the position and the distance of the carbons and keep it constant during the whole time the lamp is operating. The arc lamp is provided with an automatic carbon feed. This device moves both carbons at an equal rate, which can be regulated with regard to the rate of burning, due to the quality of carbons and the current used.

If it is required to change the speed of the carbon feed, the positive carbon regulating knob (Fig. XXIV433), or the negative carbon regulation knob (Fig. XXIV434) must be set accordingly.

Of course, the speed of either carbon feed can be made — if required — very different from the other, by turning these regulating knobs to the right, instead of the carbon feed can be accelerated. In addition, the basic speed can be accelerated or decelerated by turning the knob (Fig. XXIV435) to the right or to the left. Provided the carbons are fed to a constant voltage and are of the same kind this system works with the greatest precision and when it is properly adjusted, there is no need whatever to intervene in the regulating process. However, experience has shown that the above mentioned conditions are not always strictly kept during operation, and therefore it is necessary to adjust from time to time the position of the carbons or, turning the turning knobs (Fig. XXIV470, 614) by hand.

The automatic carbon feed mechanism is automatically turned on and off after the bulb is lighted or switched off. Of course, it is possible at any time to put it out of gear by turning a switch (Fig. XXIV770). This is done only if normal carbons are used. If so-called high intensity carbons are used, the switch is turned on all the time.

The lamp or the arc is switched off either by the rectifier switch or by quickly withdrawing the carbons by means of a handle (Fig. X1455 or 659).

**Adjusting the mirror:** When equipping the lamp and especially after installing the machine it is necessary — besides checking the relative positions of the arc and the mirror — to adjust the mirror itself. This is done by tilting it round its vertical axis, turning at the same time the turning-knob (Fig. XXIV546), (or tilting it by means of a turning-knob (Fig. XXIV546) round the horizontal axis, which is perpendicular to the optical axis). The adjustment of the arc and of the mirror for brightness and equal illumination of the projected picture must be done by means of a lever while the motor is running and after the lamp house cover has been opened (see further adjusting the projector).

For checking the current and the voltage on the arc there serves an ammeter (Fig. X1743) and voltmeter (Fig. X1740), with scales, the colour marks of which indicate the maximal and minimal values for certain type of carbons and their diameters. The lesson on the arc must not be allowed to drop under values indicated by the marks which are given in the following table; otherwise the required minimum output could not be reached.

Current intensity in amperes	Type of carbon	Dia. of positive carbon in mm	Dia. of negative carbon in mm	Colour
15-20	Normal	10	7	Light blue
20-25	Normal	11	8	Dark blue
30-35	High-intensity	4	4.5	Green
40-50	High-intensity	7	6	Red

Voltage in the arc	Type of carbon	Dia. of positive carbon in mm	Dia. of negative carbon in mm	Colour
29-31	High-intensity	6	4.5	Green
33-36	High-intensity	7	6	Red
44-52	Normal	10	7	Blue
46-52	Normal	11	8	Blue

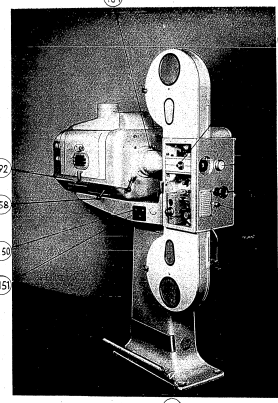
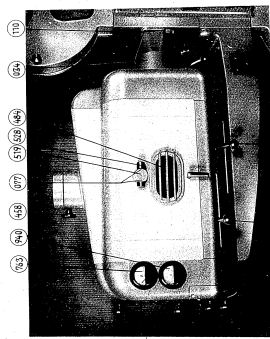


Fig. 11



**The lamp house shutter.**

The shutter (Fig. X1332) which safely cuts off the light beam is actuated by a handle (Fig. X1332) from the outside. The mechanism of the shutter is connected to the mirror guard by means of a lever gear. Besides this, the shutter is firmly fixed with the projection system electromagnets which control the shutter electrically.

The shutter is designed so as to close automatically when the electromagnet supply current is interrupted.

**The dissolving system.**

The lamp house of the projector is provided with a dissolving device (Fig. X1333) mounted in the interior of the projector in front of the light aperture. It is actuated partly by a handle (Fig. X1333) from the outside and partly from the inside by an electromagnet. By depressing the handle (Fig. X1333) current flows into the electromagnet of the dissolving device and lights the sound-varying device in operating position. The electromagnet then holds the shutter and the projector is running.

When using two projectors, each dissolving system is interconnected so as to secure a perfect changeover of the picture as well as of the sound. When the film in the first projector is running out, the second projector is set in operation as mentioned above and at the same time, the dissolving device of the first projector is thrown out of gear (i. e. the current feeding the electromagnet is automatically interrupted, the shutter closes and the sound head exciter lamp goes out).

**Ventilation of the lamp.**

The lamp house is equipped with a short chimney connected to the exhaust in the chimney there is located a valve, regulated from the outside by a turn. The knob of this valve is marked by a white groove indicating the position of this valve.

During operation a draught of natural air through the chimney the valve can remain completely open. On the other hand, when the ventilator inserted strongly that it disturbs the burning of the arc and then it is necessary to leave the draught partly closed. In this case, the valve becomes so that the draught partly opens the valve. If everything is done according to the instruction, the arc lamp is ready for use and after inserting the film and switching on the projector it is possible to begin operating.

**Threading the film.**

Thread the film into the projector as follows (see Fig. 0000). First open the door of the projector head together with the objective lens holder. Now, after pressing the locks (Fig. XIV, X1519) down, proceed to open the lids of the upper and lower magazines.

Slip the film reel on the upper magazine pivot (Fig. X1527) equipped with a friction clutch. The sound track must lie on the right side of the film when loading towards the screen. The first part of the film with the picture vertically oriented points from the upper part of the reel towards the projection screen. Before threading the film, unwind from the reel about 1.5-2 m of the so-called waste.

By means of a downward pressure swing-out the guards and the pressure rollers (Fig. VII305) of the tension sprocket and with an upward pressure do the same with the guard and the pressure roller of the intermediate sprocket (Fig. VII305, 306). By pressing on a button (Fig. 2001-445), open the film gate, thus obtaining sufficient space for threading the film.

After careful closing of all the film connecting parts, i. e. of all the guide rollers and sprockets, especially the film gate, etc., proceed to thread the film between the film device guide rollers of the upper magazine (Fig. X1524, 245) and insert it into the film channel of the projector head. Then slip the film on the back of the tension sprocket (Fig. VII313) and by means of a guard (Fig. VII292) secure it by a backward movement against any break.

Roll film on over loop with the film — see Fig. 0000 — large enough not to touch the safety device valve (Fig. VII314) when turning — place it in the film gate and close it. Make sure that the rollers cross does not function, i. e. that the film aperture is illuminated. If not, turn the turning screw (Fig. X1527) and secure it by snapping the roller into place (Fig. VII316).

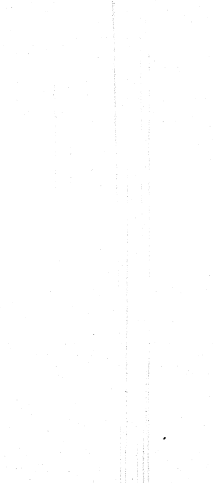
Form a loose loop again and pass the film on to the holdback roller (Fig. VII325) and after slipping it around the soundhead members (Fig. VII327) slip it on the labor roller with the mechanism damper (Fig. VII324).

Then engage the perforation of the film on the cogged holdback sprocket (Fig. VII325) and make it secure again by pulling down the pressure roller (Fig. VII304) to prevent any sway of the film.

Then let the film slide between the film device guide rollers of the lower magazine (Fig. XIV, 234) and attach the end of it into the slit in the film reel rest which, pivots on the pivot of the Acoustic Friction clutch (Fig. X1520). In the lower magazine's horizontal reel (of 115 mm in diameter) must always be used.

By turning the taking reel to the right the loose part of the film can easily be wound on. Check whether the film has been correctly threaded by manually turning the governor knob (Fig. X1527) on the front plate of the projector head in the direction shown by the arrow.

**Starting the projector.**  
When the arc lamp as well as the projector proper have been prepared for operation, according to the previous instructions, proceed to start the machine. This is done according to the description which forms part of the mounting instructions mentioned before.



- 1 Main synchronous motor
  - 2 Motor winding
  - 3 Motor winding
  - 4 Characteristic equipment in arc
  - 5 Motor lamp
  - 6 Lamp
  - 7 Lamp
  - 8 Motor winding
  - 9 Motor winding
  - 10 Converter for synchronous
  - 11 Transformer with terminals
  - 12 Converter for synchronous mo-
  - 13 Converter for synchronous mo-
  - 14 Transformer
  - 15 Transformer
  - 16 On way of parts button
- A, B — A.M.S.A. — Motor for  
 C, D — the cable connection  
 E, F — on the outer machine  
 G, H — contact on the outer ma-  
 I, J — Drive — heating con-  
 K, L — Projection from parts  
 M, N — Motor winding  
 O — Motor winding for parts at  
 P — Projection conductor
- On starting of two machines the  
 machine is connected with switch  
 must be 2 of one machine and  
 must be 1 of the other machine.  
 The other machine.

The current circuit of the sound head exciter lamp. (The lamp is lighted only when the amplifier is turned on.) After setting the motor there is always the possibility of controlling the correct functioning of the oil pump in the upper chassis (Fig. VII-25), where the oil can be viewed flowing down.

As the film material is not always of the same quality (differing in thickness or rigidity) and in view of minimum wear and least end high-quality reproduction it is essential to mention the quality pressure of the film-gate (guide-ribs) runners as well as regulate the optimum pressure of the roller (Fig. VII-24). This should correspond as much as possible to the material and the pressure of the film gate runners can be changed by loosening the grooved locknut (Fig. XXVII-467) and turning the small grooved screw (Fig. XXVII-474) which is then tightened again by screwing down the grooved locknut.

The pressure of the roller (Fig. VII-23) can be regulated by turning the grooved turn-knob (Fig. XII-97) mounted on the projector head front plate with the torque (Fig. 20) of the roller points approx. to the centre red mark. Divergent stabilisation of the film in the sound head can be achieved by gently loosening or tightening the hand turn-knob located at end of the hold back roller axis (Fig. VII-25).

**Adjustment of the supply reel and the take-up reel tension.**

As the film must be run under the same tension at all points during the course of its travel, the braking moment of the supply reel in the upper magazine and the tension of the take-up reel in the lower magazine has been set at the optimal value.

However, there is still a possibility of changing to a certain extent the braking moment as well as the take-up tension.

This is done by screwing the supply reel (Fig. XXVII-470) to the left or to the right, thus the braking moment can be increased or lessened.

In a similar way the tension of the take-up reel can be changed by loosening the supply reel (Fig. III-105) or the friction clutch and by turning the screw (Fig. III-107). The take-up tension must not then exceed the value of 400.

After adjusting the required braking moment or the tension, the safety nuts must be tightened again.

**Projecting proper.**

In principle the operator usually proceeds in the following way:

1. Make sure whether all the switches of the projector, rectifiers and amplifiers are at "on" position.
2. Insert the carbon in the carbon holders and check their position.
3. Turn on the main switches on the control board.
4. If some gramophone music is to be reproduced before the performance, turn on the amplifier and the change-over switch to the gramophone position and set the volume control to the value selected beforehand.
5. Thread the film into the projector and make sure that it has been threaded correctly.
6. Set the film in the film aperture at start.

7. Turn on the rectifier switch and after about 3 minutes — when the performance should begin — arrive the arc adjust the position of the carbons following the marks on the projection room wall and make sure that the lamp burns quietly.
8. If required, pre-adjust the rate of heat of the carbons (verifying this by means of the marks on the projection room wall).
9. Directly before the beginning of the performance set the amplifier set change-over switch in the "film" position and switch the amplifier volume control to zero.
10. In due time start the projector, pressing on the left (black) push-button at the side of the projector head plate and watch the film slip into the film channel and the film gate.
11. The moment the sound track enters the projector head — i. e. after about 3 seconds — depress the level of the lamp house shutter and the volume knob. These actions are very easy and can be done very quickly — as is necessary — in order to catch the start of the sound in the full force needed.
12. If the picture on the screen is not sharp enough, bring it into focus by turning the turning-knob (Fig. XII-125).
13. At the same time follow the position of the picture on the screen. If it happens that the dividing line between the frames can be seen on the screen, adjust the picture by turning the framing-knob (Fig. XII-125).
14. The lights in the auditorium should be extinguished slowly (by damping).
15. During operation observe constantly the picture on the screen (its sharpness and position in the film aperture) the sound volume and especially the carbon-head cone and position of the arc — checking by means of the tested marks on the projection room wall, and adjust everything as required.
16. If operating with 2 projectors, get the second machine ready for use similarly at the first one.
17. When the film reel in the first projector approaches its end, still greater care should be taken to control the picture and the sound (the arc and the arc lamp in the second projector has already been struck and the film in the aperture has been set at start). When the first mark of the film in the second projector appears in the upper right corner of the projecting film reel appear in the upper right corner of the projecting film reel of the second machine. Thus operation with the 1st projector has been interrupted and the second projector started without any interruption of the show. Simultaneously, if necessary, set the volume control — using the control speaker — to the required volume (it often happens that different reels are not of equal sound volume).
18. When the film in the 1st projector runs to its end, stop the first machine by pressing the lower red push-button of the second machine or by pressing the right red push-button of the first machine.
19. Extinguish the arc-lamp of the first machine.

**The end of operation.**

When the end of the last of the programme approaches, switch off the arc lamp at a suitable moment (time, etc.) and turn on fully the lights in the auditorium.

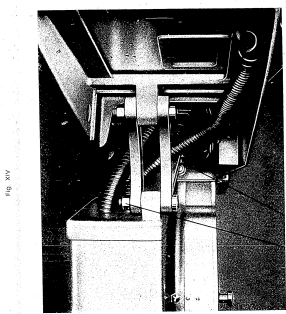
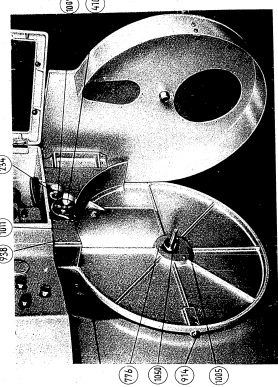


Fig. XXV

Turn the amplifier volume control to zero and switch the amplifier over to signals. After the rest of the film has run through the whole projector, stop the machine by pressing the right red push-button, turn off the recycler and amplifier switches and the main switch on the switchboard.

**Maintenance of projector.**

**Changing the oil.**

The lubricating is done by means of a central pressure system. The circulating oil goes to the motor in the course of its travel and before it is forced by the pump into the pipes, it must be cleaned in this case the oil is cleaned first by its own sedimentation, the heavier particles collect at the bottom of the reservoir. Further, the oil drawn by the pump is cleaned by means of a wire sieve, which traps large particles of dirt. The smaller ones, (non-metal) are held back by a filter (Fig. XXIX-482), the steel particles then by a magnetic filter (Fig. XXX-481).

Therefore it is necessary to clean these filters after the first 25 hours of use. The second and further cleanings are done regularly after 50 hours of operation.

When cleaning the system, unscrew by means of the key (Fig. XVI-1293) the lid (XXX-818) on top of the projector head. Take out the filter proper, and magnetic (Fig. XXX-481) in tandem and dry them with a clean cloth. As a result of the mechanism being run in the first cleaning a clean cloth hooded drain and must be replaced after 50 hours of operation.

After loosening and unscrewing the screw (Fig. III-026) remove the old lubricant. Having loosened a grooved screw (Fig. IV-024) take off the rear transparent cover, wash away the dirt deposited on the bottom of the casing and clean it thoroughly with a brush and dry it. Replace the screw again and tighten it. Fill the lower part of the projector head housing with fresh oil.

The next filling is effected after 100 hours of use, the third and the following ones always after 500 hours of operation. Similarly, after about 1000 hours of operation replace the oil in the friction brake of the upper reel magazine (Fig. XXX-040) and in the friction clutch of the lower magazine (Fig. III-050), screws and tighten them securely. Through the oil-line pour fresh oil into the upper reel. Then replace the upper screw (—) and tighten it again. Fill the lower reel from time to time, once in 1-2 months, apply a few drops of oil to the following parts:

- a) film roller axes and axes of film safety valves.
- b) pressure roller axes.
- c) lower roller axes.

**Lubrication of the motor.**

The motor bearings, equipped with a wick-lubricating system, can be oiled only after the motor has been removed from the projector head. The oil contained in the area of the lower magazine friction clutch can be let out after unscrewing 2 screws (Fig. III-105). After unscrewing three screws (Fig. XIV-373) in the lower magazine take off the lid (Fig. XIV-100). Grasping the motor with one hand, loosen with the

other the set screw (Fig. XV-1309) under the projector by means of the fitting pin (Fig. III-011). Take the motor out of the strap mount and place it on a high support prepared in advance (in order not to be obliged to disconnect the light cable).

Only then may the screws (marked red) on the upper and lower motor cover be unscrewed; they cover the works in the oilholes, to which a few drops of lubricating oil should be applied. The motor is also lubricated after 25 hours of use. After coating the cylinders with screws, replace the motor in the mount so that the holes of the elastic motor strut engage the pins of the main shaft. See that the oil on the motor collet seeps in the groove of the mounting strap. Tighten the mounting screw (Fig. III-031), replace the cover (Fig. XIV-100) and lubricate the lower magazine friction clutch with oil (see Para Changing the oil).

**Cleaning the projector.**

To ensure flawless projecting, the projector must always be kept in good condition. The machine must be cleaned every day before operating. Clean carefully all the guide rollers, pressure rollers, sprockets, intermesh sprockets, film gate and magazine axes, remove any dirt or dust, and see that these film collecting parts are free from any traces of oil, which cause rapid deterioration of the film. For cleaning the parts access to which is rather difficult, such as the axes between the pressure rollers, use a cotton brush (Fig. XVI-1293). When cleaning, never use any metallic instruments, but use the cotton-wool swab and a brush. Never attempt to remove dust by blowing it off. The film gate and the guide strips (runners) must be cleaned after projecting each reel of the show.

Besides this scrupulous daily cleaning of the surfaces, which come into direct contact with the film strip, remove also regularly any dust or dirt from the projector by means of a duster (Fig. XVI-1300). Once a month thoroughly clean the whole projector.

**Replacing the filling in the sound head flywheel.**

The flywheel mechanism of the soundhead is designed so as to stabilize the motion of the film after 5 seconds. No flutter or vibration caused by variations of speed of the film moving past the sound take-off mechanism must be noticed.

However, if after a fairly long period it happens that the stabilizing of sound film can only be obtained in the 6th second after starting the projector, the special flywheel filling (Fig. VI-559) of the soundhead (Fig. XVI-823) should be replaced.

The replacing of the filling (to be done by an expert), is carried out in the following way:

Unscrew the safety screw (Fig. VI-424) and remove the washer (Fig. V-056). By means of a forcing-off device which can be fastened to the flywheel with two small screws (Fig. XVI-1310) and by turning the hexagon winged nut screw (XXX-1370) pull the soundhead flywheel about 10 mm towards you.

Grasp the flywheel with both hands and by gently pulling towards yourself slip it off the shaft. Take care not to drop it, as it is heavy and slippery with oil.

Then lay it on a clean pad and after loosening the screws (Fig. XXX-1350) remove the forcing-off device (XXX-831).

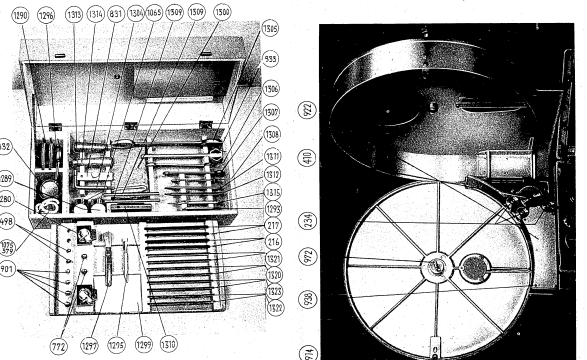


Fig. XVI

Having unscrewed the screws (Fig. XXXI-135), remove the packing ring (Fig. XXXI-136) and unscrew the small packing screws (Fig. XXXI-137) from the thread holes in the stut (Fig. XXXI-138).

Now partially insert the screws in the two opposite holes (Fig. XXXI) in the stut so as to grip them with both hands. By slow, steady, bending movements and simultaneously pulling of the stut (Fig. XXXI-136), take it out of the flywheel and again remove the screws from the stut.

Remove the used stut and flywheel interior filling and carefully clean both surfaces. Apply an adequate quantity of new filling to the inside of the flywheel and on the outer part of the stut. Replace the stut in the flywheel and by pressing the stut with both hands and by simultaneous backward and forward movements of the stut, reset it into its original position. At the same time the exact quantity of the filling is forced through the stut thread holes from the stut figure (Fig. 138).

Then replace the gasket until it is settled in its original place. Tightening of the screws (Fig. XXXI-135) on the stut is done by gradual tightening. The stut can be rotated by a slight rattle movement and that the ring does not act as a rotating brake if it is necessary to label the stut in the flywheel, applying a stronger pressure. When the mechanism functions correctly, wipe off the remainder of the filling and screw the packing ring (Fig. XXXI-136) on and tighten it.

Now slip the flywheel carefully on to the shaft; see that the bearing gear pins seat in the holes between the teeth in the stut. When resetting the flywheel on the shaft, use the small screw (Fig. VI-434) under which a washer (Fig. VI-346) has been placed. The groove on the shaft must then be aligned with the flywheel groove so that the washer legs engage the shaft grooves as well.

Tighten the screw (Fig. VI-434) securely.

**Cleaning the objective lens.**

Remove the objective lens from its carrier and carefully clean the outer surface of the front lens with soft tissue cloth (Fig. XVI-1797), a handkerchief, which has been washed several times can also be used.

Clean the rear lens in the same way. The dirt is best wiped off by means of a fine quill brush (Fig. XVI-1797); do not use this brush for any other purpose than cleaning the optical parts. The opaque coating of the inner surface of the objective lens is a special anti-reflex layer with which they are coated.

**Cleaning the sound head optical system.**

The dust on the sound head optical system must be wiped off daily, using a fine soft brush (Fig. XVI-1797). However, never remove the optical parts from the soundhead, as their precise adjustment might thus be disturbed. At the same time check the extra-temp for cleanliness and readiness for further use.

**Oiling and cleaning the lamp.**

The shaft bearings must be lubricated about once a month by introducing a few drops of oil, leaving it standing a few minutes. The upper and lower bearings can be re-oiled easily, while the lower ones must be lubricated through the respective holes (Fig. XIII, a, b) in the cover.

The spindle-threads must also be lubricated about once a month by applying a thin layer of ball-bearing oil and great strain oil.

The best kind of lubricant is vaseline with a high melting point.

The regulating mechanism must be removed from the housing after unscrewing a screw (Fig. XVI-300). The regulating mechanism bearings are lubricated by applying a few drops of the above mentioned oil.

Stick a match stick in a slit made of the mentioned lubricant (even high melting point) to the gears (Fig. XXXIII-435, 440) and lever cams (Fig. XXXIII-445).

The inside of the lamp, especially the upper cover and the carbon cartridges, must be kept scrupulously clean and the burning arc elements must be removed twice a month.

Special care should be devoted to cleaning the cartridges at insulated points as a thicker layer of sediment becomes conductive and may cause a short-circuit.

The lamphouse bottom must be kept clean; the copper-drippings and ashes are swept into a pan which must be frequently emptied and always replaced immediately. After each show, as soon as the lamp cools down, remove remains of carbon from the bottom.

The lamp house mirror should be kept spotless and must be cleaned carefully — just as the objective lens — to avoid any scratches.

**Changing the Maltese cross mechanism.**

The complete Maltese cross mechanism, including the intermittent, can be replaced if necessary.

Open the glass door in the projector head, loosen the intermittent sprocket screws and slip off the sprocket.

Loosen 4 screws (Fig. IV-214) on the projector head rear wall and take off the cover (Fig. IV-202). After unscrewing two screws (Fig. VI-663) take off the transparent cover as well. Loosen the screw on the Maltese cross flywheel (Fig. VI-670) and the Maltese cross unit in the Maltese position and by turning the knob (Fig. XII-223) set the Maltese cross proper in the rest position. After loosening two nuts (Fig. VI-328) the whole Maltese cross unit can be removed and replaced with another.

Insert the new Maltese cross unit into the machine, so that the shortened level-wheel tooth engages the slotted aperture marked with a black notched circle (see the main shaft technical spec).

Tighten the Maltese cross unit again by means of two nuts (Fig. VI-328) and raise the intermittent sprocket.

The replacement must be done by an expert.

**Changing the guide rollers, fire valves, tension roller, holdback sprocket and pressure rollers.**

The replacing of guide rollers and fire valves can be effected very easily by merely slipping off the safety strap ring.

The tension and holdback sprockets can be replaced after loosening two screws (Fig. XVI-802).

The pressure rollers can be replaced after unscrewing the roller axis. The sound head lens can be replaced after unscrewing the hand turning knob, removing the spring, and the steel and felt pad. After the replacement the seating system must be readjusted (see p.)

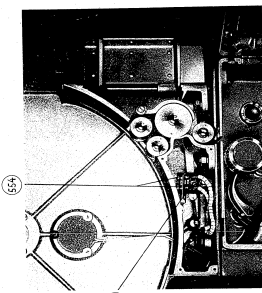


Fig. XVIII

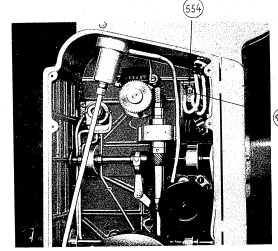


Fig. XIX

#### Changing the photocell.

Grasp the loop (Fig. VII-146) and raise the photocell cover. Now the photocell and its mount (Fig. VII-146) can easily be taken out. Replace the reserve mount and the photocell in the projector head; its correct location is determined by a three-pronged cap.

The photocell proper in its mount can be changed in the following way: remove the lid and take the photocell with the three-pronged cap out of the mount. Having removed the spacers, solder the cap off. Solder this cap on to the new photocell, which is then fitted into the metal mount and finally inserted into the projector head.

Replacement of the photocell proper is best entrusted to an expert.

#### Changing the exciter lamp.

Open the lid (Fig. VII-147) of the exciter lamp housing and pull out the exciter lamp and the special holder towards you.

To replace the spare lamp and the holder proceed in the reverse order. If the bulb proper in the holder is to be replaced, give the contact switch a turn by which the bulb is loosened; remove it and replace it with another. See that the bulb is firmly seated and that the groove on the adjusting ring of the bulb engages the holder pin.

#### Changing the pilot light and the sutfite lamp.

The light illuminating the mark in the film gate can be replaced by pulling out the holder (Fig. XIV-215) and replacing the built-in bulb with a new one. Replace in a similar way the pilot light illuminating the lower magazine scale, the upper slit and the film aperture.

#### Replacing the film gate tension runners.

The film gate runners can be changed according to the kind of film used. They are kept in the equipment case. The replacement is carried out as follows:

Depress the runner, push it upwards and pull it out towards you. Mount new runner in the reverse order.

#### Changing the elastic strap between the motor and the main shaft of the projector head mechanism.

Roll the motor out of the mounting strap (see p. 18 Lubrication of the motor). Remove the used rubber strap (a. g. by means of screwdriver) from the cap on the motor shaft and slip on a new one.

#### Changing the motor.

Roll the motor out of the mounting strap (see p. 18 Lubrication of the motor). After loosening the 4 screws (Fig. XIV-258) in the lower magazine take off the lid (Fig. XIV-191) of the clamp bracket and disconnect the 4 motor supply leads. Thus the motor and the lower reel friction clutch are set free. If the friction clutch has to be removed, unscrew four screws (Fig. XIV-256).

Replace the new motor with the friction clutch in the reverse order.

#### Changing the arc lamp mirror.

If the mirror has to be changed for some reason or other, place the new mirror in the holder, fasten the catches and tighten the screws. The set mirror must have sufficient freedom of movement (allowing it to be moved forward) without any effort. If the catches were too firmly pressed on the mirror the ensuing strain would cause the mirror to be broken when the arc is struck.

#### Standard equipment.

- 1 Bottle of lanthanum oil (low solidification Pt.)
- 1 wooden equipment case (Fig. XVI)
- 1 12 V. 3 W bulb (E 10 cap (90))
- 1 12 V. 3 W bulb (E 14 cap (77))
- 1 12 V. 3 W sutfite bulb (60)
- 2 V. 3 A exciter lamps with holder (88)
- 1 slit brush (297)
- 1 slit brushlet brush (179)
- 1 A. 3 duster (129)
- 2 slide bars (runners) with velvet strip (left) (117)
- 2 slide bars (runners) with velvet strip (right) (118)
- 2 runners of hardened fabric (left) (121)
- 2 runners of hardened fabric (right) (122)
- 2 steel runners (left) (123)
- 2 steel runners (right) (124)
- 1 reel spacers (129)
- 1 box with filling for four-headed flywheel (83)
- 1 box with mercury switch and intermitter sprocket (37)
- 1 oil can with heavy solidification Pt. oil (129)
- 2 screwdriver handles (151, 154)
- 1 flywheel remover (83)
- 1 driving motor elastic clutches (106)
- 4 spring-screws case (138)
- 1 A. 3 duster (129)
- 2 screw drivers (small and medium size) (131, 132)
- 2 hex wrenches (24x17, 14x17, 9x10, 8.5x7) (136, 130, 137, 130)
- 1 metal screwdriver (119)
- 1 screw spanner (143)
- 10 clamping ring (47)
- 1 instructions for use
- 1 circuit diagram of the machine
- 1 genuine certificate
- 1 cleaning and lubricating chart

#### Standard equipment.

- 1 Test rectifier
- 1 Test amplifier
- 1 Zeiss-combination casing — L, F. and M. F. speaker

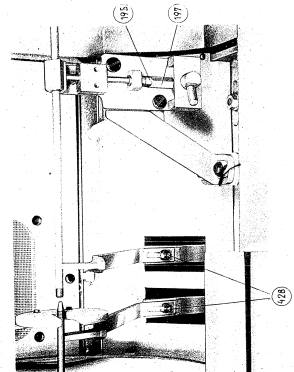
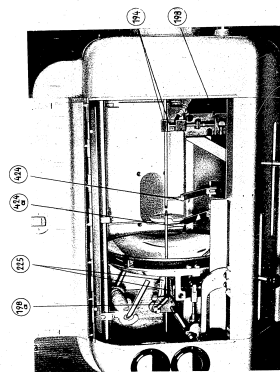


Fig. XVI

Fig. XVII

- 1 Tesla control speaker
- 1 Tesla crystal microphone
- 1 electric gramophone
- 1 film storage-case

**Objective lenses:**

- Projection objective lens sleeve  $\phi$  82.5 —  $f = 110$  mm, speed of lens 1 - 1.4
- Projection objective lens sleeve  $\phi$  82.5 —  $f = 90$  mm, speed of lens 1 - 1.25
- $f = 100$ , speed of lens 1 - 1.5
- $f = 110$ , speed of lens 1 - 1.5
- $f = 120$ , speed of lens 1 - 1.5

**Fundamental physical characteristics of low congealing-point PT oil:**

- Viscosity: 27 to 41 cP (at 33 to 45 at 52° C)
- Acidity: 0.0 mg KOH/g
- Oxidation number: 0.2%
- Congealing-point: -29° to -30° C

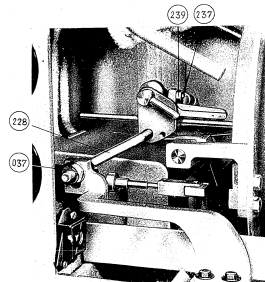


Fig. XXII

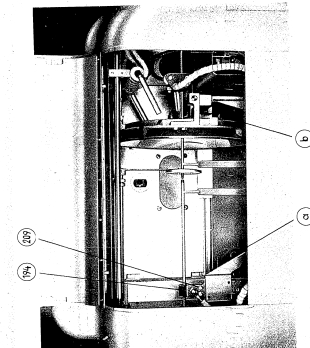


Fig. XXIII

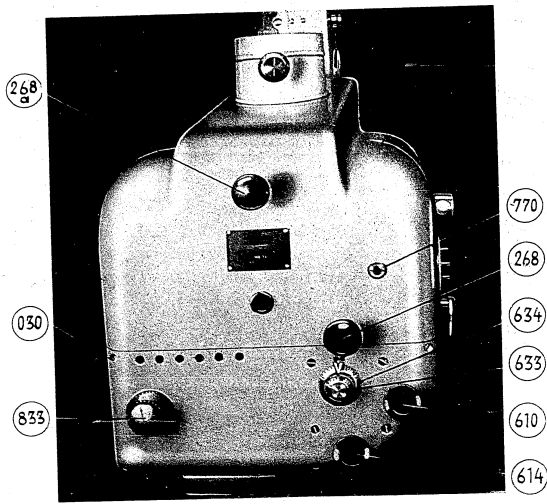


Fig. XXIV

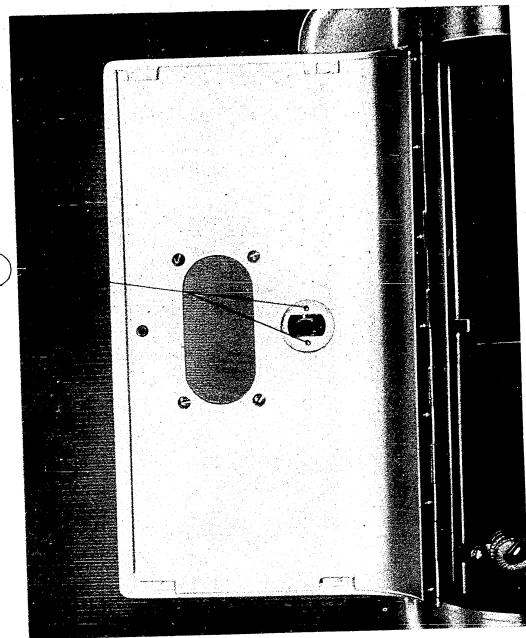


Fig. XXV

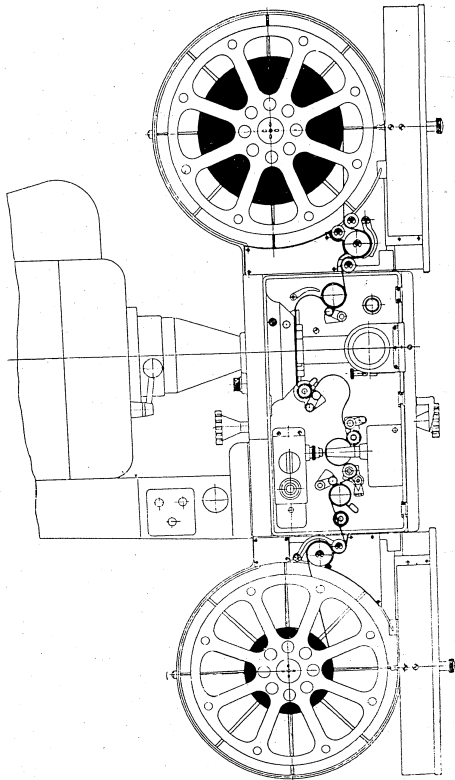


Fig. XXVI

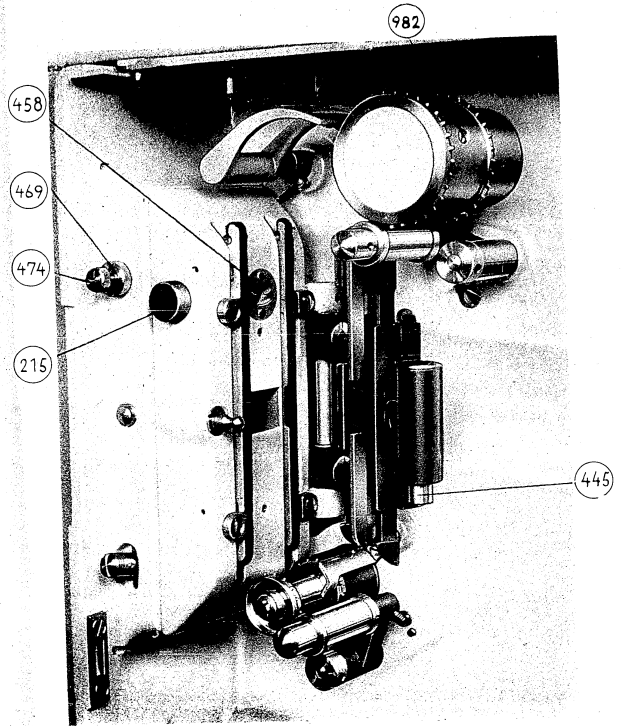


Fig. XXVII



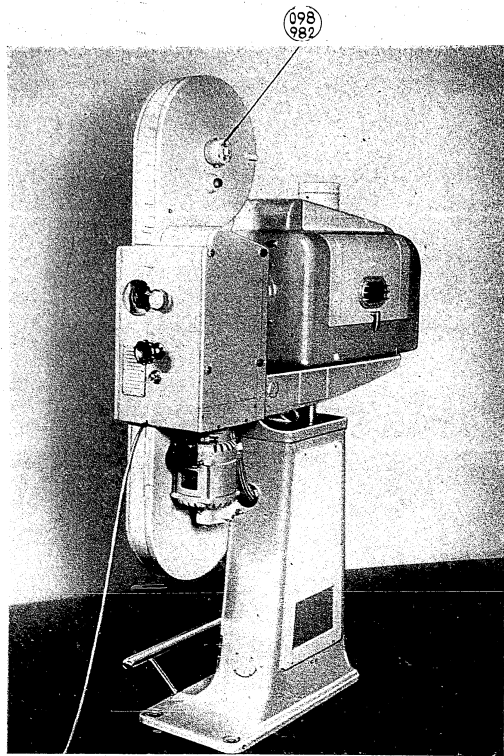


Fig. XXVIII

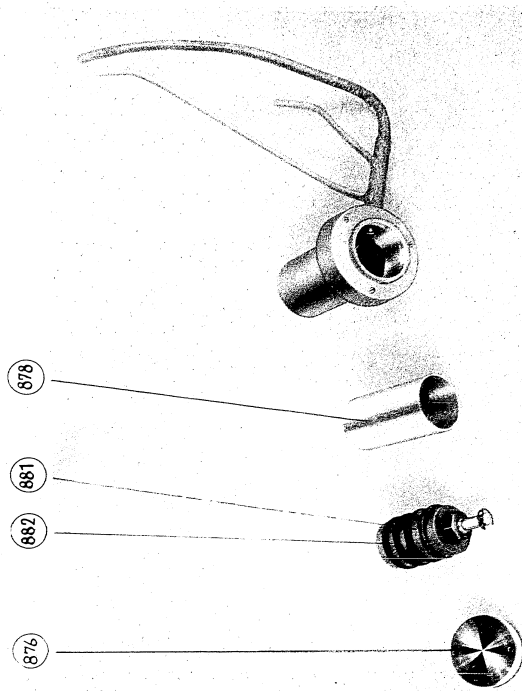


Fig. XXIX

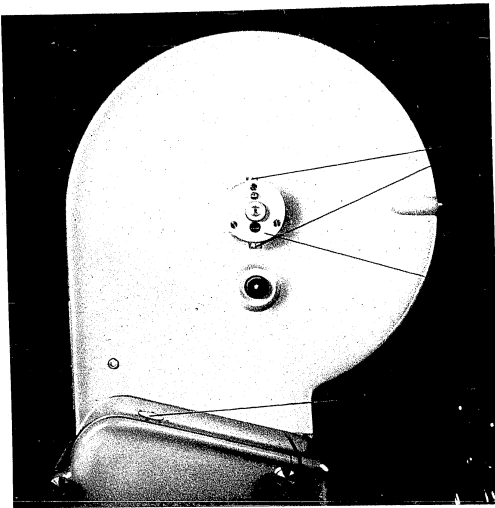


Fig. XXX

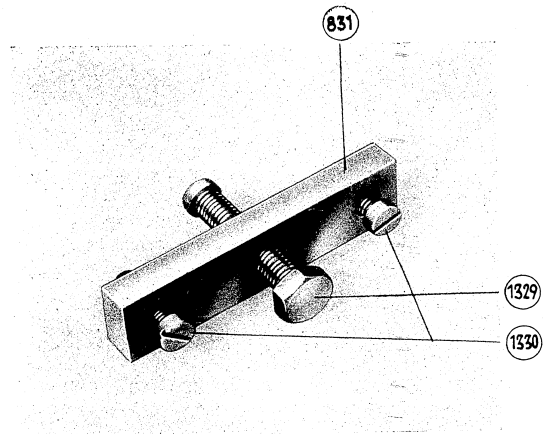


Fig. XXXI

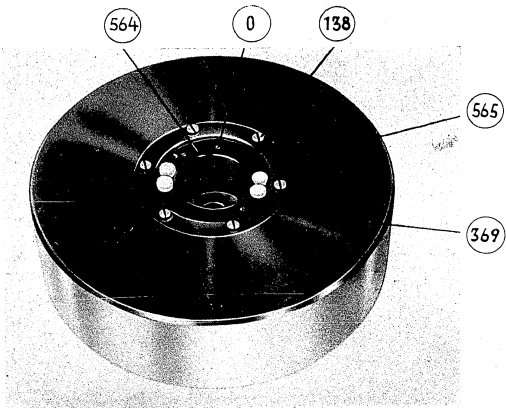


Fig. XXXII

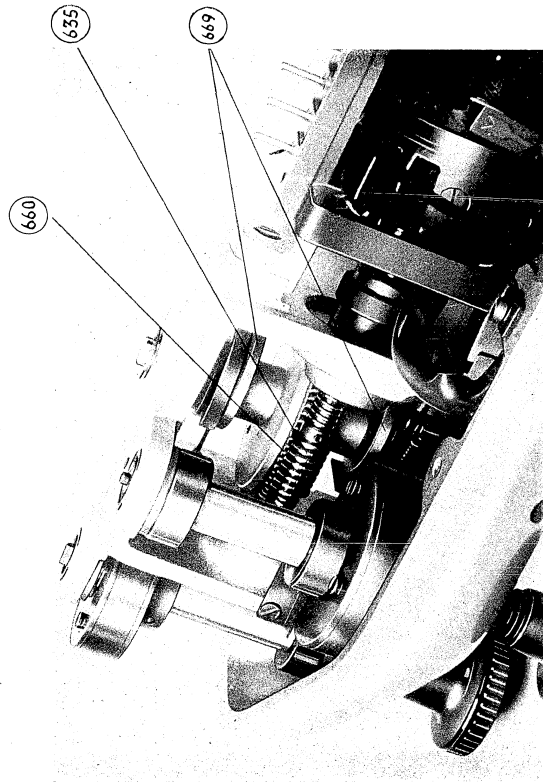


Fig. XXXIII