Film-Tech

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MODEL T04-X2

40W XENON

SOUND FILM PROJECTOR

INSTRUCTION MANUAL

APPLICATION

The 104-X_2 Model 35mm Xenon lamp projector is suitable for use in assembly halls, military quarters, countryside collages, clubs, theatres and etc. to project 35mm optical sound-film. It was fitted 1000 Watts spherical Xenon lamp as light source, provides brilliant luminosity and good colouration. It is also can show the cut-frame off film and the wide screen film, so it was the most desired 35mm film projection equipt. in rural market-town cinemas.

SPECIFICATIONS

Power requirement:	A.C. 220V, 50Hz (If in stead of the motor belt-pulley with the special one, the 60Hz A.C. also can be used)
Projection lamp:	22V, 1000w high voltage, spherical Xenon. The effective light flux would be not less than 3000 lumens(2.8Lm/w)
Evenness of light:	60%
Exciter lamp:	6V, 12W, incandescent lamp(D.C.)
Pilot lamp:	6.3V, socket type
Photoelectric converter:	2CR-5X10(mm^2) Silicon photocell
Projection lens:	The standard lens is F120, 1:1.9
Projection speed:	24 frame/sec.
Picture unsteadiness:	Not more than 0.03mm in crosswise, 0.04mm in longitudinal
Wow. & Flutter:	Not more than 0.35%
Power motor:	Single-phase capacitive starting induction motor, A.C. 110V, 50Hz. Power: 60W
Magazine capacity:	Norm. magazine: 350mm large magazine:600m
Total power consumption:	Approx. 2000 VA
Complete set weight:	Approx. 300 kg

FEATURES

The mechanical construction has been designed compact and reasonable. The performance is reliable. Installation, dismantment, manipulation and adjustment are all easy. The noise of running is only a little. The framing device could be used for rotating the all intermittent mechanism to move the picture up or down on the aperture. As doing this, the light losses little, and not to damage the perforation. The luminosity is. steably.

Since equipped with the Xenon lamp as light source, brings about brilliant

luminosity and good colouration.

Changeover between two units is semiautomatic.

Inside the cylindrical shutter, mounted two centrifugal fireproof blades. whe the projector is stopped for some reasons, the blades would be closed automatically, thus intercept ing the projection light so as to ensure the film form burning out. The most of accessories are interchangeable with the modle 103-A ones.

A Standard Set Consists of

Projector	2	Tripod (pair)	2	Amplifier	1
Rectifier	1	Tools & cable (set)	1	Loudspeaker (group)	1
Rewinder	1				

CONSTRUCTION AND ADJUSTMENT

1. Drive Mechanism

The projector is driven by a motor drive pulley (1) and the main driving

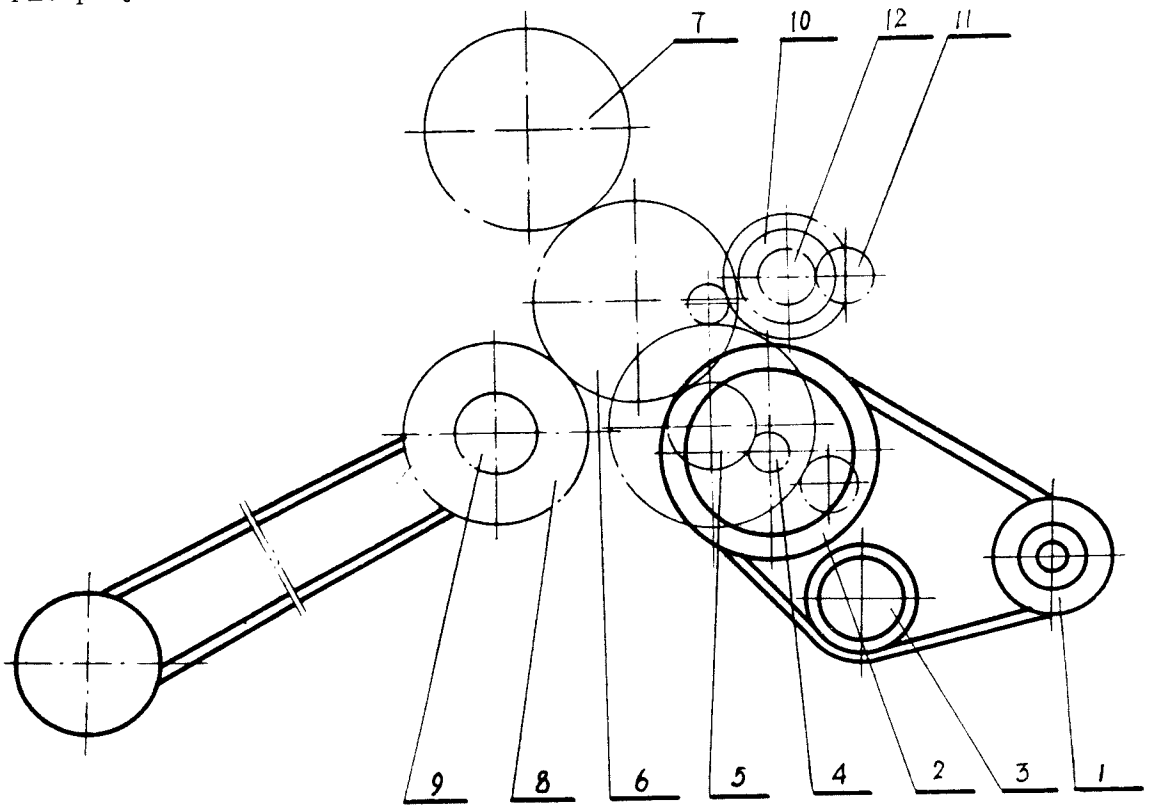


Fig. 1

1. Motor Drive Pulley
2. Main Driving Pulley
3. Tension Roller
4. 15-tooth Gear
5. 31-tooth Connecting Gear
6. 94-tooth Gear
7. 75-tooth Feed Gear
8. 75-tooth Take up Gear
9. Convey Belt-pulley
10. 31-tooth Connecting Gear
11. Sync-gear
12. 23-tooth Shutter Gear

pulley(2) with a speed ratio of 2:1. Pressing against the belt is a tension roller (3) for maintaining suitable friction between the pulleys and the belt. The main ariving pulley is directly mounted on the cam shaft. Its rotation turns the maltese cross and the intermittent sprocket to transport the film. A 15-tooth gear(4) mounted on the main driving pulley shaft meshes with a 31-tooth connecting gear(5) while it gears with the 94-tooth gear(6). In the front of the 94-tooth gear, it engages with two 75-tooth driving gears (7)(8). The ratio of the rotary speed of them to the rotary speed of 15-tooth gear is 1/5. The 75-tooth gears drive the feed and take-up sprockets via a driving shaft. A convey belt-pulley (9) fixed on the lower 75-tooth gear turns the friction disc via a delt to take film up. On the rear of the 94-tooth gear meshes with 31-tooth connecting gear (10) for rotating the thutter via a sync-gear(11), which consists of the 15-tooth and 23-tooth shutter gears(12). The ratio of the rotary speed of the 23-tooth shutter gear to the rotary speed of 15-tooth gear is 1/1.

2. Intermittent Mechanism

The intermittent mechanism is consists of the Maltese cross, the cam disc and the oil tank. The process of transmission is driven by the main driving pulley, the pin(2) on the cam(1) moves the Maltese cross(3) intermittently which transmits the intermittent movement to the 16-tooth sprocket(4) for film transporting. The cam and Maltese cross are sealed together in an oil tank. On the front cover is an oil hole with a screw and ansight window, so as to oil or observing the oil level. The whole mechanism is fastened on the main chasis with three "T" shaped clamping plates. Turn the knob of adjusting frame, the oil tank can be turned larger than 90°, so as to eliminate the misframe.

The bearing(5) of the Maltese cross is an eccentric one. Turning the eccentric bearing with a special spanner, the clearance between Maltese cross and the cam can be adjusted. When in operation, press the sprocket with your thumb along its running direction, there should be no evident "clamping". But the rotation should be smooth and mobile. Tighten the nut until the bearing of the Maltese cross unblae to turn freely. Over tighteness will damage the accentric bearing. The pin on the cam is tightened with a hexagonal nut. When adjusting, loosen the nut slightly, turn the pin until it engages with every slot of the Maltese cross without any bumping. As a result of wear & tear, the mechancal noise may be larger as time goes on. We must timely adjust it or change the piece parts of it. The intermittent sprocket(4) mounted with a screw(6) on the shaft can be moved slightly along the shaft by loosening the screw, so as to ensure the rectilinearity of film transporting.

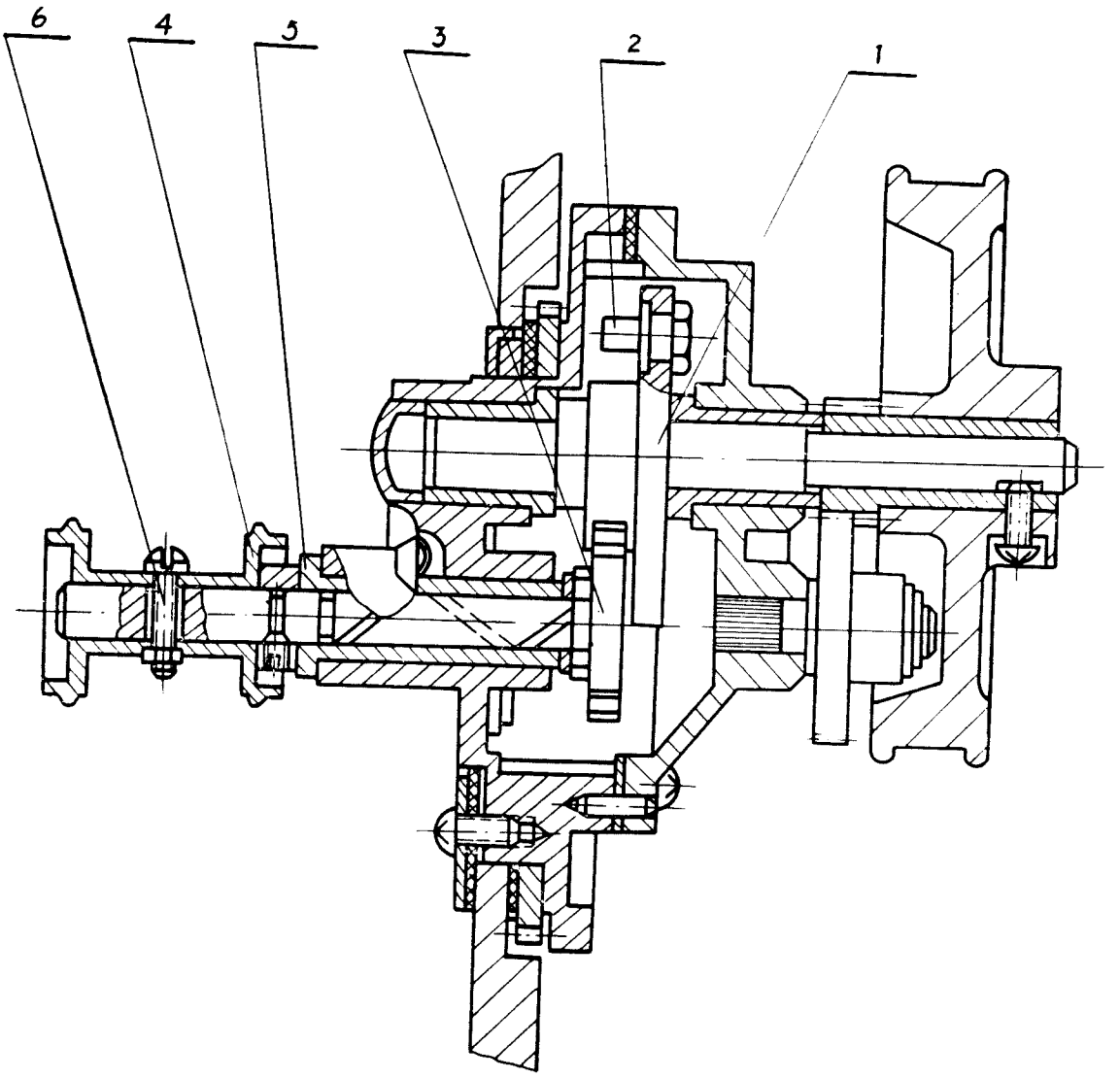


Fig. 2

1. Cam
2. Pin
3. Maltese Cross
4. 16-tooth Sprocket
5. Sleeve Bearing
6. Screw

3. Film Transportation Sprockets

There are three kinds of transporting sprocket, i. e. feed, take-up and intermittent sprockets. To ensure smooth engagement and disengagement between film perforation and sprocket teeth, the operating outer diameter of the feed sprocket is 0.2mm larger than it of the take-up sprocket. On the feed sprocket is marked with "103" (or # 22101) while on the take-up one marked with "103" (or # 22120) for identification. Do not interchange them otherwise damage will occur to film perforations.

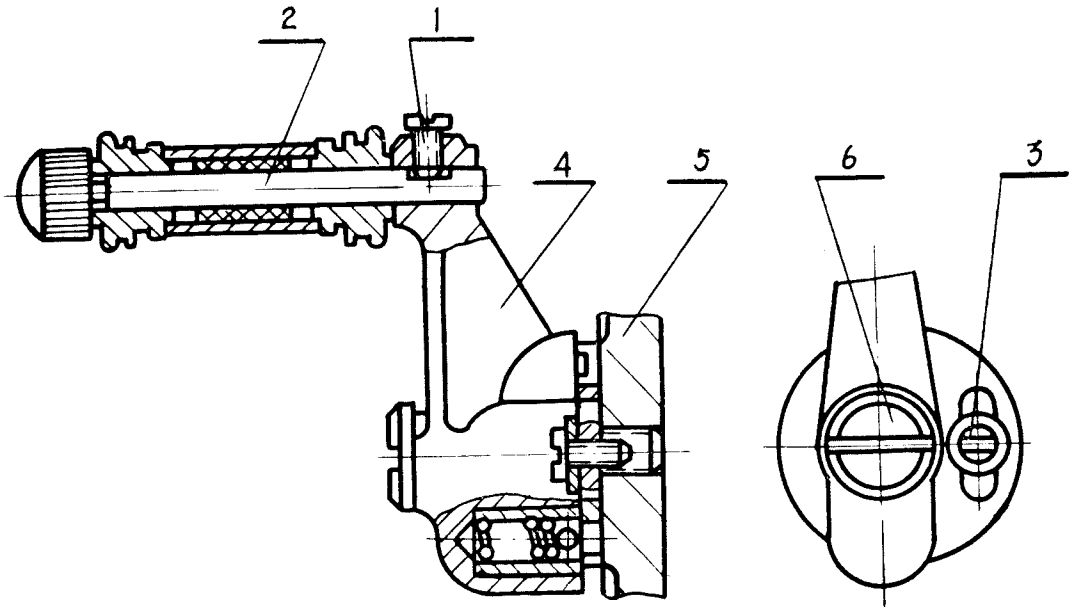


Fig. 3

1. Screw
2. Pad Roller Ass'y
3. Screw for Snap Spacer
4. Pad Roller Arm Ass'y
5. Main Chassis
6. Fastening Screw

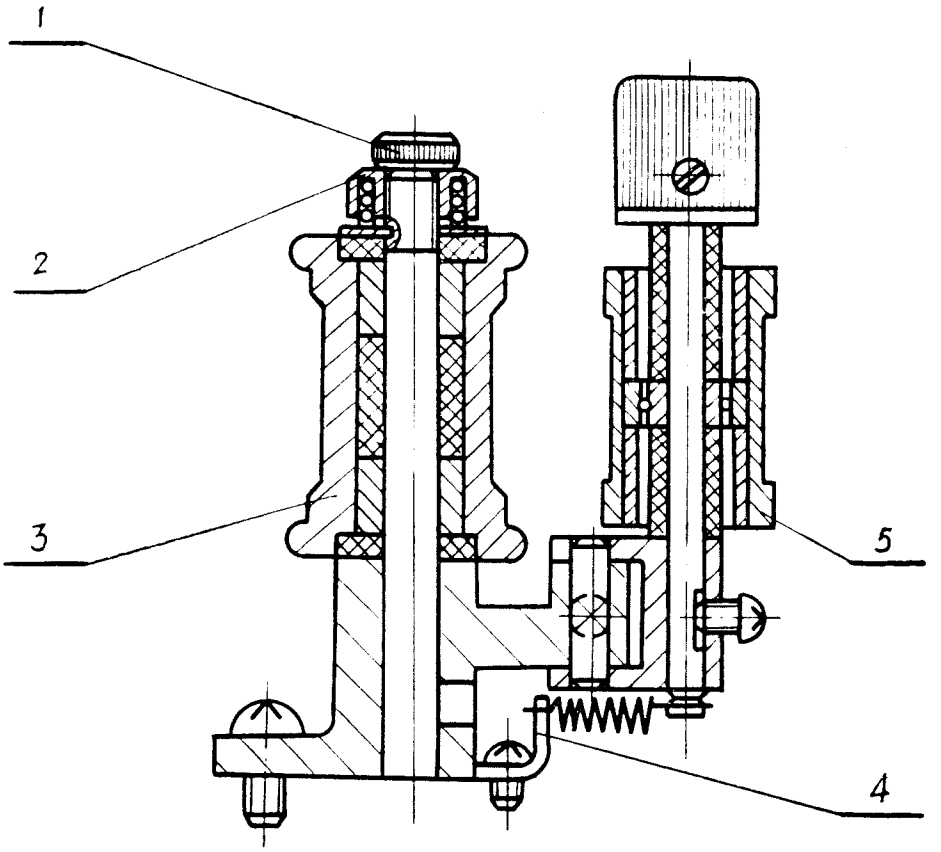


Fig. 4

1. Screw 2. Nut 3. Roller 4. Spring Plate 5. Pressure Roleler

4. Rollers

The rollers are classified as the pad roller, damper roller, shock-absorbing roller, sound drum pad roller guide roller and etc. according to the function of them.

PAD ROLLER

The pad rollers are press close type. Please do not pull close obstinately, so as to keep the shaft axis rectilinearty. The adjustment of the pad roller: Loosen screw(3), move the roller arm(4) to adjust the clearance (generally 0.3mm) between the pad roller and transporting sprocket.

DAMPER ROLLER

The damper roller construction is showed as Fig 4. Loosen screw(1), turn nut(2), the friction of the roller(3) can be adjusted. The pressure of the pressure roller(5) is adjusted by turning the spring plate(4) angle to change the damper.

SHOCK-ABSORBING ROLLER

Adjusting shock-absorbing roller should be cooperated with the damper roller. Turn the spring plate angle, so as to change the pulling force of the roller. When the film speed is normal, the shock-absorbing roller shaft should remain in the middle of its moving range about the front and the back. See Fig 5.

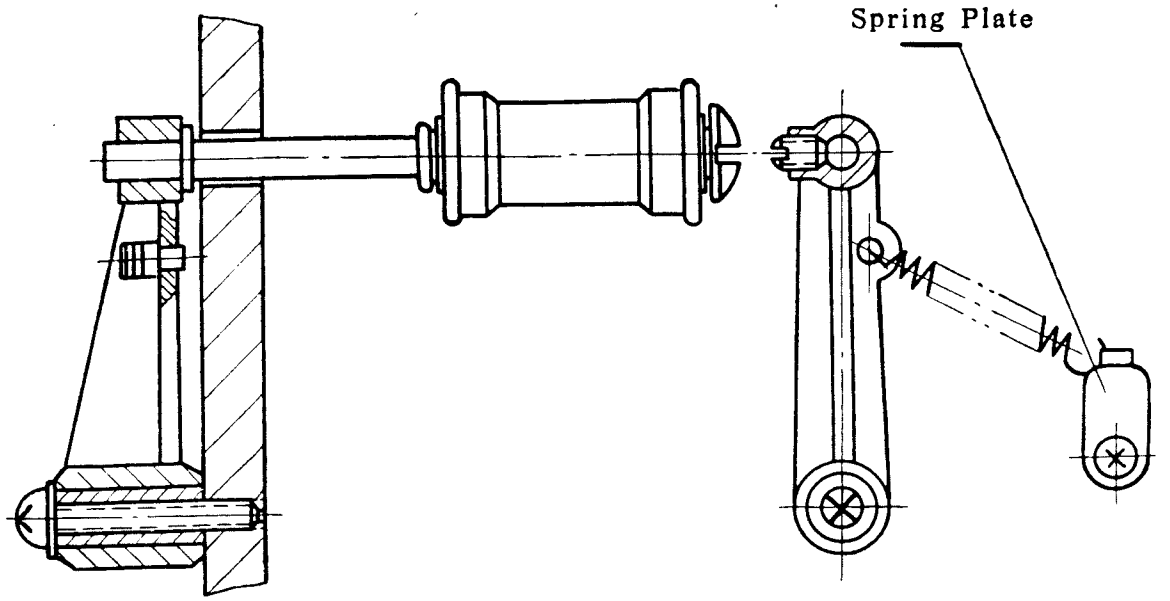


Fig. 5

SOUND DRUM PAD ROLLER

The action of the sound drum pad roller cdsld ensure the sound track aiming at the light spot. When making adjustment, turning a adjusting screw, the roller can be moved inwards or outwards until it is corrected. See Fig 6.

5. Framing Device

The framing device is used to eliminate the appearance of frame line on the

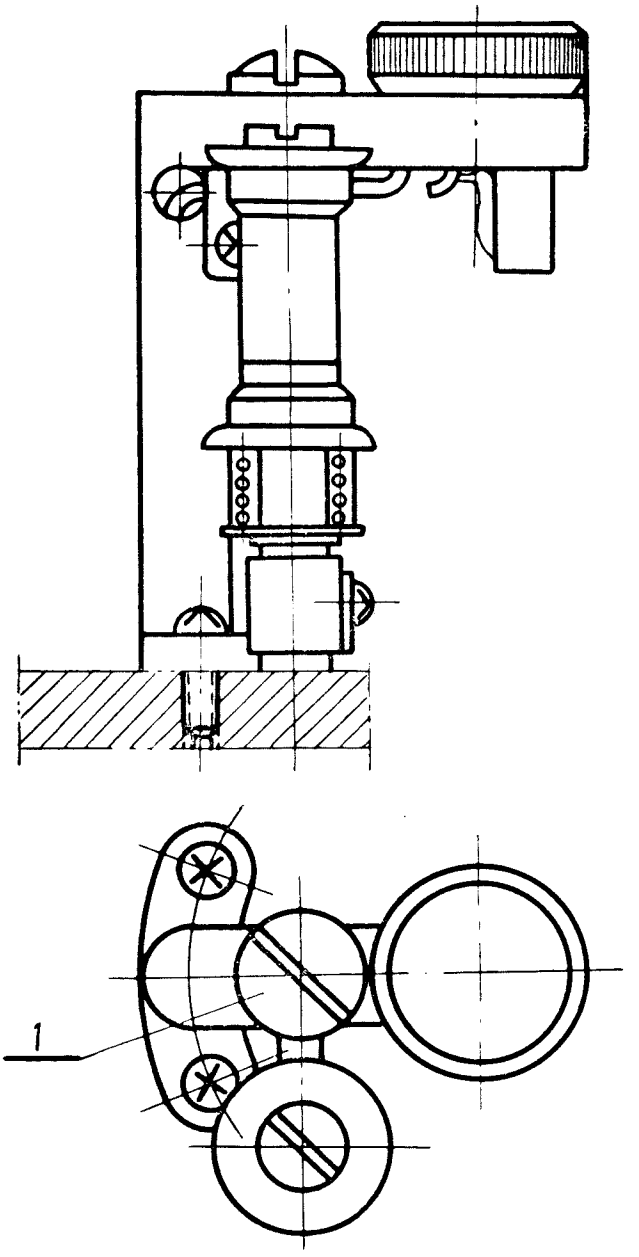


Fig. 6

screen, i. e., "stagger frame". When turning the Knob towards the right or left, the intermittent mechanism is rotateds 90 at same time. Thus a picture-frame is moved up or down on the film gate, so that no travelling ghost will appear during the adjusting process.

The adjustment of the shutter: Aim with a pointed object at any tooth of the inter-mittent sprocket. Then, keep the pointed object still, rotate the main drive pulley slowly by hand until the third tooth of the intermittent sprocket faces at the pointed object. Move the shutter till the center line of the shutter blade is in line with the center line of the film gate. When done, tighten it up. (See Fig. 7) In case the defect is beyond such correcting method, dismantle the sync-gear, adjust the shutter with the method stated above, mount the gear afterwards. If the shutter is still out of alignment, readjust it again according to the stated method.

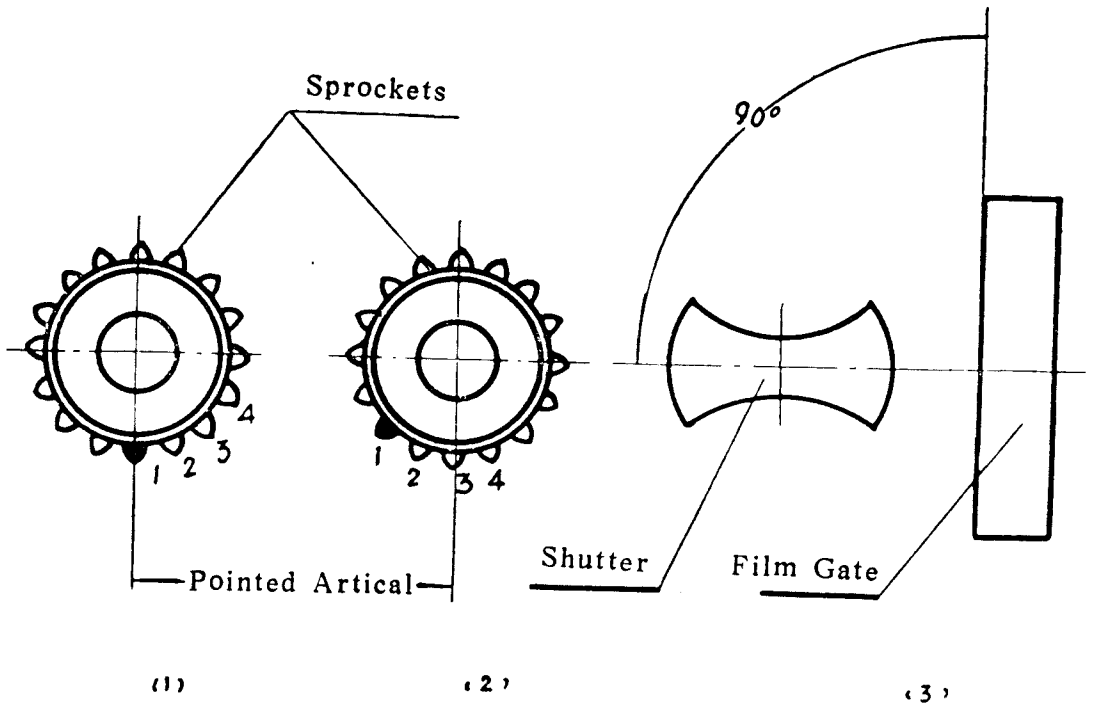


Fig. 7

6. Film Gate

The construction of the Film gate stand & cover is in serting type, easy for dismantling and clearing. When adjusting the tension of film gate, turn the nut(3) till the film tension is about 120-150 grams. A guide roller over the film gate is shown as Fig. 8, the roller could lead the film through the path correctly. Adjust the pressure of the tension shoe by turning the nut. If the tension

shoe is not in place or its plessure is unsuitable, the film jumping will occur during operation, so the working arces of the tension shoe should be tightly pressed against the working edges of the intermittent sprocket, meantime the side of the shoe should be in line with the side of the sprocket.

7. Projetion Light Source

It was fitted 750 W spherical xenon lamp as the projection light source, Lighted horizontally. the reflector was coated. The light beam can be adjusted via a reflector holder and a reflector adjusting stand. Method as follows:

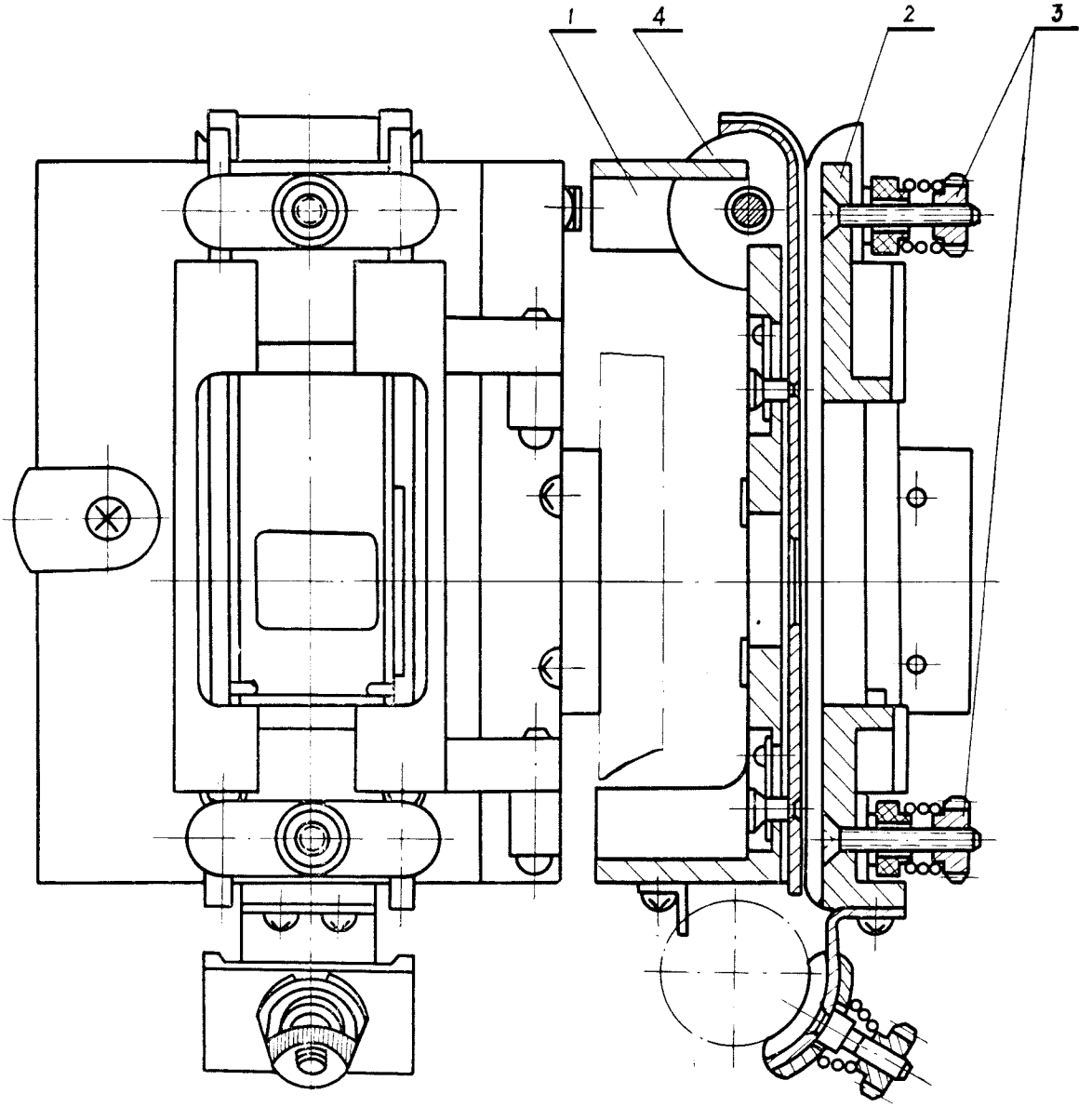


Fig. 8

1. Film Gate Stand
2. Film Gate Cover
3. Nut
4. Guide Roller

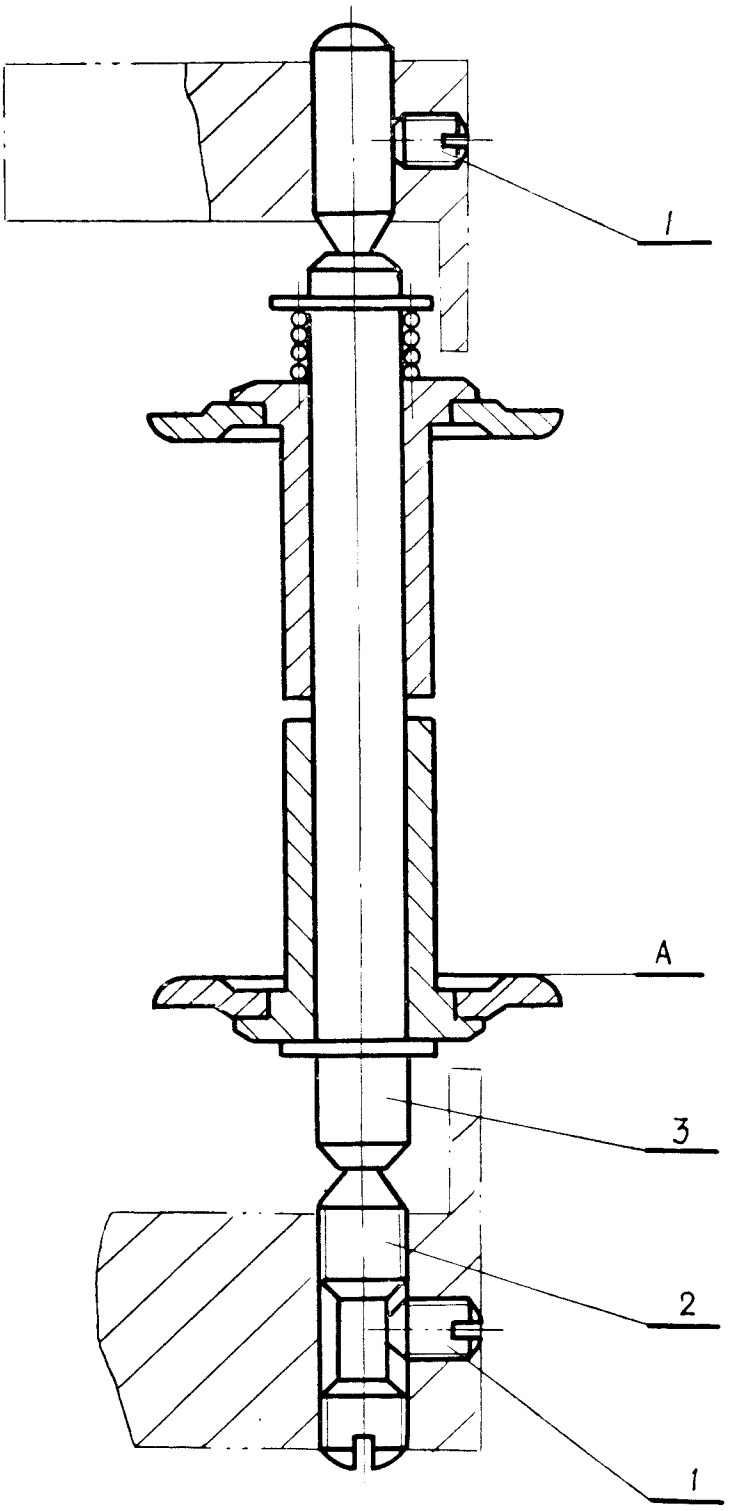


Fig. 9

1. Screw 2. Centre 3. Roller Shaft

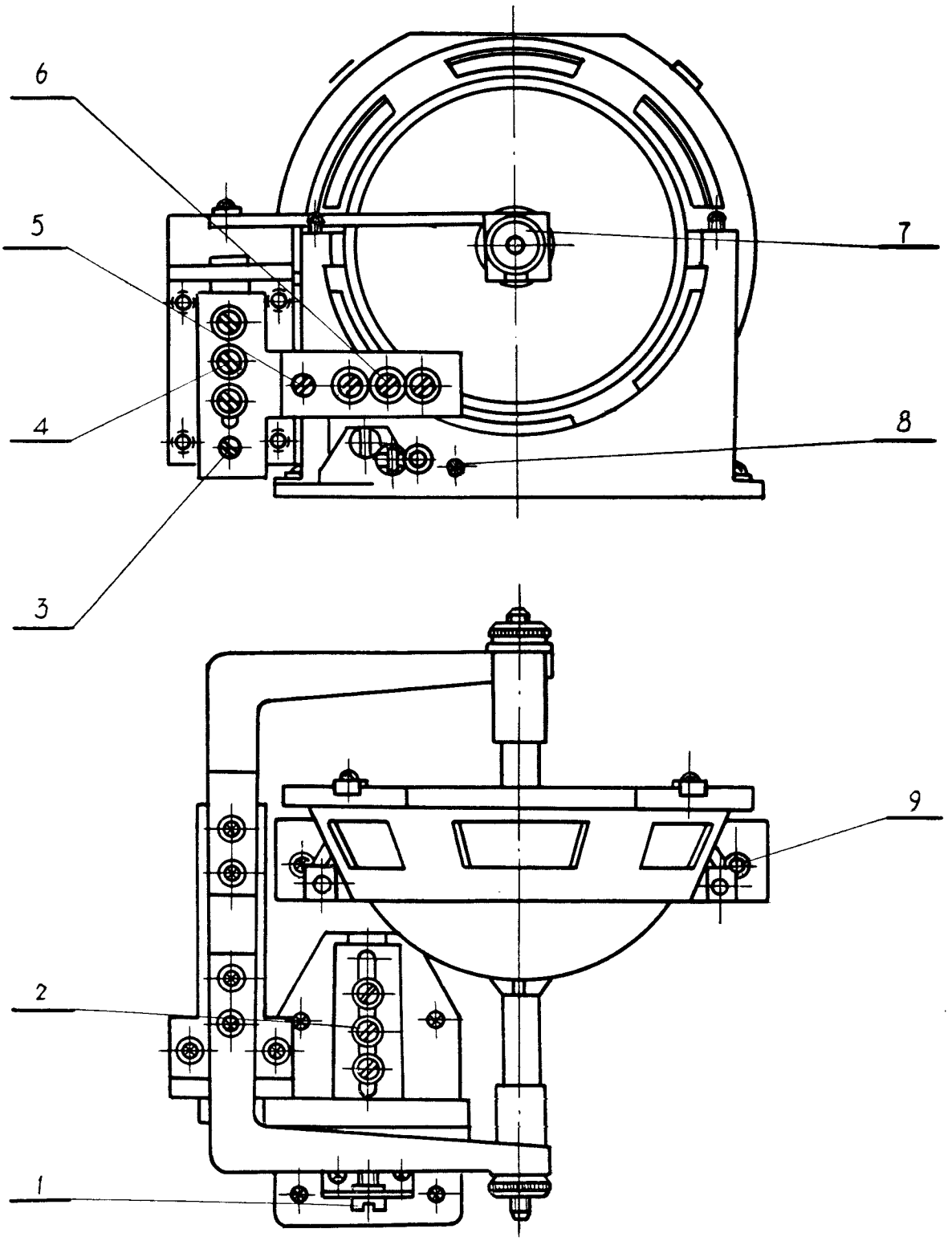


Fig. 10

1. Screw 2. Screw 3. Eccentric Pin 4. Screw
5. Eccentric pin 6. Screw 7. Knurled Nut 8. Screw 9. Screw

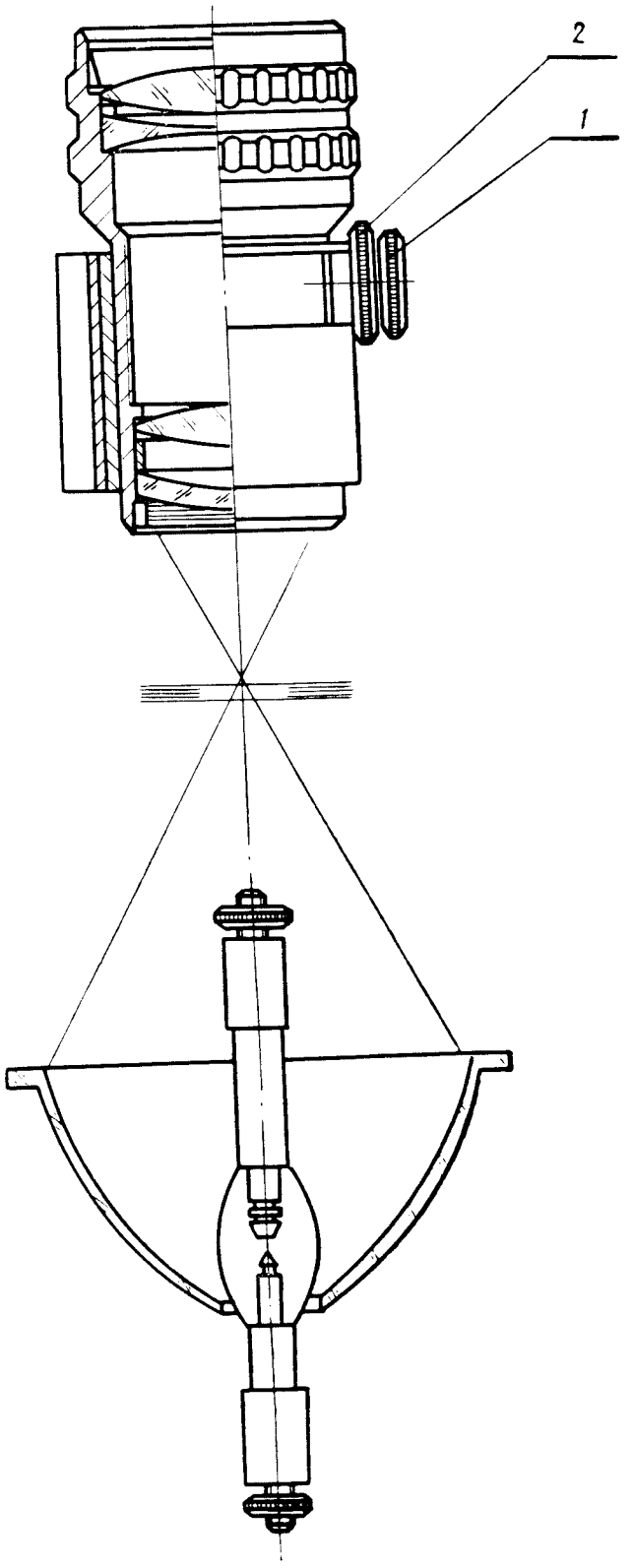


Fig. 11

1. Focusing Knob 2. Fastening Knob

Loosening the screw(2), adjusting the screw(1), the stand could be moved forward or backward.

Loosening the screw(4), adjusting the eccentric pin(3), the lamp could be moved inside or outside.

Loosening the screw(6), adjusting the eccentric pin(5), the lamp could be moved up or down.

Adjusting the screw(8), or (9), the reflector can be tilted or be level for adjustment, so that, it can get the optimum brightness and the even light distribution on the screen. Lastly, locking the screw No. (2)(4)(6).

8. Projection Lens

The projection lens is composed of fourpieces of the achromatic spherical lenses which were coated. Ordinarily, it should be kept cleanliness. When cleaning, first wipe it with soft camel hair brush, then carefully clean them

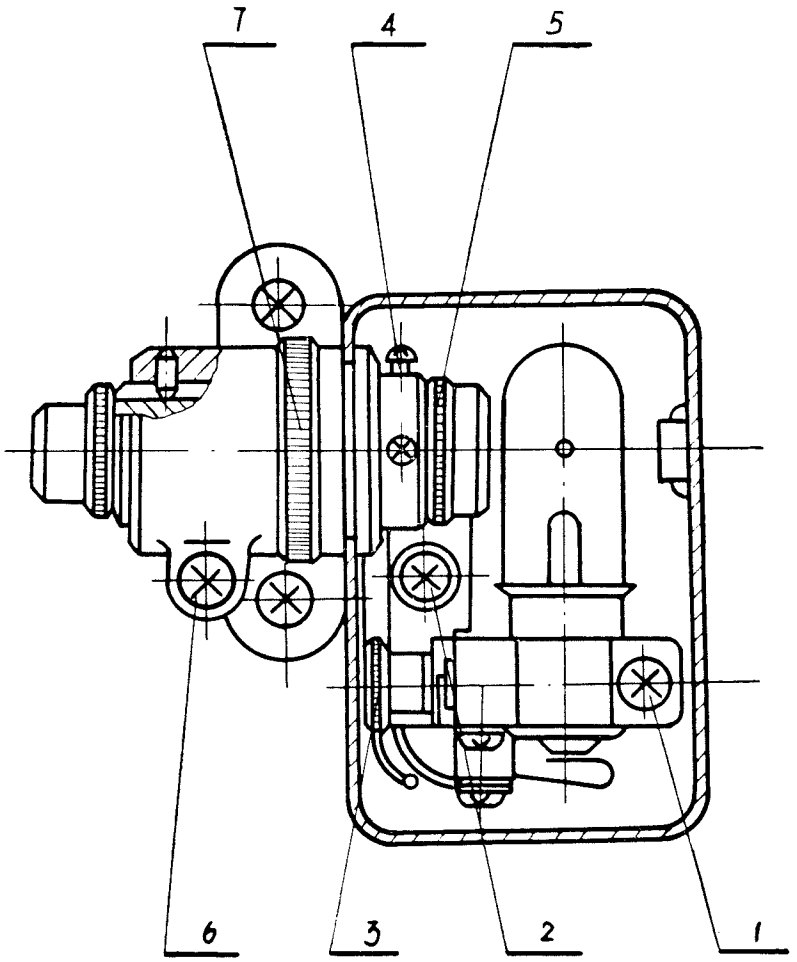
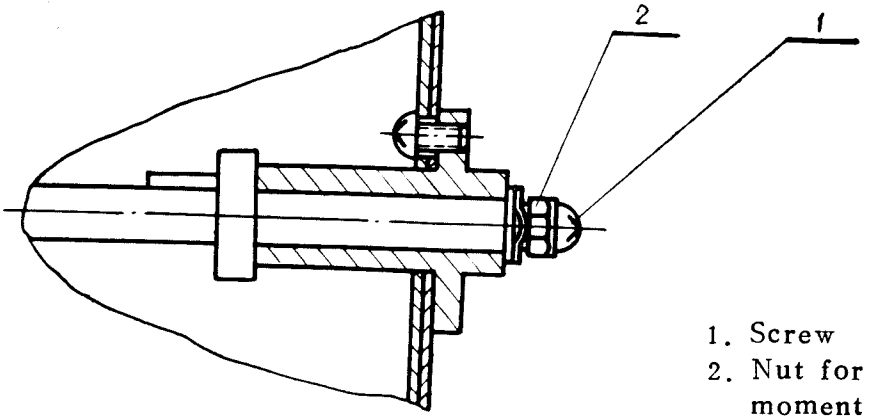


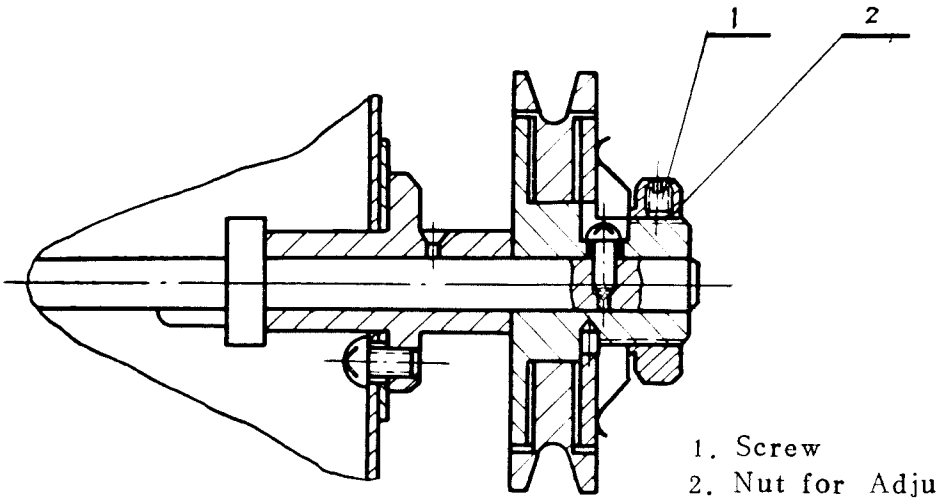
Fig. 12

1. Screw 2. Screw 3. Screw of Knurled Head 4. Screw
5. Convergent Lens-barrel 6. Screw 7. Focusing Nut



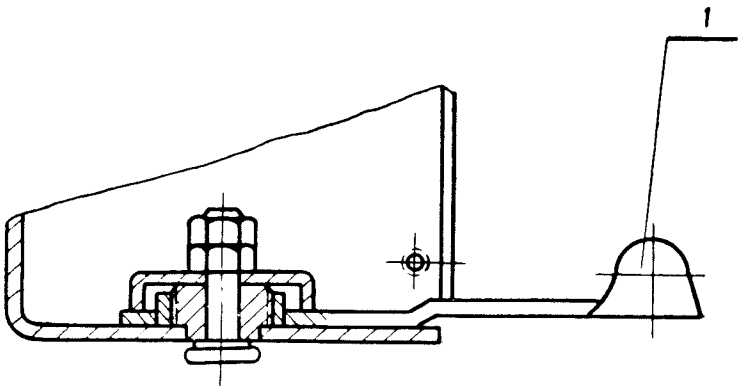
1. Screw
2. Nut for Adjusting moment

Fig. 13



1. Screw
2. Nut for Adjusting Moment

Fig. 14



1. Fastening Bar

Fig. 15

with absorbent gauze dabbled with the mixture liquid of 50% alcohol & 50% ether.

9. Optical Sound Reproduction System

The exciter lens is made up with the spherical achromatic lens elements. See Fig. 12. Loosening the screw(1), the exciter lamp can be turn. Loosening the

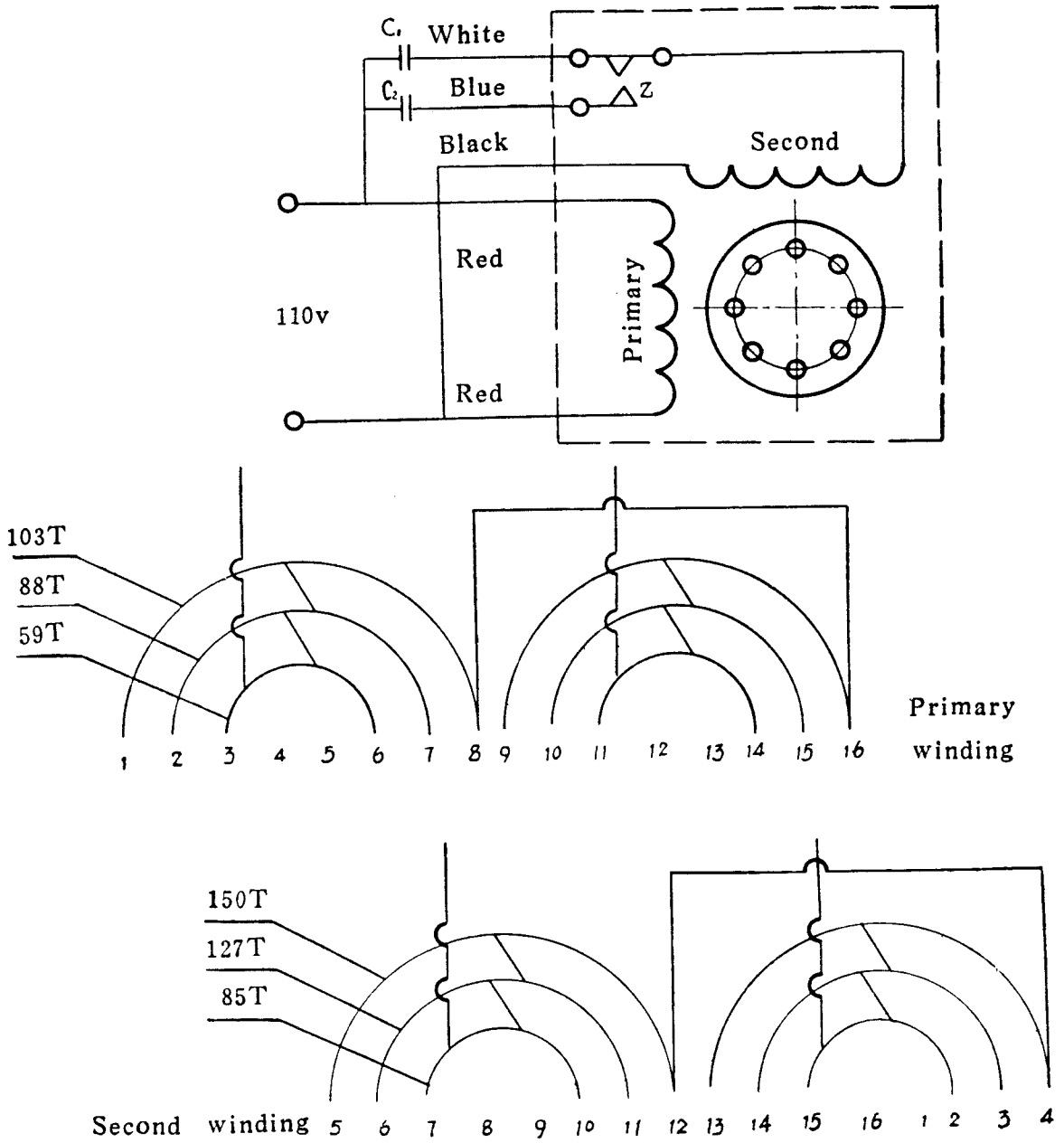


Fig. 16

C1—Running capacitance CZJJ-2-250V-10uF
C2—Starting capacitance CDJ-110V-50uF
Primary winding—∅0.49 MM HS enamel-polyester wire
Second winding—∅0.41 MM HS enamel-polyester wire
z—Eccentric switch

screw(2) or (3), the position of exciter lamp can be adjusted separately inside & out side or in up & down directions. Loosening the screw(4), turning the Convergent lens-barrel(5), the horizontal position of the mechanical slit can be adjusted. Loosening the screw(6), and turning the focusing nut(7), the focus of the exciter lens can be adjusted on the film, so as to obtain the well volume & the best tone quality. The focus of the exeiter lens is accurately adjusted with 7000 Hz-test film before delivery from the factory and therefore needn't adjustment unless absolutely necessary.

10. Magazine

The feed film tension can be adjusted, so as to ensure the stabilitr & evenness of the feed film. The less tension, the better, in case the freely feed film does not occur. See Fig. 13.

The take-up system employed in this projector is a finely constant friction torque mechanism. See Fig. 14. The take-up tension can be adjusted by loosening screw(1) and turning the nut(2), in order to avoid the damage to film.

The feed & take-up magazines can be fastened & locked with a special designed device in the bottom of them, see Fig. 15. So that the magazines are stable in projecting process.

11. Motor

The motor is of sqnirrel-cage induction type, 16 winding grooves (stator), single phrase and two-pole one, mounted a ecc-entric start switch inside, equipped with a start condenser (50 uF) thus increasing the start torque. The condenser of run-ning is 10 uF. The wiring diagram is showsd as Fig. 16. The colour of the leads are defferent. After wiring, if the motor turn inversely, please exchange the two pieces of the red wire, then wiring them again.

OPERATION AND MAINTENANCE

To ensure satety and excellent performance as in well as in avoiding failures and prolonging the lives of the films and the projector, the projector must be properly operated and maintained. This is an important job of the projectionist to perform and must be carried out carefully.

(1) Preparation before Performance

If the performance is to be carried out in open air, choose an open and flat ground which is far away from any brooks and any places in danger of fire hazard, so as to ensure safety, besides, should ascertain the condition of the power source supply. When hanging up the screen, take note that it is easily visible to the audience and not interfered by stray lights.

The projector should face the screen. A distance of about 1.2 meter should be kept between the two projectors, so as to perform easily. The relationship

between width of projectable image area(W), projection distance(L), and focus of lens(F) is given by:

$$W = \frac{A \cdot L}{F}$$

The A means wicth of aperture (Standard: 20.9 mm).

When are you going to set up the projector, first set up the tripod, then mound the projector on it. After fixing the take-up belt, you can take out the upper and lower magazines and set them up accordingly.

(2) Inspection & Cleaning before Projection

Check whether every tension & pressure of the projector.

Check whether the transmittant parts, the film path elements and screws get loose.

Check sound drum and all rollers to see whether they turn freely.

Clean the dust and the dirt from the elements of the film path and the optical parts.

Check the oil tank to watch the oil level.

Lubricate the parts with lubricating oil as specified and wipe off any overflow.

Connect the machine to the electricity supply and start the motor, check whether the driving mechanism is normal.

Switch on the projector lamp, check the luminosity aud evenness of light.

Turn the total volume knob toa suitable position, then take a piece of paper and move about it in front of the exciter lens to cut or open the light ray, at this time, the loudspeaker should sound the "popping" noise. Otherwise, it means that sound reproduction system have to inspect, adjust and fix the breakdown.

(3) Threading and Projection

Thred film according to the film path of the projector after loading a reel of film in the upper magazine. The emulsion side of film should be faced to the projection light source and the sound-track on the outer edge. Leave a proper loop between the take-up sprocket and the film gate. Leave another film loop between the intermittent sprocket and the middle guide roller. When threading is done, turn the driving mechanism with a crank to chech the proper threading.

Before projection starts, keep the volume of the amplifier down to the minimum and then turn on the motor and the projection lamp in sequence. The exciter lamp is also switched on at the same time. Raise the volume until it attains a suitable level. At the same time, watch for proper framing and focusing. Make adjustment If necessary.

Before each change-over, remind the other projection ist to have every-

thing ready prior to the first change-over cue. When the first cue appears, start the motor of the second projector and change-over on the second cue. Stop the motor when the film runs out from the first projector, then load another reel for the next projection.

(4) Maintenance of Machine

In case the projector is not in use, store it in a dry, ventilated and safe place. Do not keep it in any place exposed to wind, rain or direct sun shine. and prevent the corrosion of the acid & alkali. In case it has to be stored without using for a long time for some reasons, apply an antirust grease coating on all unpainted parts and periodically connect cnrrent to the projector, specially the amplifier and xenon power source. It should be dampproof and shockproof during transportation.

The machine should be inspected periodically. Generally, the following inspection and adjustment should be carried out after every 30 performances:

Check the tension &pressure of film path elements to see whether they are proper. Check the clearance among the mechanism units whether proper, sound drum and rollers turn whether free.

Inspect the whole film transporting mechanism. Adjust it until all parts (with the exception of the sound drum pad roller) are not directly in contact with the sound track and picture areas.

Check whether the driving mechanism is worn or loose. Tighten the screws on all parts if they are loose.

Observe whether the illumination on the screen is even, listen in the sound quality effect whether better.

Check whether the position of the shutter is correct, and the automatic fire shutter is reliable.

Check the contacts on all cable plugs, sockets and switches.

After all the adjustments are made, use a length of new film as test lood and runpit in the projector for 130–150 times. Then check for scratches and perforation damaged.

If something is out of order, it should be adjusted and repaired in time. Prohibit performance with defect.

The machine should be kept clean. Scrap the film transporting parts with dry soft cloth and wipe the dust of the sprockets with teeth brush after projection for every while.

The optical lens should be cleaned according to the require. The reflector surface do not be scrapped but can blow it with bellows or with soft camel hair brush wipe it gently. It should be dampproof strictly so as to avoid the coating peeled off.

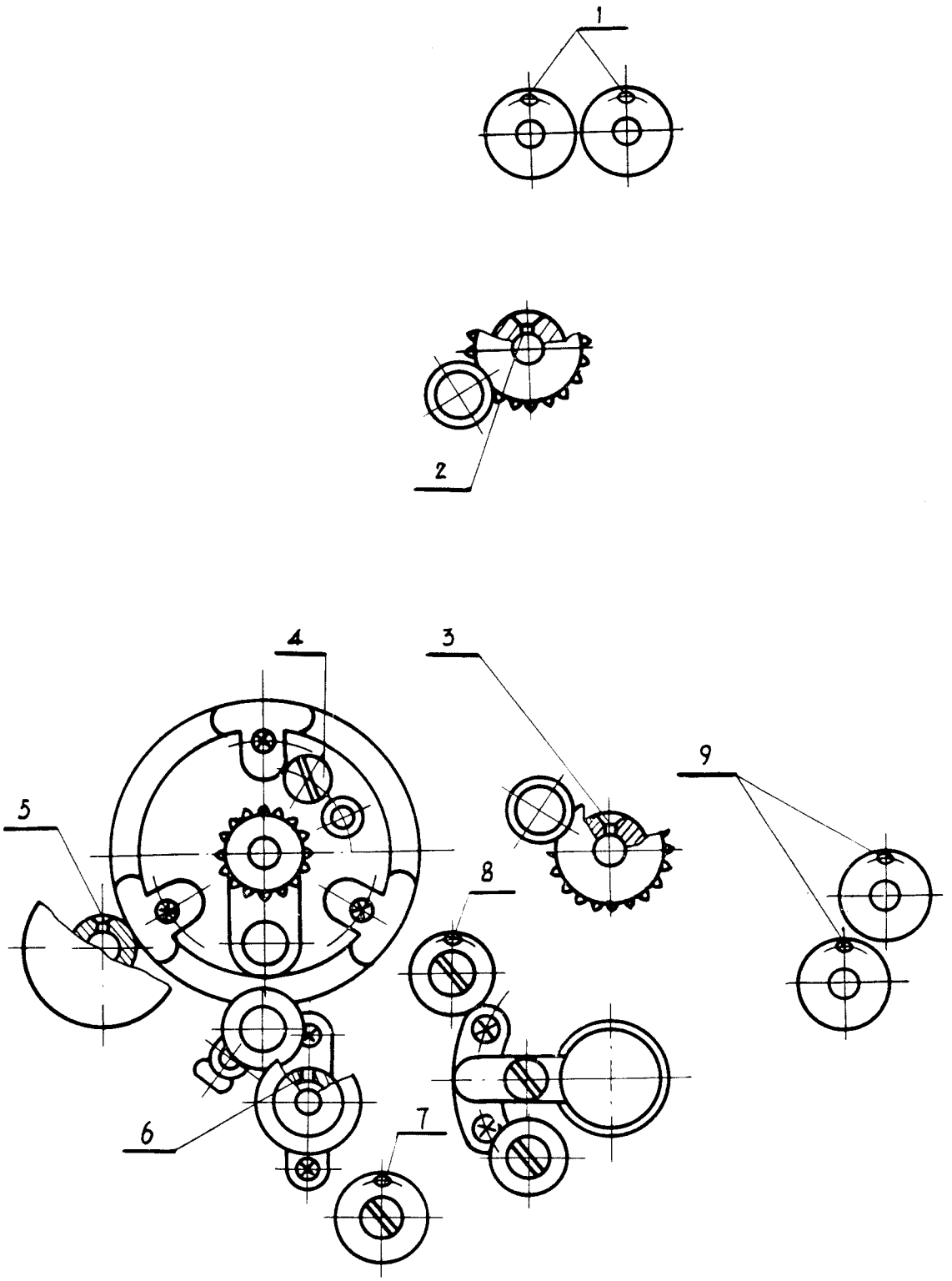


Fig. 17

Lubricating Points on the Front Partsof Projector

As the projector will be used in places of different climate, the lubricating oil used should be changed according to local temperature. Generally, machine oil No. 30 is suitable in higher and No. 10 in lower temperature. The oil holes of the projector is shown in Fig. 17. 18.

The oil tank of the Maltese cross should always be filled with lubricating oil. Maintain the oil level up to the middle of the sight window, when the sight window is located in the middle line position. The pad roller and the sound drun pad roller should be dismanted for lubricating, the driving gear needs oilling a little also.

Where it could damage the film is shown in Fig. 19, noticing inspection and maintenance in use.

(5) Installation of Xenon lamp

Fastened the one terminal of lamp (cathode), and not to do for another one (anode) with which could be support the lamp only.

In this way, it could avoid explode if it was uncoaxial or deformed by being

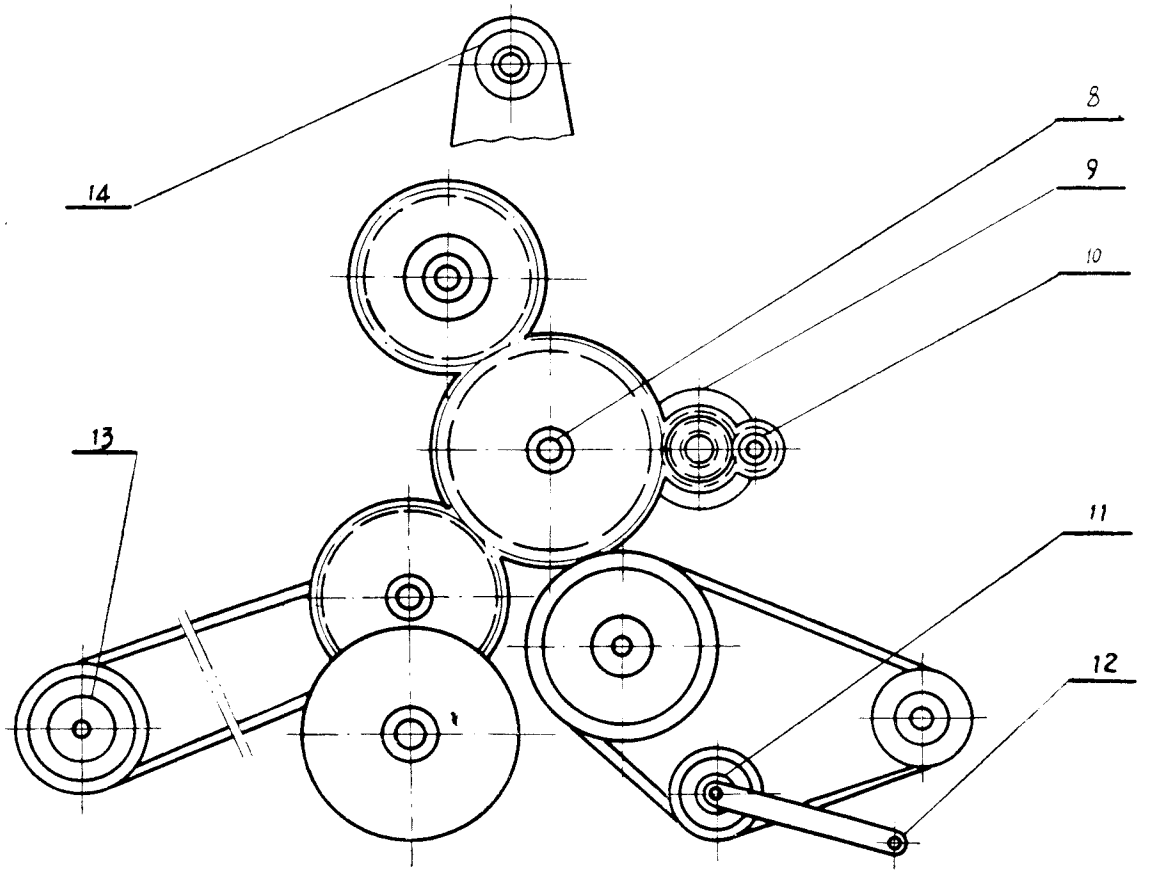


Fig. 18

Lubricating Points on she Rear Part of the Projector

heated. So as to prolong the life of the lamp.

Generally, after projecting motion picture for 30 to 50 hours, the lamp should be turned 5°～15° degrees. Thus it could prolong the life of the lamp.

(6) Installation of the blower

Remove 4 pcs of nut M4, 4 pcs of screw M4×8 from the blower. Twist 4 pcs of pin into the screw hole on the top of the lamp-house, then install ate the axial-flow blower MZ 30. For the cover of the blower, fasten it with 4 pcs of screw M 4×8. If connected the blower turn reverse, exchange the position of any two of blower please.

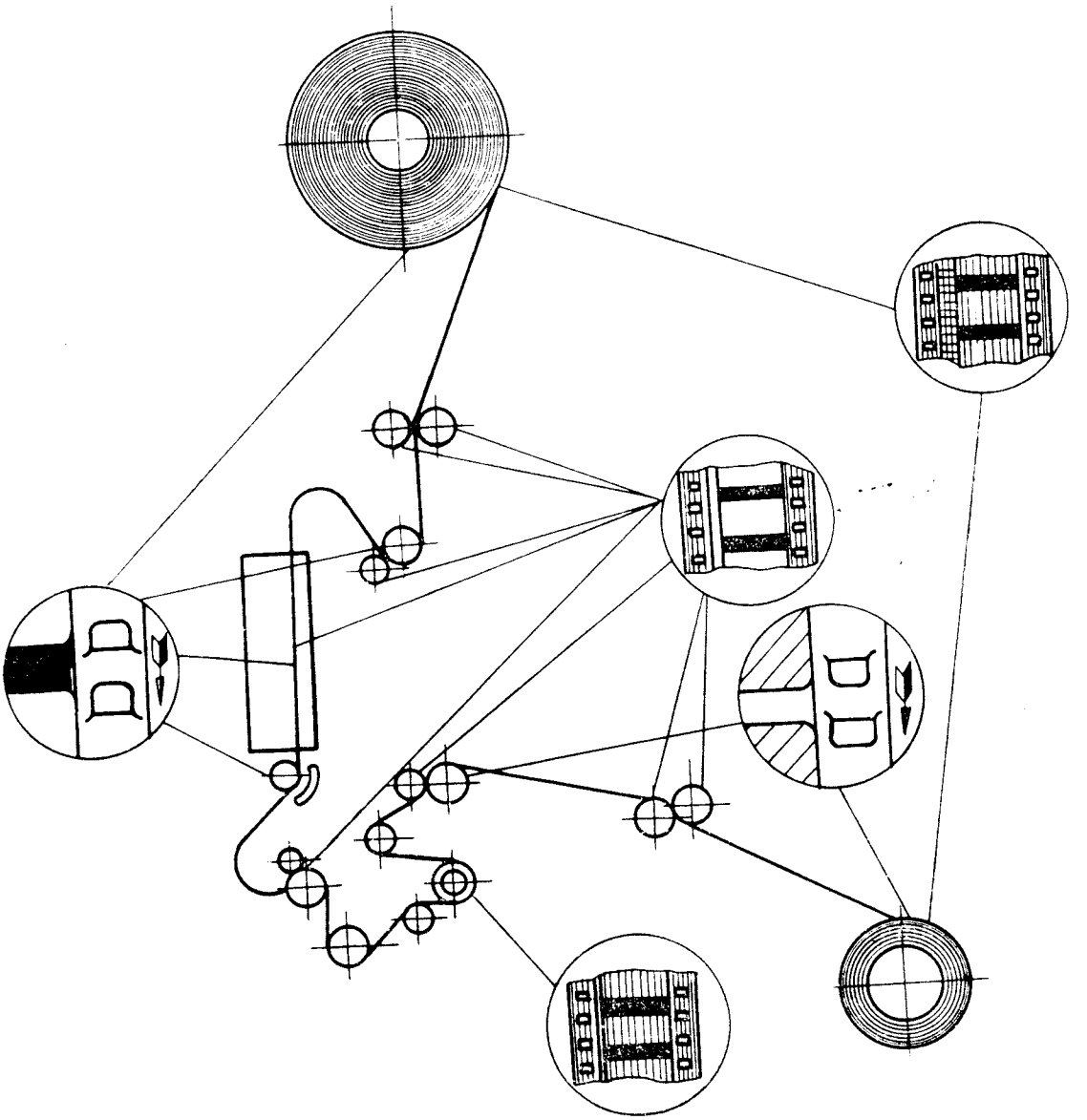


Fig. 19

PACKING LIST OF A COMPLETE SET

I. Projector	QTY.
1. Model 104-X_2 Projector (include a lens JF 35/120)	2
Feed & Take-up Magazine (equipped 4 pcs spool, bar and pin for each one) each 2 sets	
Rewinder (equipped 2 pcs of spool, bar and pin)	1 pair
Casting Cover of Fan	2
2. Accessories:	
W.S. Lens Holder	2
W.S. Aperture Mask	2
Cut-frame off Aperture Mask	2
Sound Reproduction Cable	2
12-pin Power Cable (L=2.5 M)	2
Handle	2
104-X2 Projector Operation Manual	1
60 Hz Belt Pully	2
3. Tools:	
Tool Packet	1
Adjusting Spanner	1
Locking Spanner	1
Screw Driver 6″	1
Screw Driver 4″	1
Screw Driver 2″	1
Cross Sorew Driver 3″	1
Cross Sorew Driver 4″	1
Round-nose Pliers 6″	1
Scissors 6″	1
Small Oil Can	1
Oil Tank (machine oil 2#)	1
Belt Wax	1
4. Spare Detail:	
Maltese cross Ass'y	1
Cam Disc Ass'y	1
16-tooth Intermittent Sprocket	1
20-tooth Intermittent Sprocket	1
Connecting Gear	1
Drive Belt Pully	1
Sync Gear	1

	QTY.
Pad Roller Arm	1
Spring	2
Tension Pad (inside)	1
Tension Pad (outside)	1
Spring for Tension Pad	4
Motor Belt	2
Take-up Belt	2
Spring	2
Pilot 6.3 V, 0.15 A	4
Exciter Lamp 6 V, 2 A	2
Sillicon Photocell (2 CR 34.5×10)	2
Condenser CBY 1000/3 OKV	2
Retaining Ring ∅3.5, ∅4, ∅5, ∅6, ∅9	each 2
Iron washer ∅8×0.5, ∅8×0.2, ∅10×0.2, ∅10×0.8	each 4
Paper Washer ∅10×0.5	4
Cloth washer ∅8×0.5	4
Cross Screw M 2.5×8, M 4×8, M 3×8, M 4×12	each 4
Plug Sorew	2
Spherical Xenon Lamp XQ 1000 W	2
Reflector	2
5. Packege:	
Plastic Packet, EPS Spacer and Packing Box	2 sets
Magazine, EPS Spacer and Paper Box	1 set
Tool Box and Paper Box	each 1
Moistureproof Agent	2
Paper Box for Casting Cover	2
Ⅱ. Tripod	
TriPod	1 pair
Cloth Packet and Paper Box	2 packets and 1 box
Top Plate, EPS Spacer and Paper Box	1 set
Ⅲ. Loudspeaker	
Loudspeaker Cabinet (included 2 pcs of loudspeaker 16 ohms, 20 watts)	1 group
Cable	1
Moistureproof Agent	1
Paper Box	1
Ⅳ. Amplifier	
Model FK 40-5 Amplifier	1 set

	QTY.
Cable (BY 5301-18)	1
Manual	1
Fuse ∅5×20, 5 A	3
∅5×20	3
Plastic Packet, EPS Spacer and Paper Box	1 set
Moistureproof Agent	1
Ⅴ. Xenon Power	
Model XD 1000-3 Power Supply	1 set
Manual	1
3-pin Line Cord (BY 5301-16)	1
No. 1 Spare Parts Ass'y (XD 1000-3-070100)	1 pack
Fuse (XD 1000-3-070200)	1 pack
No. 2 Sparts Parts Ass'y (XD 1000-3-070300)	1 pack
Plastic Packet, SpacerPlate, EPS Spacer and Paper Box	1 set

Shanghai August 1st
Film Machinery Factory
P.R. China