

**CARE AND
OPERATION**

of the

Keystone

PROJECTOR

8

MILLIMETER

MODEL

K-109

**KEYSTONE
MANUFACTURING
C O M P A N Y**

151 HALLET ST., BOSTON 24, MASS., U.S.A.

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Foreword

You will enjoy the satisfaction and pleasure of being able to produce life like pictures upon the screen, of people and scenes which are familiar. This instruction book is intended to guide and help you to operate your projector.

Standard equipment consists of one empty 400 foot film reel, a 1" projection lens and a 750 watt lamp packed with the projector.

The motor on this projector operates only on 110 - 120 volts alternating or direct current. If you do not know the line voltage we suggest that you ask your local electric service company. If the voltage of the lamp is less than the line voltage the life of the lamp will be much shorter.

The operation of this projector is very simple, but unless these instructions are accurately followed, there will be danger of injuring both the machine and your film.

Explanation of some of the parts shown in figures.

Aperture Plate	Contains aperture and film track
Still Picture	Engages motor to mechanism
Pressure Plate Latch	Holds pressure plate open
Film Guide — Upper — Lower	Holds film on sprocket
Framer Lever	Adjusts picture on screen
Hand Setting Knob	Moves film one frame
Master Switch	Controls current to motor and lamp
Pressure Plate	Holds film steady at aperture
Pilot Light	Light to thread film in dark
Reel Lock Clip	Holds reel on shaft
Reversing Switch	Reverses Motor
Rewind Lever	Engages mechanism to rewind film
Sprocket	Feeds the film
Supply Reel	Holds the film to be projected
Take-up Reel	Takes up the film after projecting
Tilting Knob	Permits angle projection
Splicer Drawer	Contains Built-in Splicer

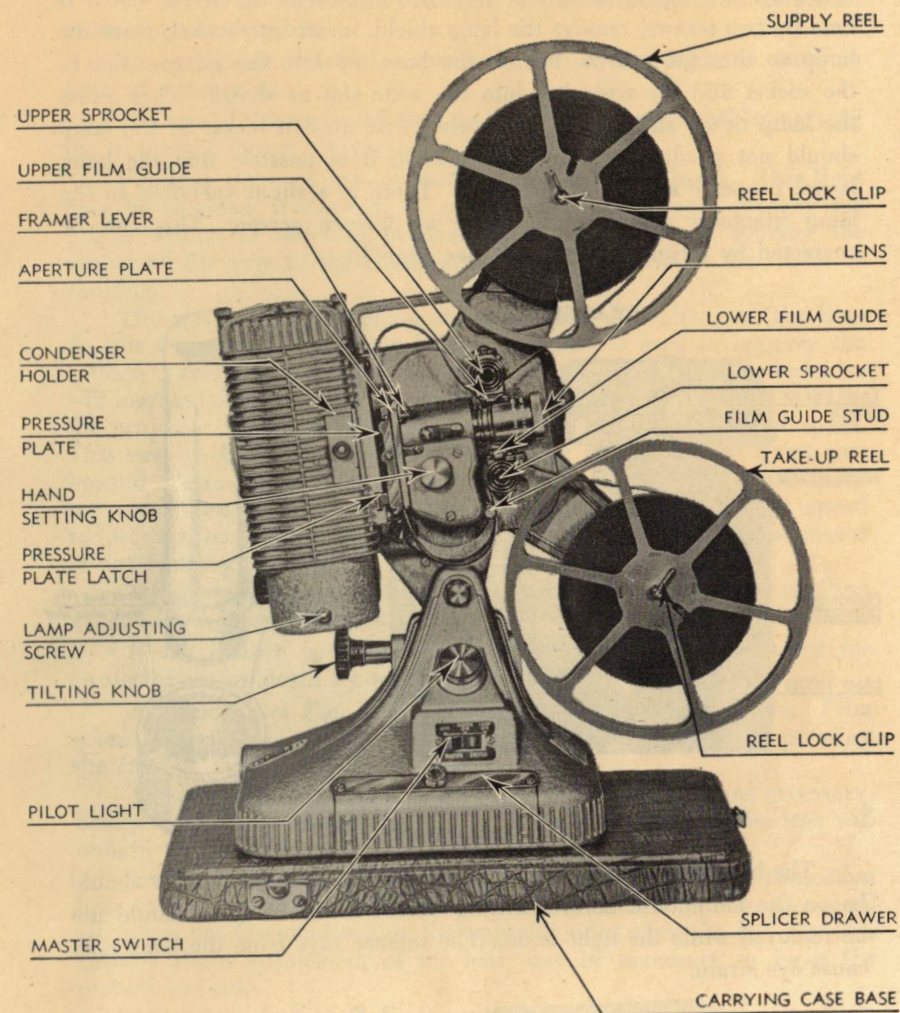


Fig. 1

Installing Lamp

The lamp is packed in an individual carton. Remove and unpack carefully. To install the lamp, remove the lamphouse cover, which is held by two screws, remove the lamp shield, insert into socket, place the lamp so that the narrow lug on the base fits into the narrow slot in the socket and the wide lug into the wide slot as shown. Then press the lamp down and turn right or clockwise until it locks. If the lamp should not produce a clear even screen, it is possible that the lamp is not properly seated in the socket. There is a slight variation in the lamp filaments which might cause an uneven screen. This can be corrected by adjusting the lamp, see page 15.

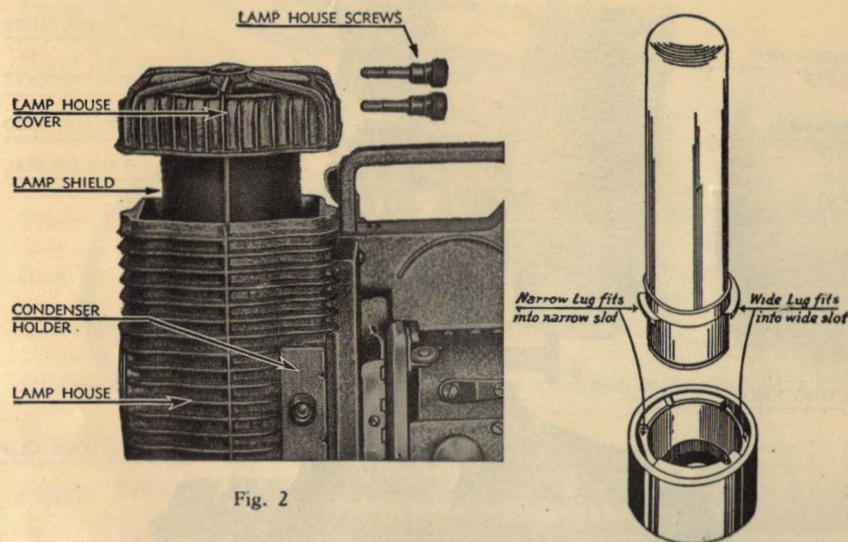


Fig. 2

The lamp shield should be replaced and the lamphouse cover should be on the lamphouse before turning on the current and it should not be removed while the light is on. The intense rays from the lamp may cause eye strain.

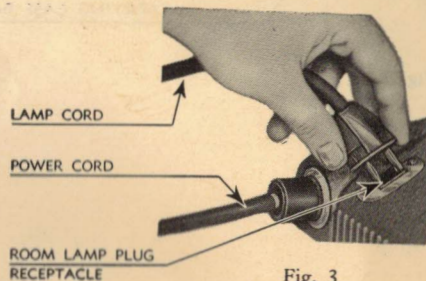


Fig. 3

A floor lamp or table lamp may be plugged in to the receptacle marked "Room Lamp Plug," the lamp will automatically go off when the Projector Master Switch is ON. It will come on again when the Master Switch is turned OFF.

Operating the Projector

To obtain the maximum brilliancy on the screen, the room should be as dark as possible.

The projector should be operated from a firm table or stand in front of a screen.

The size of the projected field on the screen is regulated by varying the distance between the projector and screen.

Plugging the cord into an outlet, lights the pilot lamp. This light may be shielded, if desired, by rotating the dome top. Moving the master switch to the mid position operates the motor, moving the switch all the way to the right turns on the lamp while the motor is running.

The speed of the projector depends upon the voltage of the line. As this varies in different localities, a rheostat is used to regulate the voltage operating the motor. Turning the speed control knob clockwise will increase the speed and counter clockwise decrease the speed. When the projector is in operation the knob should be set at normal speed. This can be determined by speeding up the projector to a point just beyond where the light flicker on the screen, stops. At normal speed the ventilation is sufficient to protect the lamp, while a lower speed reduces the ventilation. The lamp cannot be turned on when the motor is not running.

The reversing switch, Fig. 5, should be in the forward position except when it is desired to run the film in reverse for special effects.

If the picture is too high or too low on the screen, pivot the projector up or down by turning the tilting knob Fig. 1.

A framer lever Fig. 1, changes the location of the aperture. Film when aged shrinks slightly and adjustment can be made by pressing the framer lever up or down.

Turning the projection lens Fig. 1, to the right or left, as necessary, brings the picture on the screen into sharp, clear focus. The lens will remain where set.

Reversible film has the emulsion on the side nearest the projection lens while duplicates from originals or prints from negatives often used for titles, has the emulsion on the opposite side, when the reel contains both, a slight adjustment of the lens may be necessary to focus the picture and title.

A continuous flow of air is necessary to carry off the excess heat. The lamp generates sufficient heat to melt or expand the glass bulb, unless properly ventilated by forced draft.

The still picture lever must be in the "motion picture" position to operate the projector. The "still picture" position is used only when stopping for a still.

To stop the machine turn off the master switch.

When rewinding the film from the take-up reel, the rewind lever should be moved to the "on" position BEFORE STARTING THE MOTOR. For normal operation the rewind lever should be at the "off" position.

Threading the Film

Reels must be **STRAIGHT** and **RUN TRUE**. Bent reels cause the film to bind and jam, interrupting the operation of the projector. They should not be put on or removed from the reel shaft while the light is on as the jar may break the filament of the lamp.

Before threading the projector with film, focus the projection lens on the screen by moving the lens backward or forward and finally rotating for sharp edges of frame line on screen, this will give approximate focus. When the film has been threaded, a slight adjustment will be necessary for accurate focus.

Place the reel on the upper reel shaft as shown in Fig. 1 so that the film draws from the top of the reel and the picture upside down.

The lug on the reel shaft will fit into the slot of the reel. The round hole will be on the outside nearest the reel lock clip. Turn down the reel lock clip to lock the reel in position.

Unwind about two feet of film for threading purposes.

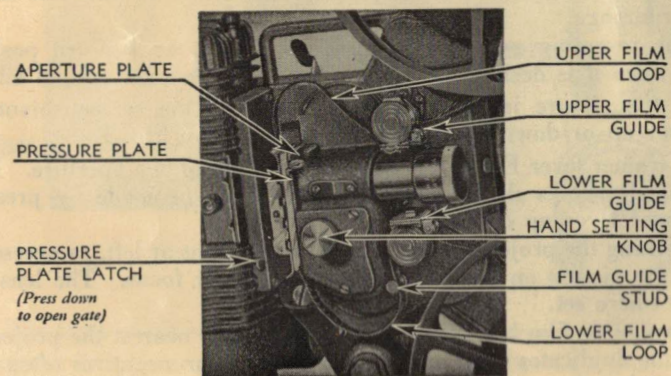


Fig. 4

Press the upper film guide down and insert the film under the upper sprocket, the film perforations must engage the teeth on the sprocket, push the film guide up to its normal running position.

Open the film gate by pressing down the pressure plate latch until the pressure plate is held back. See Fig. 4.

Slide the film into the gate forming an upper film loop as shown. Press back on the latch, releasing the pressure plate.

The film must be seated in the track of the aperture plate and the pressure plate must rest flat on the film when the film gate is closed. TURN the HANDSETTING KNOB around clockwise SEVERAL TIMES by HAND, moving the film in the reverse direction, to make sure that the claw is engaging the film satisfactorily.

Raise the lower film guide and form the lower loop by passing the film in front of the film guide stud then insert the film over the lower sprocket. The film perforations must engage the teeth on the sprocket. Press the film guide down to its normal running position.

The upper and lower film loops are of very great importance. They provide slack in the film between continuously moving sprockets and the intermittently moving pull-down claw, preventing the tearing of the film perforations. The correct sizes for the film loops are outlined on the main body casting.

Push the empty take-up reel into position on the lower reel shaft so that the lug in the reel shaft will fit into the slot of the reel. The round hole will be on the outside to fit the round portion of the reel shaft nearest the reel lock clip, then turn down the reel lock clip.

Insert the end of the film in the slot of the reel hub and wind up the slack film by rotating the lower reel in a clockwise direction, by hand.

The rewind lever should be in the "off" position, allowing the film to unwind off the upper reel and take-up on the lower reel.

The operating speed of the projector must be sufficient to hold back the safety fire door permitting light to pass through to the aperture. If the screen is dark after the switch has been moved to the "lamp on" position, turn the rheostat knob towards "high speed" until the fire door is out of the way.

Special Instructions

The film must be seated in the track of the aperture and the pressure plate must rest flat on the film when the film gate is closed.

Before turning on the current, turn the handsetting knob clockwise by hand until the claw engages the perforations and feeds the film through, without losing either loop.

The reversing switch must be in the "forward" position, the clutch lever in the "motion picture" position and the rewind lever in the "off" position, before starting the motor. Should the rewind be engaged while the projector is in normal operation, the tension on the film caused by the sprocket pulling against the rewind will ruin the sprocket holes in the film.

Stopping for Still Projection

The film may be stopped on any desired picture by pushing the still picture lever to the "still picture" position.

A special high heat resistance glass moves in front of the condenser holder when the mechanism stops, protecting your film from excessive heat given off by the lamp and guarding it against blistering and warping.

If the picture does not appear on the screen, it will indicate that the blade of the shutter is in front of the condenser. Turn the hand setting knob Fig. 1 until the shutter opens permitting light to pass through the lens.

Do NOT ATTEMPT TO SHOW A STILL PICTURE WHILE THE PROJECTOR IS RUNNING IN REVERSE AS THE HAND SETTING KNOB WILL BE DIFFICULT TO MOVE.

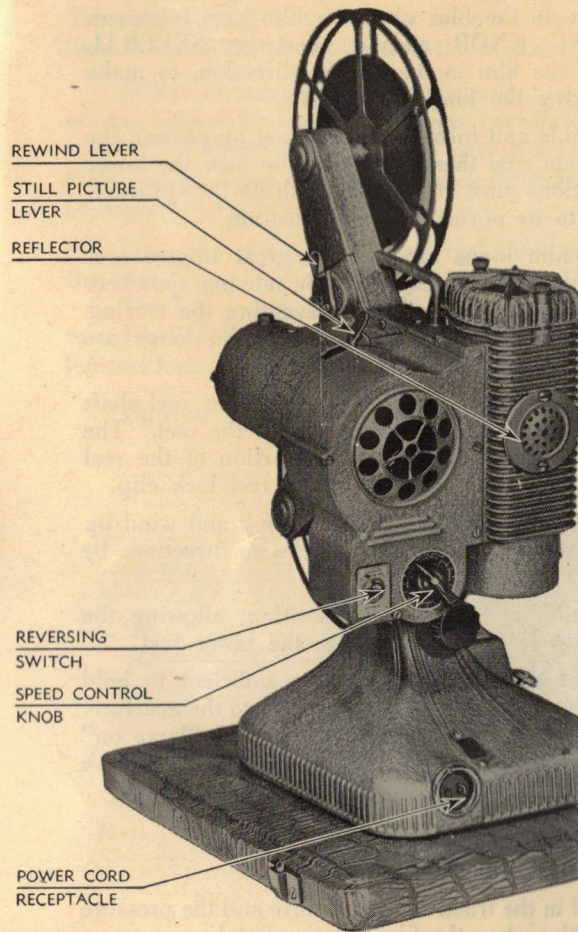


Fig. 5

Reversing the Film Movement

Many amusing effects can be obtained by reversing the film movement. This is done by pressing the reversing switch, Fig. 5 to the position marked "reverse." The film will change its direction of movement immediately.

All other switches and levers should remain in their original position.

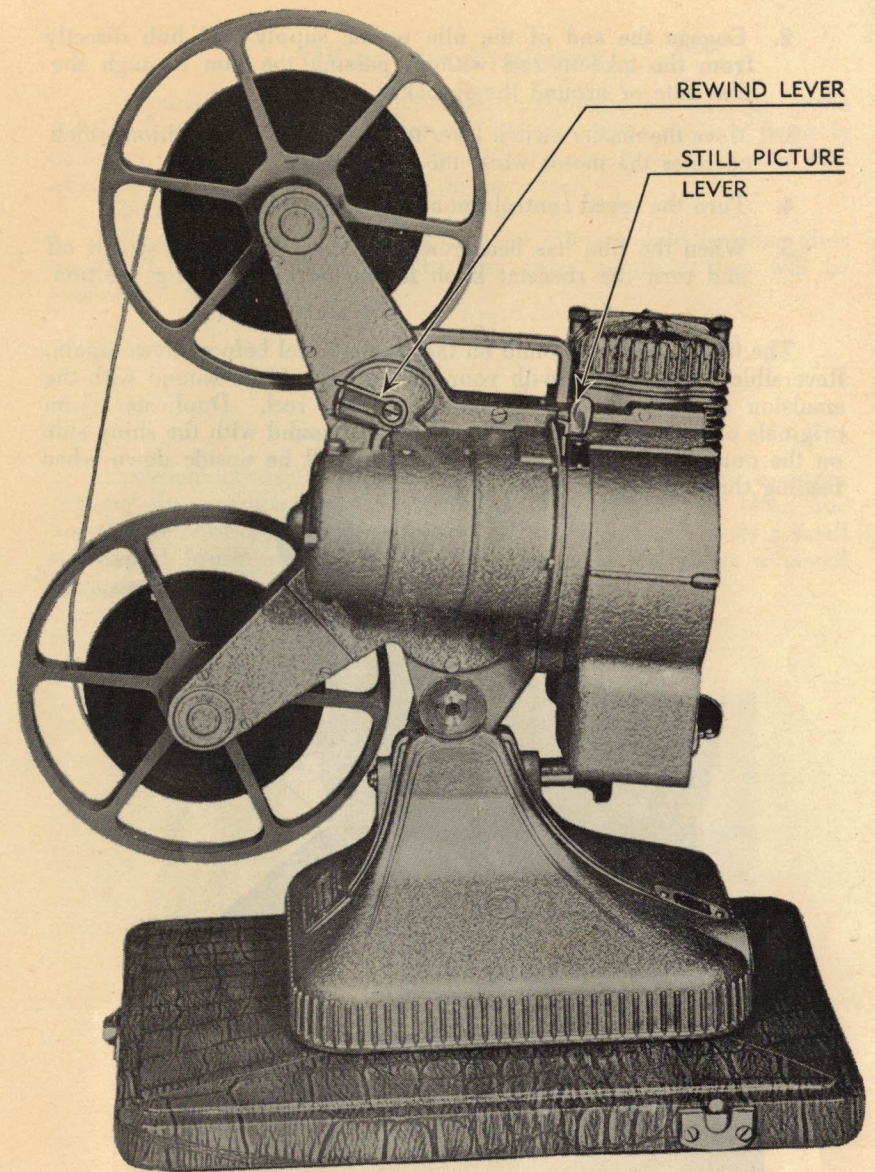


Fig. 6

Rewinding the Film

The reversing switch must be in the "rewind-forward" position when rewinding the film.

To rewind the film:

1. The rewind lever must be moved to the "on" position while the projector is stopped.

2. Engage the end of the film to the supply reel hub directly from the take-up reel without passing the film through the film gate or around the sprocket.
3. Move the master switch lever to the "motor on" position which operates the motor while the lamp is off.
4. Turn the speed control knob to "high speed."
5. When the film has been rewound, turn the master switch off and turn the rheostat knob to the normal running position.

The film must be rewound on the original reel before shown again. Reversible film, as taken with your camera, should be wound with the emulsion or dull side on the outside of the reel. Duplicates from originals or prints from negatives should be wound with the shiny side on the outside. The object in the picture will be upside down when feeding through the projector.

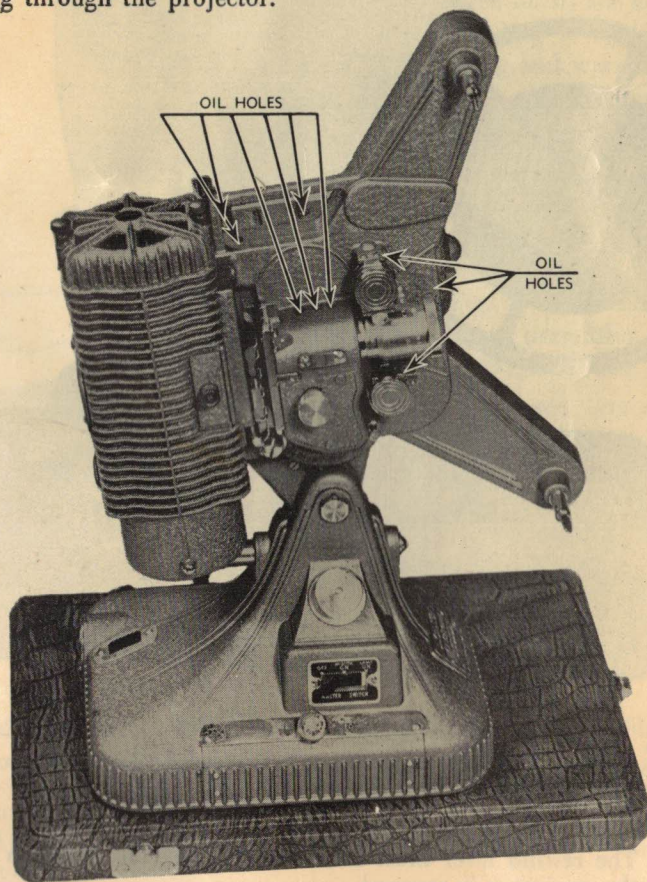


Fig. 7

Oiling the Projector

All moving parts should be oiled occasionally with a high grade watch oil or Keystone projection oil. A few drops at each point is sufficient. When too much oil is applied, it very often reaches the film affecting the quality of the picture on the screen.

There are 9 oil holes shown in Fig. 7.

When the projector is in frequent use oiling should be done after about 10 hours of running. Otherwise every month or two will be sufficient.

Care of the Projector

Occasionally dust and lint will collect about the film aperture causing the projected picture to have fuzzy edges. To clean the aperture remove the projection lens by pulling it out and insert a small soft-haired brush or a piece of soft cloth wrapped about a pencil through the lens holder.

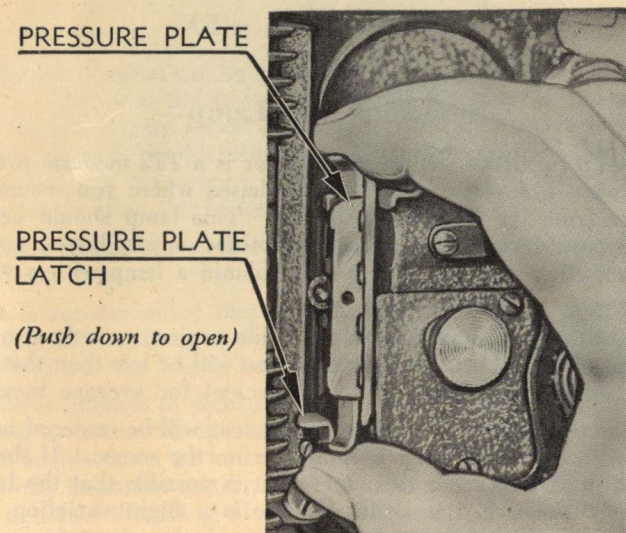


Fig. 8

Removing the Pressure Plate

Particles of dirt or film emulsion may cause a scratch on your valuable film.

The pressure plate can be removed to clean the film channel. Wipe the track on both the pressure plate and the aperture plate with a lintless cloth moistened slightly with alcohol or dry cleanser. To remove the pressure plate press the latch *down* and slip the pressure plate out. To replace, slip it back over the pin and press the latch back toward the lamphouse. See Fig. 8.

Be sure the pressure plate is straight and seats evenly on the aperture plate when replaced.

To clean the condenser pull out the condenser holder Fig. 2 and wipe the lens clean with a soft lintless cloth.

To remove or clean the reflector see Fig. 5, take out the two screws and remove the holder. Be sure the projector has cooled off.

The projection lens must be kept clean and free from dirt and oil. Dirt on the lenses will cause the picture on the screen to appear cloudy or flat. Wipe the two outside lens surfaces carefully with a soft, clean lintless cloth. *Do not try to take the lens apart.*

Replacing the Lamp

The lamp furnished with this projector is a T12 medium prefocus base, 750 watt, 115 volt and can be purchased where you secured the machine or from the Keystone Mfg. Co. This lamp should be used only on voltages from 110 to 115. Do not use on any higher voltages or the lamp will burn out. You should obtain a lamp with a voltage the same as your circuit.

A 500 watt lamp may be used with this projector, without moving the position of the socket. The illumination will be less than that given by a 750 watt lamp. However it is sufficient for average home use.

The lamp socket is set so that the filament will be centered in front of the condenser, giving even illumination on the screen. If the lamp should not produce a clear even screen, it is possible that the lamp is not properly seated in the socket. There is a slight variation in the lamp filaments which might also cause an uneven screen.

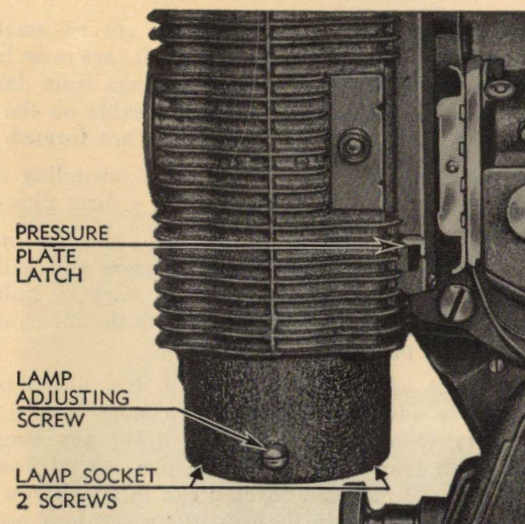


Fig. 9

Adjusting the Lamp

The lamp socket can be adjusted to place the filament in its correct position. Unloosen the two screws under the base of the lamphouse which holds the lamp socket and turn the lamp adjusting screw Fig. 9, right or left until the filament is in its correct position giving an even illumination on the screen, then tighten the two screws under the lamphouse holding the socket in place.

The average life of this lamp is from 18 to 30 hours if used on rated lamp voltage.

It is recommended that correct house voltage is determined and make certain your lamp is of same voltage. If 115 volt lamp is used on a 120 volt line the life of lamp will be shortened considerably.

Never attempt to change a lamp with the current on. Lamps are required to burn with the base down, and the machine should not be turned upside down or laid on its side while the lamp is burning. It is also very important to turn off the current when removing or attaching reels, or when threading film. The filament wires of these lamps are very sensitive when hot, and a sudden jar is sometimes sufficient to break the filament.

Excess heat will cause the lamp bulb to blister and break. The lamp socket has been set to provide a space $\frac{3}{32}$ " wide between the condenser and the lamp. This allows sufficient circulation to protect the bulb. Please check before inserting the lamp to assure space.

Care of the Film

The pictures on a motion picture film are so small and are magnified so enormously on projection that great care must be exercised at all times to prevent scratches or other markings from damaging the film, because all such markings are very noticeable on the screen. It is impossible to remove these defects once they are formed.

Scratches are generally caused by careless rewinding of the film, from "cinching" it tightly on the reel, or from a dirty film gate.

Slack film should be taken up by *rewinding* the film onto another reel *slowly*, and then winding with an even tension and uniform speed back onto the first reel. Never try to take up slack by holding a reel in one hand and pulling the end of the film with the other, or very bad "cinch" marks will be produced.

The film, if kept where the air is very dry, has a tendency to become brittle. It is advisable, therefore, to store it in a cool place where the air is fairly moist. Never leave it for any length of time near a radiator or hot air pipe. If by chance any of your films do become brittle, place the reel in a covered can in which you have put a moist sponge. Leave the film in the can for twenty-four hours and its flexibility will be restored. Care should be taken that no water comes in contact with the film.

Kodachrome film should always be kept dry and cool.

The best and most convenient way to keep films in good condition is to store them in Keystone Film Cans.

Almost all reels are made up of different scenes, spliced and cemented together. These sometimes come apart or the film breaks either because it has become old and brittle or incorrectly threaded in the projector.

If a break occurs during projection, the film can be spliced in the following manner. See Figures 10-17 incl.

All 8mm film on the market is non-inflammable and is entirely safe from all fire hazard.

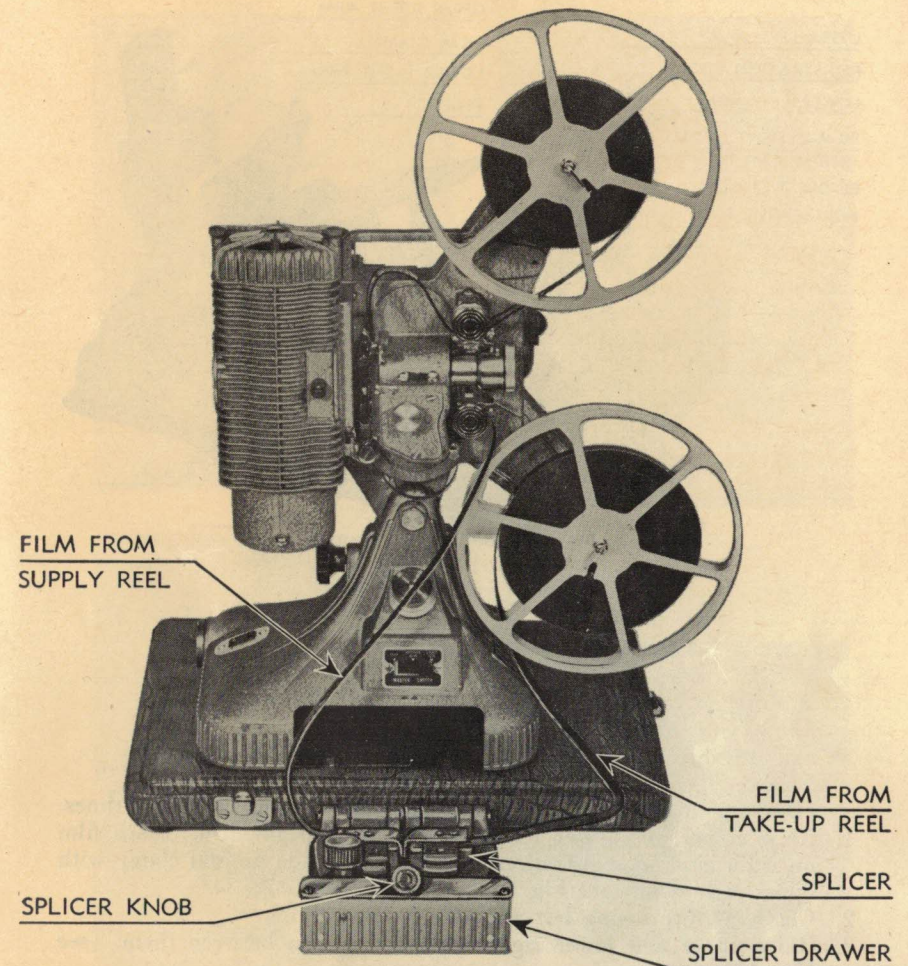


FIG. 10 SHOWING LOCATION OF FILM AND SPLICER FOR SPLICING

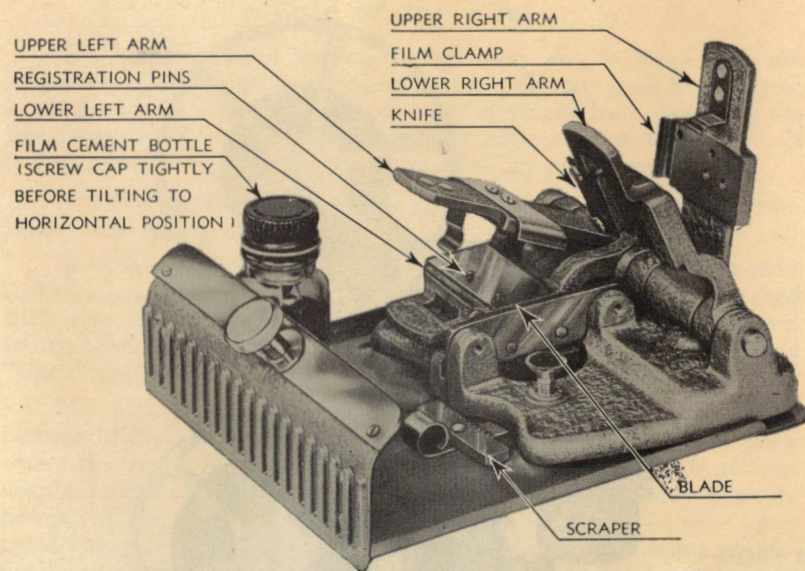


Fig. 11

Splicing 8mm Film

- Be sure to keep emulsion (dull side) of the film up at all times.
1. Raise upper and lower left arm and upper right arm. Place film on right side on registration pins, emulsion side up and clamp with upper right arm. (see Fig. 12)
2. Cut film by pressing left arm down.
3. Raise upper and lower right arm leaving film between them. (see Fig. 13)
4. Place other film to be spliced on registration pins on lower left arm, emulsion side up and clamp with left arm. (see Fig. 14)
5. Cut film with right arm.
6. Dip one end of felt pad into water for moistening film protruding beyond left arm, and scrape all emulsion from this film portion with scraper, by sliding back and forth. Wipe off all scrapings with other end of felt pad. Make sure surface of film is clean and DRY before applying cement. (see Fig 15)
7. Apply film cement to scraped film surface (see Fig. 16) and bring down right clamp with film over the cemented portion and leave clamped for at least one minute (see Fig. 17), lift all clamps and remove film from registration pins slowly and carefully and the splice is now complete.

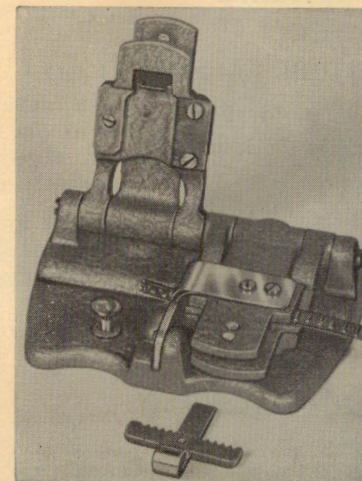


Fig. 12

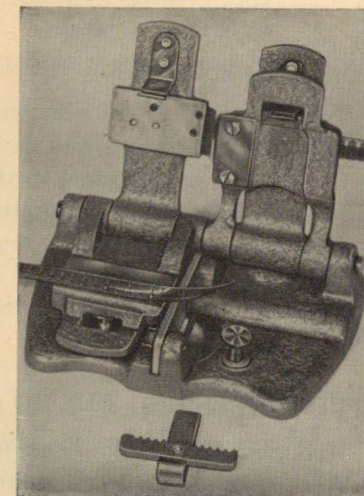


Fig. 13

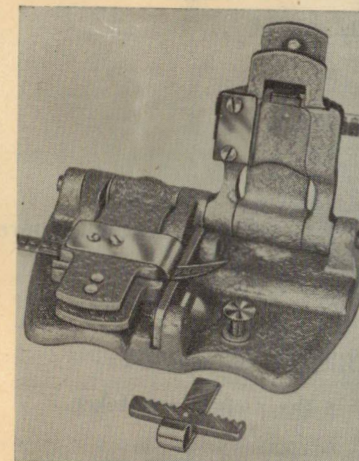


Fig. 14

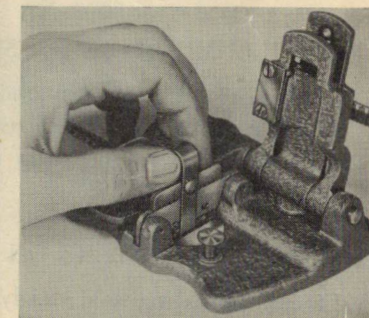


Fig. 15

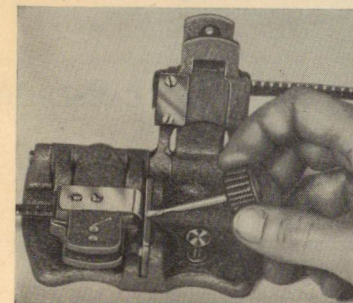


Fig. 16

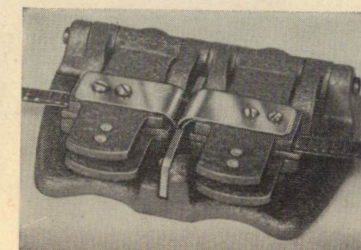


Fig. 17

Cause of Poor Operation

LOSS OF LOWER FILM LOOP COULD BE CAUSED BY:

- Teeth of sprocket not engaging film perforations.
- Film not fitted properly in the track of the film gate.
- Claw not engaging film perforations.
- Broken or torn film perforations.
- Film shrunk or warped.
- Improperly made splice.
- Tension too weak on film gate.

IMPROPER FEEDING DUE TO SPLICE, CAUSED BY:

- Too much film cement being used.
- Film too thick due to roughening the surface.
- Side edge of film overlapping.
- Sprocket holes not in line or evenly spaced.
- Wrinkling at splice.

UNEVEN ILLUMINATION ON SCREEN:

- Filament of lamp not centered in front of the aperture.
- Reflector not properly centered to reflect light into the aperture.
- Dirty lens or dirty film, dirty reflector.

FLICKERING OF PICTURE ON SCREEN CAUSED BY:

- Camera not being held steady when the picture was taken.
- Projector operating too slow.
- Low voltage.
- Lack of oil.

PICTURE ONLY PARTLY IN FOCUS ON SCREEN CAUSED BY:

- Film not properly seated in the track.
- Film gate bent.
- Warped film.

Projection Lenses

One of the important features of the Keystone Projector is the instant interchangeability of projection lenses. By projecting through a lens of the proper focal length practically any desired picture size may be obtained without moving the projector and screen from the most suitable and convenient positions in the room.

The chart below indicates the sizes of pictures secured at various distances with the three focal lengths offered in Keystone Projection lenses.

Projected Picture Sizes with Various Lenses

Distance in feet from screen	FOCAL LENGTH OF LENS		
	$\frac{3}{4}$ "	1 "	1 $\frac{1}{2}$ "
	WIDTH OF PICTURE		
4'	1' 0"	0' 10"	
5'	1' 3"	1' 0"	
6'	1' 6"	1' 2"	0' 8"
8'	2' 0"	1' 6"	1' 0"
10'	2' 6"	1' 10"	1' 3"
12'	3' 0"	2' 3"	1' 5"
16'	4' 0"	3' 0"	2' 0"
20'	5' 0"	3' 9"	2' 6"
25'	6' 3"	4' 8"	3' 2"
32'	8' 0"	6' 0"	3' 11"
36'	9' 0"	6' 9"	4' 10"
40'	10' 0"	7' 5"	5' 0"

GREEN 1	spectacular effects. (EQUAL TO WRATTEN X1) For use with Panchromatic films only. Gives greater definition to clouds and improves flesh tones when taking outdoor portraits against the sky. Will also give a more natural rendition and greater detail when photographing landscapes, garden and flower scenes.
ORANGE	(EQUAL TO WRATTEN G15) For use with ortho films for extreme contrasts, absorbs most of ultra-violet blue rays, used in marine photography to darken sky. Cuts thru haze for aerial use. Ideal for copying old prints and documents to produce a clear black and white reproduction.
PORTRAIT +1, +2, +3	Can be used with all Color and Black & White films. Inexpensive auxiliary lenses for use in front of your movie or still camera lens permitting titling with your movie camera, portraits, copying, tabletops, etc. Complete tables of distances and instructions for use enclosed with each filter.
NEUTRAL DENSITY X2, X4	Can be used with all Color and Black & White films. Reduces the amount of light passing thru the lens when taking pictures in brilliant sunlight, to avoid overexposures.
CENTERING LENS	For quick, easy centering of subject to camera lens for copying and titling.

FOR ANSCO COLOR FILM

CONVERSION (#10)	(EQUAL TO ANSCO #10) For use with Ansco Daylight Type Color film when exposed in tungsten lighting. Fine color reproduction when used with Mazda 3200° Kelvin light source.
CONVERSION (#11)	(EQUAL TO ANSCO #11) For use with Ansco Tungsten Type film, corrects and adjusts color balance so that film may be used outdoors.
CONVERSION (#12)	(EQUAL TO ANSCO #12) For use with Tungsten Type Ansco Color film when using high speed discharge gas lamps such as Strobe Units.
ULTRA-VIOLET (UV15)	(EQUAL TO UV15) For use with Ansco-Color film to reduce atmospheric haze. Used as a corrective filter when exposing Ansco-Color Tungsten Film with photo-flood lights.
ULTRA-VIOLET (UV16)	(EQUAL TO UV16) For use with Ansco-Color film. For normal haze correction, use with Ansco-Color Tungsten film with photo-flash bulbs as a light source. For use with high voltage strobe tubes 6700 to 7000 K to reduce the excess blue when using daylight films.
ULTRA-VIOLET (UV17)	(EQUAL TO UV17) For use with Ansco-Color film. Gives greater haze correction than UV16. Best for distant landscapes, aerial color views, mountain scenes and in shaded areas.

ULTRA-VIOLET 81	lighting. (EQUAL TO WRATTEN 81) For use with Ektachrome film, permits exposing Ektachrome Type B (Tungsten) film with photo-floods, corrects light source temperature to Mazda 3200° Kelvin.
ULTRA-VIOLET 81-A	(EQUAL TO WRATTEN 81-A) For use with Ektachrome film, filter prevents bluish tint in color transparencies exposed on overcast days, in distant views, high altitude aerial exposures and in the shade. Warmer color tones are the result of using 81-A filter.
ULTRA-VIOLET 81-B	(EQUAL TO WRATTEN 81-B) For use with Ektachrome film, results same as 81-A filter listed above. When much warmer color values are desired 81-B filter is used.
81-C	(EQUAL TO WRATTEN 81-C) For use with G. E. Flashbulbs No. 5, 6, 11, 22, 31, 50, when exposing Kodachrome Type A film.
81-D	(EQUAL TO WRATTEN 81-D) For use with Sylvania Flashbulbs No. 0, 2, 2a, 3, 25, 26, 40, when exposing Kodachrome Type A film.
81-EF	(EQUAL TO WRATTEN 81-EF) For use with G. E. Flashbulbs No. 5, 6, 11, 22, 31, 50; also Sylvania Flashbulbs No. 0, 2, 2A, 3, 25, 26, 40 when exposing Ektachrome Type B films.
1-D FLASH	(1D FLASH) For use with Sylvania Flashbulbs No. 0, 2, 2a, 3, 25, 26, 40, when exposing Kodachrome and Ektachrome Daylight type films INDOOR ONLY OR IN DEEP SHADE WHEN DAYLIGHT IS NOT MAIN SOURCE OF LIGHT.
2-D FLASH	(2D FLASH) For use with G. E. Flashbulbs No. 5, 6, 11, 22, 31, 50, when exposing Kodachrome and Ektachrome Daylight type films INDOOR ONLY OR IN DEEP SHADE WHEN DAYLIGHT IS NOT MAIN SOURCE OF LIGHT.

DAYLIGHT FLASH (2B)

For use with Ansco Color or Kodachrome Daylight Color films using Sylvania Flashbulbs No. 0, 2, 2a, 3, 25, 26, 40, with a 2X (one stop) filter factor. Excellent for indoor or outdoor color photography. Takes the place of two filters, the Conversion filter (for indoor flash) and a Correction filter for improving flash pictures. Completely eliminated the need for special blue bulbs or dipping of clear bulbs. It may also be used outdoors in late afternoons and evenings and around sunrise.

GUARANTEE: All Tiffen "PHOTAR" color correction filters are unconditionally guaranteed for life against separation and color fading.

Effects and Causes

DARK PICTURES lacking shadow detail.

Cause: Underexposure; consult exposure guide.

VERY LIGHT PICTURES lacking highlight detail.

Cause: Overexposure; consult exposure guide.

BLACK LENGTHS with little or no image.

Cause: Film badly underexposed or not exposed.

VIBRATING PICTURES with vertical distortion.

Cause: Improper threading and loop formation. If camera is magazine-type or is designed to be threaded without loops, then camera is probably out of adjustment.

UNEVEN TOP OR BOTTOM OF PROJECTED PICTURE

Cause: Accumulation of film emulsion or foreign material in gate of camera or projector. Refer to manual for cleaning directions.

UNSTEADY PICTURES are caused by not holding camera steady. Use a tripod whenever possible. Panoram only rarely and very slowly.

BLURRED BUT STEADY PICTURES

Cause: Incorrect focusing or too close a distance with fixed-focus cameras.

EXTREMELY CONTRASTY PICTURES

Cause: Back or side lighting without sufficient exposure allowance. Front lighting with sun behind camera is generally best.

MISTY, FLAT PICTURES

Cause: Dust, oil, or moisture on camera or projector lenses.

LIGHT CIRCULAR SPOTS OR CURVED STREAKS

Cause: Sun or lights shining directly into camera lens.

EXCESSIVE REDNESS

Cause: If daylight pictures, film exposed shortly after sunrise or shortly before sunset. If indoors, Daylight Type Film used under flood light.

EXCESSIVE BLUENESS

Cause: Type A Film used in daylight without Kodak Daylight Filter for Type A Color Films over lens. If indoor pictures with Type A Film, stray daylight entered the room through uncovered windows.

KEYSTONE MANUFACTURING CO.
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