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INSTALLATION INSTRUCTIONS
and
OPERATING MANUAL

BRENKERT

BX-40 & BX-80
MOTION PICTURE PROJECTORS

MANUFACTURED BY
BRENKERT LIGHT PROJECTION CO.
DETROIT, MICHIGAN

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REPLACEMENT PARTS

Brenkert products are manufactured by the Brenkert Projection Company, Detroit, Michigan, and are available through the RCA Manufacturing Company, affiliated RCA Theatre Supply Dealers.

Pages 16 to 35 inclusive for listings of replacement parts together with illustrations which make identification easy.

Prompt delivery is an important part of service. We cannot render such service, however, unless you use care and accuracy in placing orders. Order all parts direct from the affiliated RCA Theatre Supply Dealer in your territory, stating both the part number and the description exactly as listed in the parts diagrams and listing in this manual.

BRENKERT PROJECTORS BX-40 AND BX-80

MOUNTING AND ALIGNING

The projector mechanism is packed in a specially designed wooden case and is enclosed in an inner carton of corrugated fibre board for further protection. No excelsior or other loose packing material is used. The top of the case is so designed as to prevent its being shipped and set other than right side up.

Use caution in handling the mechanism. The unpacking should be done as near the projection room as possible to prevent excessive handling after the projector has been removed from its protecting cases.

Remove the screws from the top and open the main case. Set aside the small carton containing projector accessories to be installed later after the projector has been assembled. These accessories consist of:

1. Pilot light assembly, X-2000.
2. Quarter-size lens adapter bracket, X-1803.
3. 2 extra shear strips, X-1729.
4. Necessary magazine screws.
5. One pint of Brenkert approved lubricant.
6. Change over (when separately ordered).

After removing this carton there is visible a plywood board which is screwed to the top of the projector and fits snugly into the inner carton. Place the wooden case on its side and remove both inner carton and projector. Unscrew the plywood board from the projector and remove the mechanism from the inner carton.

UNPACKING AND HANDLING

The mechanism can be mounted readily on any standard floor base.

CAUTION: Due to the oil reservoir, the fastening holes provided in the mechanism do not go completely through the base (See Diagram No. 1) Screws of excessive length which may have been used to fasten a prior mechanism cannot be used without shortening.

These mounting holes contain a bottom type thread, threaded to a minimum depth of $\frac{3}{4}$ ". Do not force longer screws into the projector base as the inside bosses which support these threads might be damaged.

Align the projector on the soundhead, determining the exact sprocket line of both projector and sound mechanism before tightening the holddown screws. If this is not done, a serious misalignment of film may result, causing sound distortion as well as excessive film noise.

Mount the projection arc lamp, exercising care that the projection lamp is not allowed to slide down and strike the shutter housing, X-1007. Such force might distort the casting causing the shutter blades to strike the inside of this housing. The cone on the projection lamp should never be allowed to rest against this part. There should always be a clear gap of about $\frac{1}{16}$ " between the cone of the projection lamp and the shutter housing of the Brenkert projector. It is especially advisable to exercise care in this regard when the projection angle is steep, as the lamphouse will have a tendency to slide under its own weight until it is securely bolted to the lamphouse carriage table of the pedestal.

CAUTION: Before any attempt is made to operate the projector, the oil reservoir must be filled with genuine

Brenkert Lubricant so that the sight gauge at bottom of the film side of the projector will show at least one-half full when the machine is at rest. This reading must be taken when machine is at rest as the oil is relieved from the gauge when machine is in operation.

THREADING THE PROJECTOR

When the projector has been satisfactorily installed and all associated equipment has been connected, the projector should be tested with standard sound film to determine if any errors have developed in the mounting.

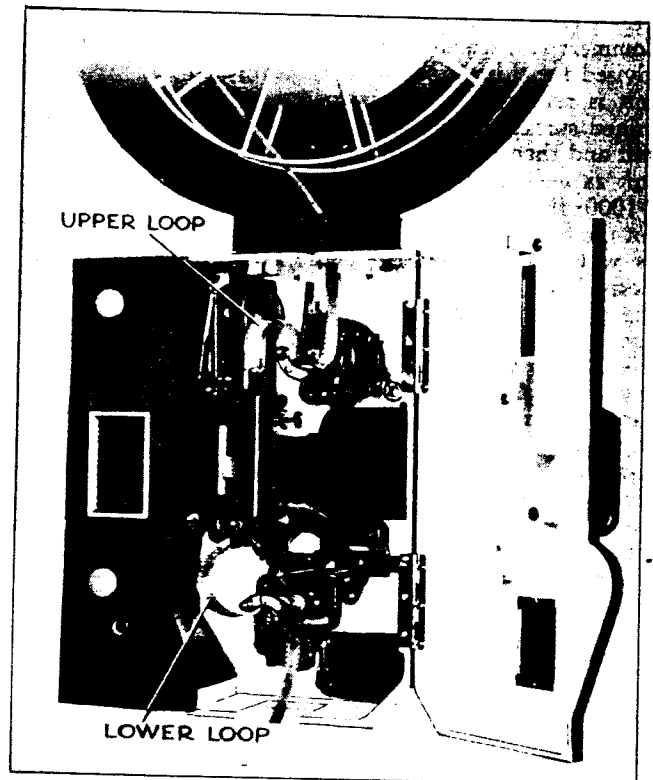


Figure 1—Threading Diagram

The threading is done in the conventional manner which is familiar to all projectionists. See Figure 1. Care should be exercised in the size of upper and lower loops as a large upper loop will usually produce a flutter noise in the film and a large lower loop will result in a loud response each time the intermittent registers. The upper loop should be carried the width of two fingers above the entrance at the top of the film gate. The lower loop should be carried so that the resulting arc or bend in film will contain approximately seven frames of standard film.

Keep the operating side hinged door, X-1004, closed at all times while projecting. This controls the air stream, directing it over the quarter panel, X-1005, baffle plate, X-1012, for cooling the film aperture and gate. If the door is left open, the air takes the path of least resistance, going through the entire operating side of the mechanism, and its cooling effect is lost resulting in excessive heating of the film trap and aperture baffles.

PROJECTOR CONSTRUCTION

General—The Brenkert BX-40 and BX-80 projectors are of rugged unit construction. In mounting these units upon the main frame $\frac{1}{4}$ " x 20 steel machine screws with fillister heads have been used. This assures solid mounting as well as facilitates the removal of these units without the danger of stripping threads or marring the heads of the screws. When familiarity has been acquired with these projectors any unit can be removed and replaced wherever required. Dowel pins have been inserted where necessary to assure re-establishment of exact relative positions of critical parts.

Re-Sealing Units—After removing any unit from the main frame and housing, it will be necessary to carefully re-seal these units as well as the threads of the mounting screws with a suitable composition, to the main frame. Commercial Permatex #2, or approved equivalent, is advised for this purpose. For example, if any complete unit is removed, it will be necessary to clean the machined surface of the main frame as well as that of the unit and then by applying a film of Permatex #2 to the unit as well as to the threads of the mounting screws, P-1000, the leakage of oil can be prevented. If this is not done, oil will seep by the mounting screws and find its way to the operating side of the projector. This method of sealing the units to the main frame is very effective and when properly done it is a guarantee that none of the lubricant from the gear side of the projector will find its way to the operating side. Do not remove any unit unless a tube of sealing compound is first obtained. Being a commercial product it is obtainable in any automotive supply store or can be obtained by ordering from RCA Manufacturing Company, Camden, New Jersey. Units should never be removed unless there is a definite necessity for so doing. For detailed instructions on the various units, refer to the drawings and photographs which follow as a part of these instructions.

HOUSING UNIT X-1000

(See Diagram No. 1)

General—This unit group pertains to the one piece housing and main frame, rear shutter housing, quarter panel doors, gear side cover, glass observation windows, framing handle and oil gaskets, as well as all nuts, studs, etc., which are attached to and form a part of this assembly.

To examine any part of the film trap, lateral guide roller, etc., remove the quarter-panel, X-1005, by unscrewing two knurled knobs, X-1010, and pulling straight back off the mounting studs, X-1008 and X-1009. See Diagram No. 1. This panel must be removed when the intermittent assembly, X-1100 is removed, or when replacing the intermittent sprocket, X-1141. See Diagram No. 2. The right-hand half of the shutter housing, X-1007, can now be removed, if it is desired to reach the hubs of the shutter blades. See Diagrams 6 and 7. If the left-hand shutter housing, X-1006, must be removed, unscrew the two cap nuts, X-1011, and remove. On new installations if rollers, X-2231 and X-2232, chatter intermittently (see Diagram No. 1) caused by the screws forming the pivot shafts being dry, lubricate each of these pivot shaft screws, X-2233, with a drop of heavy oil or vaseline.

Looking at the rear of the projector, at the left beneath the shutter, two screws, P-1009 and P-1010, will be noticed. See Diagram No. 1. P-1009 is set at the factory and should not be disturbed. It holds the intermediate gear shaft in position. P-1010 is a locking screw for the sound head projector drive shaft. This screw should be locked on all installations except those using ERPI Universal Bases. In these cases the 712 ERPI drive positions the 17 tooth pinion drive shaft. Should it be necessary to remove gear side cover, X-1002, remove three screws, two P-1003, and one X-1046. See Diagram No. 1. In replacing this cover make sure that the neoprene gasket, X-1003, is free from oil and properly fitted to the cover. Draw up evenly on each screw to assure proper seating of this gasket to the main housing, X-1001. Care should be exercised when removing this cover so as not to break the round glass oil sight window, X-1027, since it is made of tempered glass and might shatter if struck or dropped with any force. Keep petcock, P-1101, tightly closed at all times when oil is in the reservoir otherwise a slow leak may develop. This petcock is of the tapered ground valve type, and by pushing in on the thumb nut when closing, leak-proof seating is assured.

The gear side cover, X-1002, must always be in place when operating. If this is left off the rotary lubricating system will throw the oil from the mechanism. It is seldom necessary to remove this cover since no operating adjustments are made on the gear side of the projector. All parts on this side are set and locked in their proper position at the factory, on their respective dowel locators, thus maintaining proper operating tolerances of the entire gear train at all times. The only cases in which removal of this cover are necessary, are while changing intermittent movement or other such unit assemblies. This rule should be observed carefully to avoid any maladjustment which would result in impaired operation.

CAUTION: Do not reform or bend any part of the housing, metal baffles or guides. The shape of these parts has been designed to serve very definite purposes. Do not drill, cut out, or otherwise mar the housing. Keep the main frame and housing clean at all times both inside and outside. A clean and well cared for mechanism will project a better picture and will remain trouble free for a much longer period of time.

INTERMITTENT UNIT X-1100

(See Diagram No. 2)

General—This most important unit has been carefully engineered. Its design is that of the X-star wheel and segmented cam. It is ruggedly constructed and should remain in adjustment under normal operation. If at any time it is necessary to make adjustments on this unit, it should be returned to the factory where precision equipment is available for the adjustment of the close tolerances required on this unit.

Lubrication—The intermittent requires no individual lubricating. It is fully and automatically lubricated from the rotary lubricator which is constantly being supplied with oil from the reservoir. Upon starting the projector the intermittent case is automatically filled, and upon stopping the projector for any length of time all lubricant, except that which is necessary for starting, drains into the reservoir and the procedure is automatically repeated upon restarting the projector.

Changing Sprocket—An exceptionally desirable feature has been incorporated in this intermittent, namely, the ease with which the sprocket, X-1141 can be replaced, without removing the complete assembly from the main frame and without disturbing the cam to star relation or the timing of the light cut-off shutters. To remove, proceed as follows:

1. Remove quarter panel, X-1005.
2. Relieve film stripper X-1959 by removing screw P-1000 and swinging sub-casting X-1903 toward rear of projector. See Figures 2 and 3.

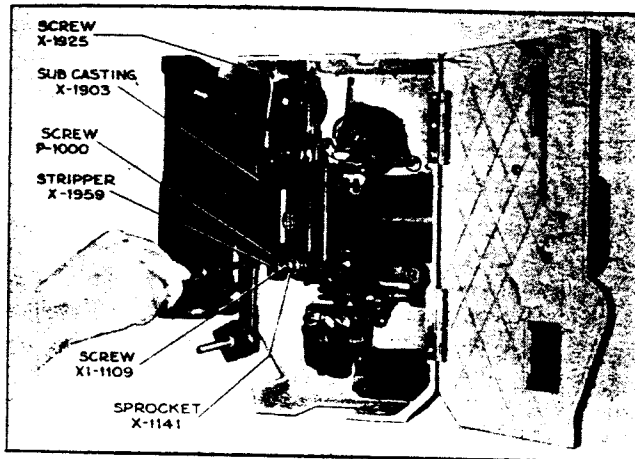


Figure 2—Relieving Film Stripper

3. Back out the left hand threaded sprocket retaining screw X1-1109 about a quarter of an inch by turning it to the right.

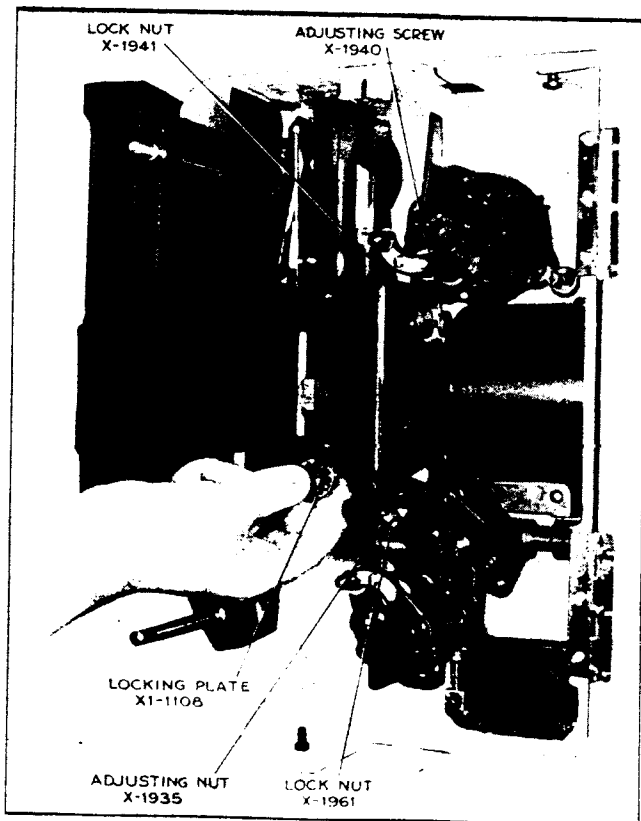


Figure 3—Removing Intermittent Sprocket

4. Place the middle and forefinger of the right hand one on either side of the sprocket behind the outer flange and the thumb on the head of the screw. By pulling on the sprocket with the fingers and pushing inward on the head of the screw with the thumb, the sprocket will loosen from the shaft and come out as far as the screw head. See Figure 3.
5. Remove screw X1-1109 and slide sprocket from shaft.

In replacing, make sure that the locking lugs on locking plate X1-1108 fit into the slots on the end of the shaft before screw, X1-1109, is tightened firmly. Do not use extreme pressure as it is unnecessary.

Removing Complete Intermittent—The entire intermittent assembly can be removed in a few minutes. Care should be exercised in handling the intermittent movement, although being of rugged construction, it is delicately adjusted and any dropping or rough handling might upset the close tolerances which are necessary to maintain steady projection. To remove, proceed as follows:

1. Remove intermittent sprocket (see instructions above on proper method for removing this sprocket).
2. Remove gear side cover, X-1002, and gasket, X-1003.
3. Loosen the locknut, P-154, and back off screw, X1-1112, releasing the steel clamp, X1-1111, which holds the intermittent assembly in place. See Figure 4.

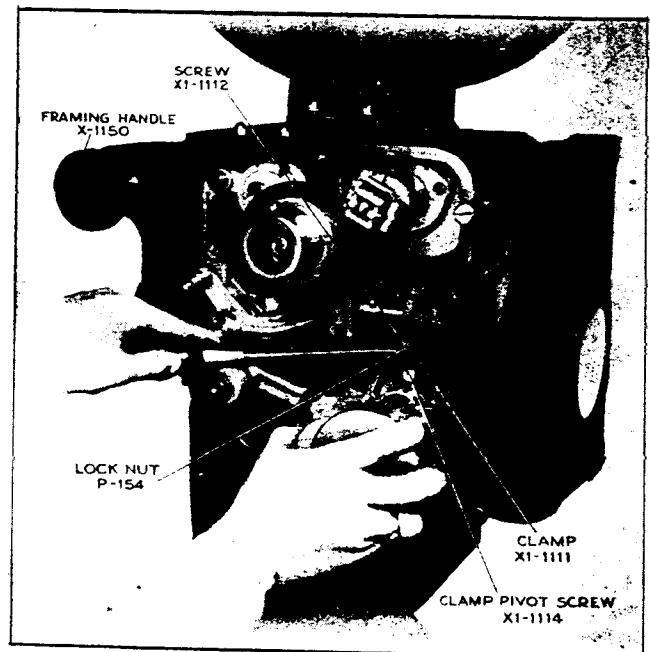


Figure 4—Removing Intermittent Assembly

4. Move the steel clamp upward about $\frac{1}{4}$ inch by placing a screw driver under screw X1-1112 and lifting. At the same time grasp the intermittent with the right hand as shown in Figure 4 and pull it forward with a slight twisting motion.

CAUTION: Care should be used so that the steel clamp X1-1111 is not lifted entirely out of its guide pins (P-176, Diagram No. 2) as it is liable to swing off the clamp pivot screw X1-1114 and drop in the oil reservoir.

5. After pulling the intermittent movement slightly forward the steel clamp X1-1111 can be released and the intermittent completely removed by pulling forward with a slight twisting motion and at the same time rocking the framing knob, X-1150.

Replacing Intermittent—The intermittent assembly can be replaced easily if the position of the key X-1135 with relation to the hole in the arm of yoke, X-1114 has not been disturbed. If this relation was disturbed, it will be necessary to restore it before attempting to replace the intermittent. To do this, insert the intermittent outer sleeve X1-1103 approximately $\frac{1}{2}$ inch into the main frame mounting bearing (see Figure 5) and

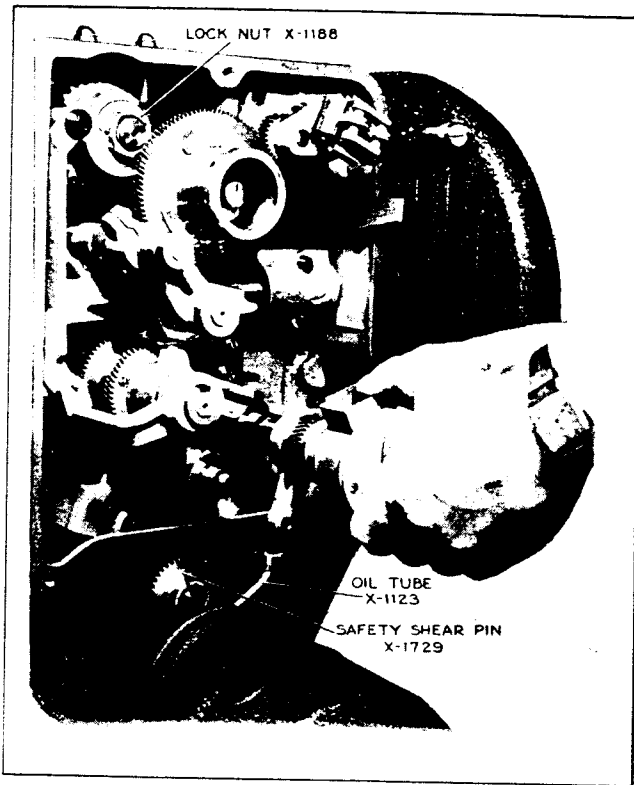


Figure 5—Aligning Intermittent Yoke Arm

apply a slight downward pressure on the oil housing end of the intermittent assembly, so that the outer sleeve X1-1103 will be held without turning. Swing the entire intermittent housing around the sleeve until the key is approximately opposite the hole in the bracket. See Figure 6. Ordinarily it will be unnecessary to make this adjustment. In any event, extreme care should be used in order that the close tolerances of the assembly will not be disturbed.

After the proper relations have been established proceed as follows:

1. Hold up the steel clamp X1-1111 and insert the outer sleeve of the intermittent assembly into its main frame bearing. Make sure that the

hole in the yoke arm X-1114 engages with the intermittent aligning pin, X-1174. See Diagram No. 3.

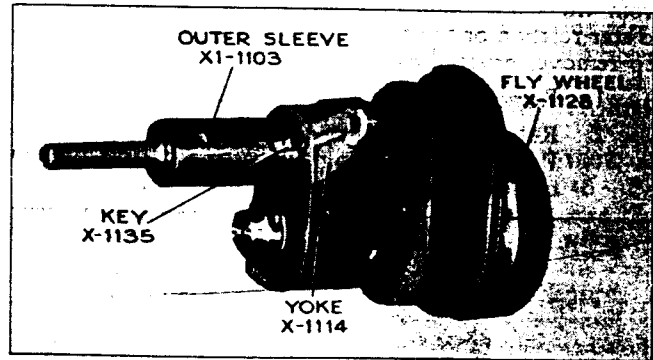


Figure 6—Intermittent Unit less Sprocket

2. Grasp the intermittent fly wheel, X-1128, and exert a slight inward pressure while rocking the flywheel until the intermittent drive gear meshes with gear, X-1714, and the locking key, X-1135, contacts the main frame or enters its key way in the main frame mounting bearing. If the key does not enter its key way, a slight rocking of the framing knob, X-1150, while exerting an inward pressure on the intermittent assembly will cause the key to engage. Proper seating of the key is usually evidenced by the steel clamp, X1-1111, dropping into its slot in the outer sleeve of the intermittent and preventing the assembly from being pulled outward.
3. Tighten the screw, X1-1112, in the spring clamp, X1-1111, until a slight back pressure is felt on the screw driver, and then lock screw back in position with lock nut, P-154.
4. Replace gear side cover and gasket. Make sure that both the gasket and the surface of the projector case are wiped free of any dirt or oil.
5. Replace the intermittent sprocket.
6. Replace the quarter panel.

Whenever the complete intermittent assembly has been removed, it is necessary to check the light shutter timing. The proper method of adjusting the shutter timing is explained in the section dealing with the shutter shaft assembly.

Framing Assembly—The framing links and connections from intermittent to framing knob can be readily observed by referring to Diagram No. 3. A frictional adjustment in this assembly controls light or heavy hand framing. To adjust, remove gear side cover. If framing action is too light, loosen locknut, X-1188 (see Figure 5), on tapered stud, X-1185, and tighten the inner nut about one-quarter turn, and retighten locknut. This increases the pressure on spring washer, P-1116, resulting in increased friction on the complete framing movement. The procedure is reversed for lightening the framing action.

LOWER FILM SPROCKET UNIT X-1200

(See Diagram No. 4)

The function of this assembly is to deliver the film from the intermittent sprocket to the soundhead.

Removing Lower Sprocket Assembly—It should rarely be necessary to remove the entire lower sprocket assembly, X-1200. If this becomes necessary, a tube of Permatex No. 2 sealing compound should be available and applied to the mounting surfaces of the main frame and the X-1200 assembly when it is replaced to prevent oil leakage. To remove the entire assembly, proceed as follows:

1. Remove film stripper, X-1219, by removing the two P-1035 screws.
2. Remove the three mounting screws, P-1000, which hold the assembly to the main frame.
3. Grasp the under side of the sprocket, X-1207, and pad roller bracket, X-1215, and exert up, down, and sideward pressure to free the assembly from the main frame.
4. Pull assembly away from the main frame.

Replacing Lower Sprocket Assembly—Before the assembly is replaced, the mounting surfaces on both the center frame and the assembly casting should first be cleaned thoroughly with carbona.

1. Apply a film of Permatex No. 2 sealing compound to the mounting surfaces of the center frame, the assembly casting, and to the three mounting screws.
2. Insert gear end of the assembly into the locating hole in the center frame with a slight rotating movement of the sprocket, X-1207, so that the gear, X-1206, will properly mesh with its driving gear.
3. Align the three mounting screw holes in the sprocket assembly with the three tapped mounting holes in the center frame and press assembly firmly into place.
4. Start the three mounting screws, which have been Permatexed and draw all three up evenly and firmly with a large screw driver. Do not use excessive force when replacing this unit.
5. Replace film stripper, X-1219.

Removing Sprocket—The lower sprocket can be changed without removing the whole sprocket assembly. To remove sprocket:

1. Relieve film stripper, X-1219, by removing the front, and loosening the rear screws, P-1035.
2. Remove the left hand thread screw, X-1231, by turning to the right.
3. Hold pad rollers, X-1222, away from teeth of sprocket, and pull the sprocket from the shaft by hand.

Pad Roller Adjustment—To alter the pressure of the tension spring, X-1221, the pad roller assembly must be removed by backing out screw X-1217 and carefully bending the spring as desired. Proper clearance between pad rollers and sprocket has been adjusted at the factory by means of hardened stop screw, P-1039, and locknut, P-155. Should it become necessary, to readjust this, three thicknesses of standard film can be used as a gauge.

Removing Pad Rollers—To remove pad rollers, X-1222, first remove screw, P-63, and then lift locking key plate, X-1225. By pulling on studs, X-1223 and X-1224, the rollers will drop out. Clean with a tooth brush or other small stiff bristle brush. Use Carbona, Kerosene or Naphtha. Wipe dry and replace by reversing removal procedure. Make sure that the locking plate, X-1225, fits into the slots in shafts, X-1223 and X-1224.

UPPER FILM SPROCKET UNIT X-1200-A

(See Diagram No. 5)

Removing Upper Sprocket Assembly—Diagram No. 5 shows the construction of the upper sprocket assembly. It is quite similar to that of the lower sprocket assembly, Diagram No. 4. The principle difference, however, is in the manner in which it is removed from the main frame. Care should be used in handling this unit. Although being of rugged construction, it is delicately adjusted and any rough handling will upset the close tolerances which have been built into this unit. To remove the upper sprocket assembly, X-1200-A, proceed as follows:

1. Remove the cover from the drive side of the projector.
2. Remove the gear assembly, X-1212, by first removing the slotted cap nut, X-1011. When removing this gear make sure that the woodruff key, P-1079, is in an upward position otherwise it may fall out and drop into the oil reservoir. The position of the key should be determined, after the slotted cap nut, X-1011 has been removed, by checking the position of the key slot in gear hub, X-1212. If the key is not in an upward position turn the complete mechanism manually by either the motor hand-wheel or flywheel. Do not attempt to turn the mechanism by using the flywheel on the intermittent movement.
3. Remove the screw, P-78 and clamp, X-1236, which hold the oil tube, X-1294, in place. Take care not to drop them into the projector.
4. Remove the film stripper, X-1220, by removing the two screws, P-1035.
5. Remove the three mounting screws, P-1000 which hold the sprocket assembly to the main frame.
6. Grasp the underside of the sprocket, and pad roller bracket, and exert alternate up, down, and sideward pressure to free the assembly casting from the main frame.

In replacing this unit, the reverse procedure as outlined above should be followed.

For instructions on the removal of sprocket, or the removal, cleaning and adjustment of the pad rollers, refer to instructions covering the lower sprocket assembly, X-1200.

SHUTTER SHAFT UNITS X-1400

(See Diagrams Nos. 6 and 7)

General—This unit has been adjusted at the factory, and there should be no reason for disassembling or adjusting any part thereof. Diagram No. 6 for the BX-40 and Diagram No. 7 for the BX-80 show the details of construction and assembly.

The BX-80 shutter is a double disc type, rotating in opposition, that cuts the light beam in the center of the picture frame aperture. This produces a better defined picture and passes more light to the screen. The gearing is factory adjusted and requires no further adjustments. Lubrication is fully automatic from the rotary lubricator.

Shutter Adjustment BX-80—An adjusting stud, X-1433, is located in the front upper center housing on the operating side of the projector. This is the only adjustment that is necessary in the shutter shaft assembly. See Diagrams Nos. 6 and 7. It is used as a micrometer adjustment to remove any slight "bleeding" or "travel ghost" that might have occurred when the shutters were timed by hand. This adjustment allows 6 degrees shutter movement either way when the adjusting stud is exactly in the center of its travel. In timing shutters this adjusting stud should first be set to allow equal shutter adjustment in either direction.

Shutter Blade Timing—The only time this adjustment should be necessary is after the intermittent assembly has been removed and replaced. Timing of the opposing shutter blades of the BX-80 projector is accomplished as follows:

1. Remove the quarter panel and the shutter housing, X-1007. See Diagram No. 1.
2. Set the slotted adjusting stud, X-1433, at the center of its travel. This position can be determined by turning the stud as far as it will go in one direction and then turning it seven complete turns in the opposite direction.
3. Refer to Diagram No. 7, and note that the two shutter blades are mounted on flanged hubs, X-1418 and X-1421 of different diameters. The inner blade, X-1450A is mounted on the larger hub and the outer blade, X-1450B, on the smaller hub. Two #10-24 filister head machine screws, either P-1032 or P-1036, which tighten the hub flanges on the blade proper, are located in the face of the inner and outer hubs respectively.

NOTE: Do not disturb the set screws, X-1429 which hold the shutter hubs to their respective shafts. The shutters cannot be timed in this manner due to fixed counterseats in each shaft.

4. Rotate the projector mechanism manually until the intermittent sprocket just starts its pull-down motion.
5. Loosen the #10-24 screws, P-1036 and P-1032, one turn each so the blades can be moved independently on their hubs without disturbing the intermittent setting or moving the mechanism.
6. Looking at the rear of the projector the inner shutter blade (the one with the large hub), moves in a counterclockwise direction and should be rotated in that direction until it divides the aperture plate opening in half.
7. Tighten the two #10-24 screws, P-1032. If they cannot be reached rotate the outer shutter blade until they come in view.
8. Move outer shutter blade (the one with the small hub) in a clockwise direction until the

lower edge of the shutter blade coincides with the top edge of the inner shutter blade. See Diagram No. 7.

9. Tighten the two #10-24 screws, P-1036, in the outer hub.
10. Check this adjustment by turning mechanism by hand (using hand wheel on sound projector) several times. Notice whether the edges of the inner and outer shutter blades are meeting exactly in the center of the aperture as the intermittent sprocket starts its pulldown movement. If this occurs then the shutters are correctly timed.
11. If a slight "travel ghost" appears when a picture is projected it can be removed by turning the adjusting stud, X-1433, clockwise if "travel ghost" is moving upward, or counterclockwise if moving downward.
12. Replace shutter housing and quarter panel.
13. Should the shutter blades be accidentally bent at any time, they can be quickly removed and replaced by means of set screws, X-1429, without disturbing the timing.

Shutter Adjustment BX-40—The BX-40 Projector is a single shutter projector, and is timed in the conventional manner. See Diagram No. 6. Release shutter blade by backing off screws, P-1032, one turn each. Time cut off shutter in the conventional manner for single blade, 90 degrees cut-off, that is, when intermittent sprocket is just starting its "pulldown", move shutter blade by hand (being careful not to disturb intermittent) in a counterclockwise direction until the upper edge coincides with the center line of the aperture plate opening. Lock hub flange to shutter blade by tightening the two #10-24 lock screws, P-1032.

GOVERNOR AND FAN UNIT X-1500

(See Diagram No. 8)

Governor—The governor unit is designed to work with equal accuracy at all projection angles. The design is the loaded flyball type working in a horizontal plane. See Diagram No. 8. It operates against the weight of the fire shutter and associated linkage by means of a push rod. The closing of the fire shutter is accomplished by a gentle spring action assisted by the design and balance of the governor weights. Therefore, it is returned to the closed position much faster than would be the case with a governor controlled only by centrifugal force. The unit is simple in design, ruggedly constructed, and constantly and fully lubricated by the action of the rotary lubricator. All adjustments on this unit have been made at the factory and no further adjustment is required.

Cooling Fan—Note upon examining Diagram No. 8 that the extended shaft to the operating side of the projector carries a rotary blade Sirocco type fan. This fan pulls cool air from the bottom outside of the projector directly in front of and past the film trap and aperture plate, and exhausts it at the top of the projector. This keeps the aperture temperature low, prevents buckling of the film, and decreases fire hazard. It is especially important that all doors and panels on the operating side of the projector are in place while projecting, as the composite design confines the air stream

to the aperture plate for maximum cooling. The projection arc is not disturbed by the action of this cooling fan. Neither does the velocity of the air affect the focus of the film.

OIL PUMP UNIT X-1600

Diagram No. 10

Late Design—This unit is of the gear type and contains an oil filter. No adjustments are necessary on this unit. An oil level window, X-1615, is located on the front of the unit for observing the amount of lubricant in the projector. The normal oil level should register between the indicating arrows on the pump. This reading should be checked when the projector is at rest, as the pump relieves the oil from the gauge while projecting. One pint of Brenkert approved lubricating oil is required to fill the oil sump of the projector. In filling use a small funnel and pour through the spring cap oil cup on top of gear side cover, X-1002. This filling is sufficient for approximately 600 hours of operation at which time it is advisable to drain the used oil through petcock, P-1101, and fill with fresh oil. To drain the projector, slip a small piece of gas or medical hose over the nozzle of the petcock so the lubricant can be directed easily to any container placed on the projection room floor.

Changing Oil—Whenever the projector oil is changed, the oil filter screen X-1621, in the X-1608 gauge retaining housing should be cleaned. This is accomplished as follows:

1. Take out the two retaining cover mounting screws, P-82 and remove the cover, X-1608, from the pump.
2. Remove the bronze screen, X-1621, from the bottom of the cover and clean thoroughly with kerosene.
3. Insert in the cover and replace the cover on the pump housing. Make sure the gasket X-1617 is in good condition and properly set when the cover is replaced, otherwise an oil leak may develop.

Removing Oil Pump—Under normal operation there should be no reason for removing the oil pump from the main frame. To acquaint the user with the accessibility of this unit, it can be removed as follows:

1. Drain oil from projector.
2. Remove four mounting screws, P-1000.
3. Grasp the gauge retaining cover, X-1608, and exert a slight alternate up and down pressure until the pump is free from the main frame.
4. Pull the pump away from the projector main frame as far as the neoprene hose will allow.
5. The neoprene hose may now be removed from the pump by removing clamp P-1109.

To replace the pump, first make sure that the neoprene hose is securely clamped to the lower tube section X-1623. See Diagram No. 10. The mounting surface area of both the pump and main frame should be thoroughly cleaned with a clean cloth and carbona. Apply a film of Permatex No. 2 to the mounting surfaces of the pump and main frame, before installing the pump.

OIL PUMP UNIT X-1600

(See Diagram No. 11)

Early Design—This unit is similar to the late type described above except that it has a tubular glass oil gauge and contains no oil filter. A slightly different method of removal from the main frame is necessary with this type of unit, though removal should be unnecessary under normal operating conditions.

Removing Oil Pump—To remove proceed as follows:

1. Drain the oil from projector.
2. Remove the cover, X-1002, and its gasket, X-1003, from the drive side of the projector.
3. Remove rotary lubricator and gear assembly, X-1212, by first removing the slotted cap nut, X-1011. See Diagram No. 5. When removing this gear make sure that the woodruff key, P-1079, is in an upward position otherwise it may fall out and drop into the oil reservoir. The position of the key should be determined, after the X-1011 slotted cap nut has been removed by checking the position of the key slot in gear hub. If the key is not in an upward position turn the complete mechanism manually from either the hand wheel or fly wheel on the drive motor. Do not attempt to turn the mechanism by using the flywheel on the intermittent movement.
4. Remove screw, P-78, and clamp, X-1236, which hold the oil tube, X-1249, in place. Be very careful not to drop them into the projector.

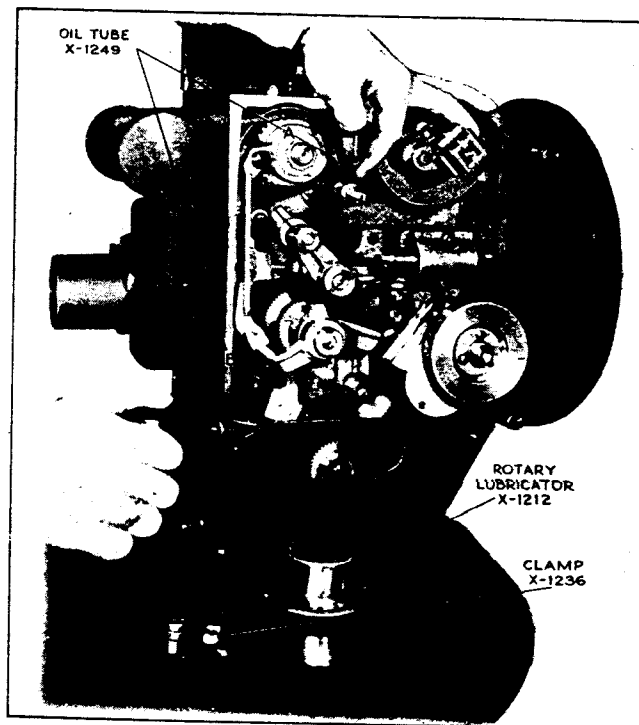


Figure 7—Removing Oil Tube (Early Design)

5. Turn the gauge assembly, P-1094, located on the film side of the pump housing, slightly to the left using a $\frac{1}{2}$ " open end wrench on the square section of the lower fitting, P-1099. This will give access to the upper left mounting screw. Care should be used in turning the gauge to prevent breaking the glass column, P-1098. Do not attempt to turn this by hand or with pliers.
6. Remove the four mounting screws, P-1000.
7. Lift the oil tube, X-1249 out of the pump by applying slight upward pressure at point "A", see Figure 7, and at the same time prying upward on the oil tube at point "B" by means of the bit of an eight-inch screw driver.
8. Make sure that the oil tube is clear of the pump. Hold the bit end of a large screw driver against the pump case on the drive side of the projector and tap the handle of the screw driver with the palm of the hand. This will loosen the pump from the main frame so that it may be removed from the film side of the projector by hand.

Before replacing the pump, clean the mounting surfaces of the pump casting and the main frame with a clean cloth and carborundum. Apply a film of Permatex No. 2 to the flanged area of the pump case, the mounting surface of the main frame, and the threads of the four mounting screws. Insert the pump and tighten evenly the four mounting screws. Replace oil tube in top of pump seating it firmly in place. Replace parts removed in items 5, 4, 3, and 2 in that order. Fill oil reservoir with a pint of Brenkert lubricant.

NOTE: In refilling the amount of lubricant which is flowing into the reservoir should be noted on the gauge. A vent hole is located in the top of this gauge and should some oil be left in the projector, which is often the case, a full pint of lubricant might fill the gauge to the top and overflow through the vent hole into the soundhead. The gauge should never show more than $\frac{3}{4}$ full when the projector is at rest.

DRIVE GEAR AND SHUTTER COMPENSATOR UNITS X-1700

(See Diagrams Nos. 9 and 12)

Main Drive Gear Unit—This drive gear unit, shown on Diagram No. 9, couples the projector drive gear, of the associated soundhead, with the projector shutter compensator unit Diagram No. 12.

Mechanical Fuse—A safety feature is incorporated in this gear train to prevent the stripping of gears in case of accident. See Diagram No. 9. This consists of a shear pin, X-1729, which is inserted in the hub construction of the outside main drive gear, X-1703. If any abnormal strain is produced in the projector the shear pin will part and the main drive gear will become an idler. This gear is easily reached as it is exposed at the drive side housing near the sound drive pinion. After the abnormal strain (such as film "pile-up") is removed, another pin can be inserted and the main gears in the projector are left in perfect condition to continue. The only tool necessary is a medium size screw driver to remove the holding screw, X-1749, and to push out the sheared part of the shear pin. Two extra shear pins are supplied with each projector and these should be kept in a handy place in the projection room.

Shutter Compensator Unit—This unit as illustrated in Diagram No. 12 is a sub-assembly mounted directly on the main frame and is lubricated by action of the rotary lubricator. Manufacturing tolerances have been held such that once assembled on the projector no adjustments are necessary.

CAUTION: Do not attempt to adjust or remove any gears in this gear train. These have been set very carefully by factory experts to operate under optimum conditions.

LENS MOUNT UNIT X-1800

Diagram No. 13

General—The lens mount is of the pre-focused type accommodating all standard American made lenses. Before inserting the lens, set the position of the pre-focus sleeve, X-1802, to approximately the mid position of its travel by means of lens focusing knob, X-1809. To insert lens, lift cam shaft operating lever, X-1815, to its maximum vertical position. Seat lens and return lever to its downward position. Do not use excessive pressure. Spring, X-1808, exerts sufficient tension to hold the lens tube in place.

Quarter Size Lens Adapter—An adapter, X-1803 is provided as an accessory to accommodate quarter size Series #1 projection lenses. This is used only when half size Series #2 lens extension tubes are not available. To install adapter it is necessary first to remove the lens mount assembly from the projector by taking out three screws, two P-1007 and one P-1008. Take out two screws, P-81, and remove light shield collar, X-1818. Insert adapter and fasten securely with two screws, P-1004. Before inserting lens see that the pre-focus adjustment is approximately in its mid position. Insert lens in adapter and clamp in position by means of screw, P-1034. Replace light shield collar and reassemble lens mount unit on projector. Clamping screw, P-1034 can be reached after lens mount unit has been fastened to projector for ease in removing lens.

Half or Large Size Extension Tubes—If the lenses to be used are equipped with half size or the large size extension tubes, they will fit the lens holder without the use of any adapter parts. The use of this lens tube is recommended as it provides the pre-focus feature which is not possible when using adapter, X-1803. It accommodates both Half and Quarter size lenses of B.&L. type or any other, the diameter of which can be adjusted by means of proper shim collars to equal the diameter of the B.&L. standard. The use of any radically off standard lenses should be discussed with the RCA Manufacturing Company, Inc., giving size, length, diameter, focal length and complete information before assuming their use.

FILMTRAP PLATE AND FIRE SHUTTER FRAME UNITS X-1900

(See Diagrams Nos. 14 and 14A)

General—This unit is built upon a rugged main casting, X-1901, which has been carefully machined to fit the main frame upon which it is rigidly mounted with three machine screws, P-1000. See Diagram No. 14. It can be removed as a complete assembly for inspection or adjustment. When the projector leaves the factory, the film trap has been carefully adjusted and aligned

with the intermittent sprocket and lateral guide rollers, X-1957. However, it is sometimes necessary to make certain adjustments over a period of time due to wear caused by the motion of the film. The most common of these adjustments is that of the lateral guide rollers, X-1957. If one of the rollers becomes scarred, it is advisable to replace it at once for best results.

Lateral Guide Roller Adjustment—In order to adjust or replace the lateral guide rollers it is necessary to remove the trap and fire shutter assembly from the main frame. This is done in the following manner:

1. Relieve film stripper by removing screw, P-1000 and hinging back subcasing X-1903 about pivot screw, X-1965 as shown in Figure 2.
2. Remove screw, X-1925, change changeover link, X-1921-A and remove changeover shutter and link.
3. Remove three mounting screws, P-1000, and slip assembly off the dowel pins, P-1058. Keep film stripper away from intermittent sprocket while doing this.
NOTE: Make sure that push rod, X-1968, which controls the fire shutter lift does not fall out as it is loose when this assembly is removed from the projector.
4. Remove plate, X-1960, by removing screws, P-1028. See Diagram No. 14A.
5. If complete removal of the rollers is desired, loosen the two pivot lock screws, P-1018, from the back of the trap. Section BB, Diagram No. 14.
6. Now withdraw outside pivot pin, X-1958, and the complete roller assembly is free.
7. Rollers can be removed from shaft by removing adjusting collar, X-1955.

After roller assembly is ready to replace, insert between pivot pins, X-1958. Tighten locking screw on back pivot then push in on outer pivot until the roller is supported and rolls freely on the pivot points. Lock outer pivot locking screw. Set the outer guide roller by means of adjusting collar, X-1955, until its face is in line with the face of the fixed film side guide, X-1907. Use a short piece of film and slide it between side guides X-1907. Push lightly and observe if guide rollers run free on their centers by this action. No end play should be left between the points of pivot pins and shaft centers, otherwise "sidesway" will result. This adjustment is quite critical and one that is often made incorrectly. Be sure set screw, P-1051, in collar, X-1955, is tight before replacing plate, X-1960.

Outer Film Guide Strip Adjustment—The two screws, P-1053, in the outside edge of the main casting, X-1901, are for adjusting the alignment of outer guide strip, X-1907, with the intermittent sprocket, X-1141. This adjustment has been made at the Factory and should not be altered unless new guide strips or a new intermittent assembly is installed. In this case, X-1907, should be set using the gauge, X-4404, which can be obtained from RCA Manufacturing Company, Inc., or its authorized dealers.

1. Remove lens holder X-1800.
2. Remove film gate by removing knurled thumb screw X-1943 and slipping gate off of locating dowels, P-1058.

3. Remove intermittent sprocket, X-1141.
4. Loosen the holding screws, X-1989, on outer guide strip, X-1907.
5. Loosen the 2 screws, P-1053.
6. Slip the gauge on the intermittent shaft in same manner as a sprocket.
7. Move gauge into position between guide strips.
8. Insert sprocket locking screw, X-1109, and tighten.
9. Adjust outer guide strip, X-1907, flush with ground edge of gauge, see Figure 8, by means of screws P-1053.

Care must be exercised in making this adjustment. Do not force either gauge or guide strip as misalignment will result. When completed, tighten all screws, replace intermittent sprocket, etc. Correct film alignment with guide strip, X-1907 is now assured.

Cleaning and Care—Keep the film trap clean. It is an asset to good projection. It is common knowledge that film leaves granular deposits on those parts of the projector where it is held under pressure. If these deposits, from various degrees of processing, are allowed to pile up they can prevent the lateral guide rollers from turning, and cause excessive drag on the film resulting in unnecessary and preventable noise. Clean the film side of this unit regularly with carbona and a tooth brush.

CAUTION: Do not expose this unit to the full light beam for longer than a few seconds unless the light cut-off shutters are in motion, because of the heat which the modern projection arc lamp generates. This heat without shutters running is sometimes as high as 1600° F. This heat is reduced to one-half when projector is running and with the cooling fan in motion no abnormal heating is possible. Always check screen alignment, light intensity, masking, etc., with the projector running.

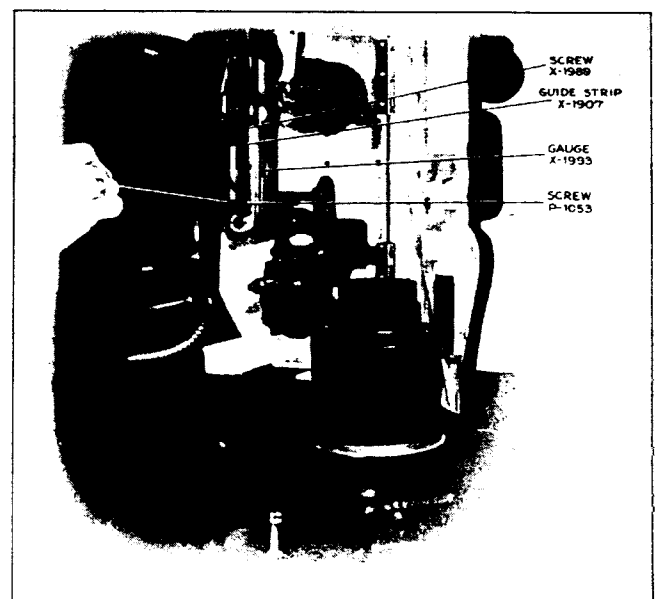


Figure 8—Film Guide Strip Adjustment

Framing Aperture—An aperture which is synchronized six frames ahead of the projection aperture is located just above the lateral guide rollers. This makes threading "in frame" easy as it eliminates the difficulty experienced in framing at the optical aperture.

Projection Aperture—To remove the projection aperture plate, X-1908, move the external section toward the rear of the projector, and pull straight out of the housing. This quick method of removing projection aperture makes cleaning easy and replacement simple and sure.

Lubrication—No lubrication of the film trap assembly is required. Do not put oil of any kind on this unit as it may carbonize and cause sticking of pad rollers, fire shutter or other moving parts.

FILM GATE UNIT X-1900

(See Diagrams Nos. 15 and 16)

General—This unit is designed to exert an even and controlled pressure on the film along the full length of the film gate as well as at the projection aperture.

Two adjustments can be made so different thickness films which may be encountered, such as new film, extremely old film, etc., can be run quietly.

First, the tension on the two upper pads, X-1946, as well as on the lower pad, X-1947, is adjusted simultaneously by means of knurled screw, X-1941 and associate locknut, X-1940, on the gate housing for minimum noise. See Figure 3. The springs which are used to create the tension on the film gate pads are made from the highest grade of clock spring material assuring long life and even tension throughout the whole unit. The springs can be changed easily by the removal of screws, X-1986 and X-1987. This allows the X-1914 housing and X-1928 front plate to be separated. The springs are fastened to the adjusting shaft, X-1945, by means of screws, P-1054. If it should be necessary to replace any of these springs, note that the lower gate spring, X-1982 is larger than the four upper gate springs, X-1981, thus maintaining greater stabilization of the film at a point nearest the intermittent sprocket.

Second, the intermittent film pad, X-1964, tension is adjustable by means of the adjusting nut, X-1935, in combination with the locknut, X-1961, to minimize any sprocket noise that might occur.

Cleaning and Care—Always clean the tension pads and intermittent film pads of this gate at least twice a week, as it prevents particles of film, emulsion, and other foreign matter from collecting around the pads or in openings which might cause scratching of film.

The bracket, X-1912 on which the gate mounts is fastened to the main frame and can be removed, though it should never be necessary, by removing the two holding screws, P-1000, and pulling the bracket off of the locating dowels, P-1058. If this bracket is removed it is necessary to use a sealing compound such as Permatex No. 2 applied to the threads of the two holding screws before reinsertion. This prevents any possibility of oil seeping through from the oil reservoir on the drive side of the projector.

Lubrication—No lubrication is necessary for this unit. No oil of any kind should ever be used on any part of the film gate.

PILOT FRAMING LIGHT UNIT X-2000

(See Diagram No. 17)

General—The pilot framing light consists of a 110 volt candelabra base clear bulb mounted on a special bracket, and "push-on-push-off" type switch, P-1091, with an extended push button. See Diagram No. 17. Furnished with this item is a two wire BX cable of sufficient length to reach the convenience outlet in the projector base. This unit is packed in the accessory carton.

Installation—Remove the quarter panel, X-1005, and two mounting screws, P-1033, just back of the film trap, X-1900, which are screwed into the main housing, X-1001. Mount bracket, X-2001. Replacing and tightening these screws. Insert bulb and pilot light is ready for operation when BX cable has been properly connected to 110 volt supply in the base.

CHANGEOVER UNIT X-2000

(See Diagram No. 18)

General—The changeover unit is of the horizontal solenoid type. The coils are so wound that a quick positive pull is assured. It is designed for operation on 110 volt AC or DC current. The changeover is packed in the accessory carton and is complete with a proper length of 3 wire BX cable to reach the junction box located on the inside of the floor base assembly, X-2100.

Installation—The changeover is mounted directly on top of the projector housing, X-1001. Two mounting screws, P-1008, are used to attach the changeover housing, X-2002. Two 1/4" x 20 tapped holes in the main housing are properly located to receive these screws. Place changeover temporarily in approximate location and engage the piston arm fork, X-2009, with the lever pin, X-2005, which actuates the shutter, X-2013. By operating the piston by hand determine if the piston arm fork, X-2009, and shutter, X-2013 are operating freely, and if so, the mounting screws can be tightened firmly and the changeover will operate properly.

If there is any tendency to bind the changeover unit should be shifted slightly until perfect alignment is accomplished before tightening the mounting screws. In addition to the actuating piston there is a piston guide rod, X-2019, which serves a dual purpose; first to guide the stroke and second to act as a dampener to the entire changeover mechanism. The dampening adjustment is made by means of headless set screw, P-1085, which when tightened exerts pressure through spring X-2014, on ball, P-212, that rests directly on the piston guide rod. This determines the ease of shutter operation and holds shutter open in case of extreme projection angles.

Adjustment—To adjust the travel of the changeover drop shutter, X-2013, proceed as follows, See Diagram No. 18:

1. Back off locknut, P-161.
2. Insert screw driver in slot in forward end of threaded plunger rod, X-2018.
3. If shutter is not closing completely, turn plunger rod counterclockwise. Turn clockwise if shutter falls too far.
4. When adjustment is correct, tighten locknut, P-161.

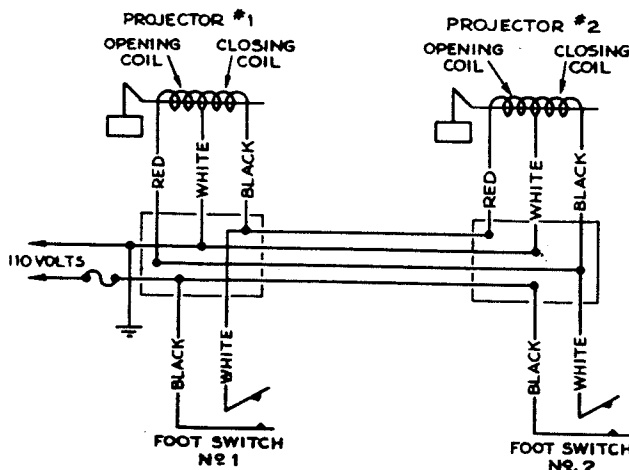


Figure 9—BX-30 Changeover Wiring

Wiring—Figure 9 is a schematic showing the interconnections of the BX-30 changeover, and the BX-20 foot switches normally used with the Brenkert BX-40 or BX-80 mechanisms. The BX-20 foot switch is the two wire, single contact type, which is normally installed on the right lower front of the projector base.

The BX-30 changeover can be used with any existing foot or wall switch if the color scheme of the original wiring is carried out. In the BX-30 changeover the white wire is common, the black wire is for the opening coil, and the red wire is for the closing coil.

BX-10 HEAVY DUTY BASE X-2100

General—The BX-10 is designed for installations requiring extra heavy bases, and where the projection room area and construction will allow for their size and weight. See Figure 10. The main frame is a one piece iron casting of sufficient floor area to maintain rigidity with the largest of present soundheads in conjunction with the Brenkert projector. The micrometer adjusting tilting mechanism operates for all projection angles between 36° downward and 10° upward. The carriage for the lamphouse is adjustable vertically and laterally for close optical alignment of any standard projection lamp with the projector mechanism.

All electrical connections and switches are located inside the main frame and include a 100 ampere switch with control levers on both sides of base, two 20 ampere tumbler switches for controlling the soundhead drive motor from both sides of the base, and one for controlling the relay switch where rectifiers are used. An emergency light convenience outlet is mounted on the front panel. A changeover switch mounting is provided on the base. Full opening panels on both sides give complete access to the interior. Four leveling screws and pads are provided.

NOTE: A 200 ampere switch is available when ordered, at slight extra cost, for use with Super-High Intensity lamps.

Unpacking and Handling—The completely assembled base is carefully checked and crated at the factory, and thus the chance of breakage in shipment has been minimized. To unpack, open one side of the crate.

CAUTION: Exercise caution in using bar or hammer where there is danger of striking or marring the base. It will now be easy to complete the unpacking operation. If the Base is to be hoisted, great care must be

exercised in proper slinging and handling or expensive breakage can result.

Place the base temporarily in as near the final location as possible in the projection room in line with the projection port opening in front wall. The sound equipment, projector mechanism, lamp house, magazines, etc., should then be installed.

The exact location of the base will not be known until a lens is installed in the projector and a light projected on the screen. Before attempting to project a light, remove right hand base panel, X-2118, loosen the two lock screws, X-2107, so that the hand wheel, X-2136, can be used to adjust the projection angle.

Aligning and Leveling—Each base is supplied with four round cupped floor pads, X-2129, which should be placed cupped side up, under the four leveling screws, X-2128, located in each corner of the pedestal. These screws should be equalized until there is a part of the weight resting on each. Loosen the two locking screws, X-2107, and bring the lamphouse, soundhead and projector, carried on a sub-swivel base, X-2192, to as near horizontal as can be ascertained by operating the hand wheel, X-2136. Using a spirit level on the machined surfaces of the base check both directions for proper leveling. This is very important as it assures the ultimate steadiness and smooth operation of the complete assembly.

Optical Alignment—Two adjustments are provided on the lamphouse platform, X-2106, one vertical and the other lateral for aligning the optical centers of the projection lamp and projection lens. Adjustment is made by aligning lamp to projector as follows:

Remove platform side strips, X-2165, held by screws at each end. Make vertical adjustment first by raising or lowering the vertical adjustment nuts, X-2108, at all four points, keeping lamphouse platform level. Make lateral adjustment by turning the horizontal adjust-

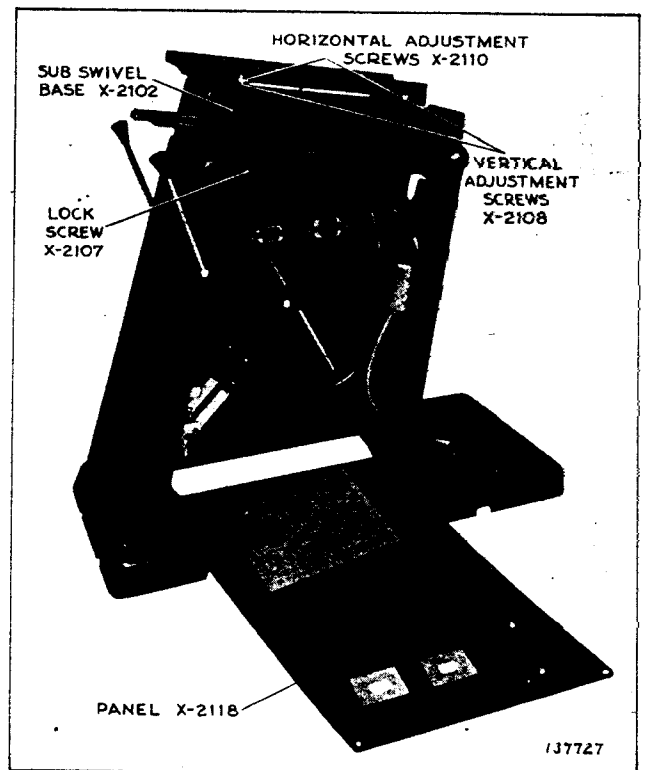


Figure 10—BX-10 Heavy Duty Base

ing screws, X-2110, using screw driver until this alignment is correct. Lock vertical adjustment and replace side strip, X-2165. The lateral adjusting screws are self-locking. When this has been completed and the projection angle has been re-established on the screen, tighten the two locking screws, X-2107. This removes any possibility of movement in the swivel part of the base.

Storage Compartments—Three compartments are provided in the rear of sub-swivel base, X-2102, one for storage of positive carbons, one for negative carbons, and one for hand tools. The depths of these compartments are adjustable to suit the length of carbons used. Remove side strip, X-2165, loosen nuts on carbon stop guide stud, X-2160, set stops at the desired depth, tighten nuts, and replace side strip.

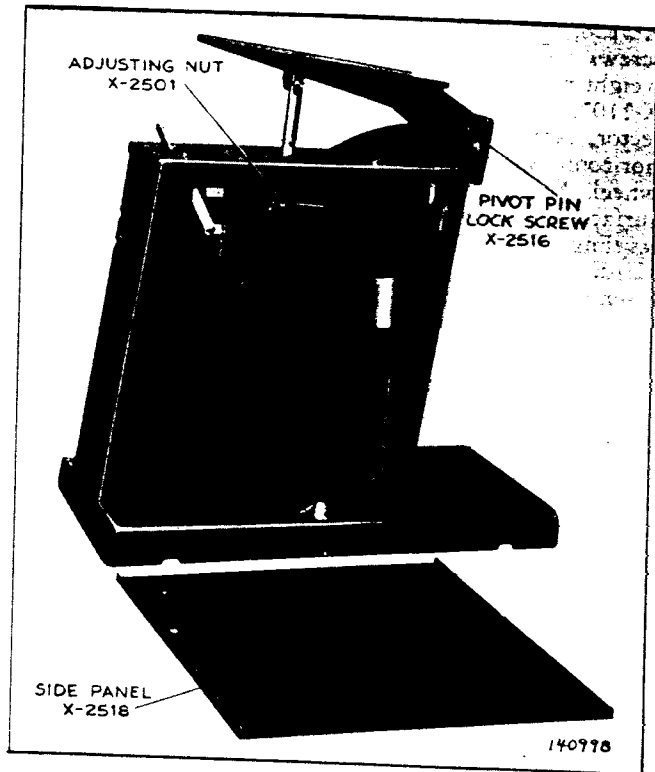


Figure 11—BX-12 Medium Duty Base

BX-12 MEDIUM DUTY BASE X-2500

General—The BX-12 is similar to the BX-10 Base but of somewhat lighter construction. See Figure 11. All electrical connections and switches are located inside the main frame. This includes a 100 ampere double pole knife switch, one 20 ampere tumbler switch for controlling the soundhead motor, and an emergency light convenience outlet.

NOTE: A 200 ampere switch is available when ordered, at slight extra cost, for use with Super High Intensity lamps.

Unpacking, Handling and Adjusting—The general instructions on the BX-10 base in regard to handling, unpacking, etc., apply to the BX-12 type. Pedestal leveling is accomplished in a like manner using floor pads, X-2510, and leveling screws, X-2511.

To set projection angle, remove right side panel, X-2518, loosen swivel screw, X-2512, by backing off nut, X-2513, and loosen clamp cap screw, X-2514. This allows free rotation of the adjusting nut and handles, X-2501, which raise or lower the lamp platform, X-2503, through screw X-2507. When final setting is correct, tighten all screws and nuts.

A slight sideward adjustment of the lamp platform and projector is possible by loosening pivot pin lock screws, X-2516, and shifting either to right or left as required. Projection angle can be adjusted from 25° downward to 10° upward. The optical alignment has been established at the factory, and no adjustments are provided.

BX-20 FOOT SWITCH

The BX-20 foot switch is shipped as an integral component of the BX-10 base but must be ordered separately for use on the BX-12 base. It is a two wire, single contact type which mounts on the base flange of either the BX-10 or BX-12 bases. Holes are provided in the BX-10 base for ease of assembly. Figure 9 is a schematic showing its connection to the Brenkert BX-30 changeover.

GENERAL LUBRICATION

Drive Side of Projector—Only Brenkert lubricant should be used. Lubrication of the projector is accomplished automatically by centrifugal action of the rotary lubricator. This action expels a steady spray of oil to all bearings and gears at all projection room temperatures. The lubricator is assisted in its function by spiral grooves in all shafts, assuring constant supply of fresh oil to all bearing surfaces. Each bearing housing has an oil groove so designed that the proper amount of oil is received from the rotary lubricator for all projection angles.

Oil returns to the reservoir by gravity assisted by oil slinging devices employing centrifugal force in this function. This procedure is continuous while the projector is running and automatically stops while projector is at

rest. To assure the proper oil supply to the rotary lubricator, the oil indicator gauge must show at least 1/2 full before starting the projector. Oil level must be checked with projector not running as the oil is relieved from the gauge while the mechanism is in operation.

A 1/8" diameter tube provided with a Gitz fitting supplies oil to the intermediate gear shaft between sound pinion and projector proper, main drive gear. Apply two or three drops of Brenkert oil every 24 hours. This tube and fitting, X-1123, extend upward and to the right of main drive year. See Figure 5.

The projector drive gear and 17 tooth pinion assembly of most sound mechanisms must be oiled externally through a Gitz oiler provided on the end of the drive

shaft. This should be supplied with the proper oil as instructed by the sound equipment manufacturer.

Film Side of Projector—No lubrication is required on the film side of the projector. However, when some type of sound mechanisms are used the 17 tooth pinion shaft extends through to the film side and should be lubricated from this side by hand. In these cases, a Gitz fitting is provided on the end of the shaft, which extends through to the film side and should be lubricated with the proper oil as instructed by the sound equipment manufacturer.

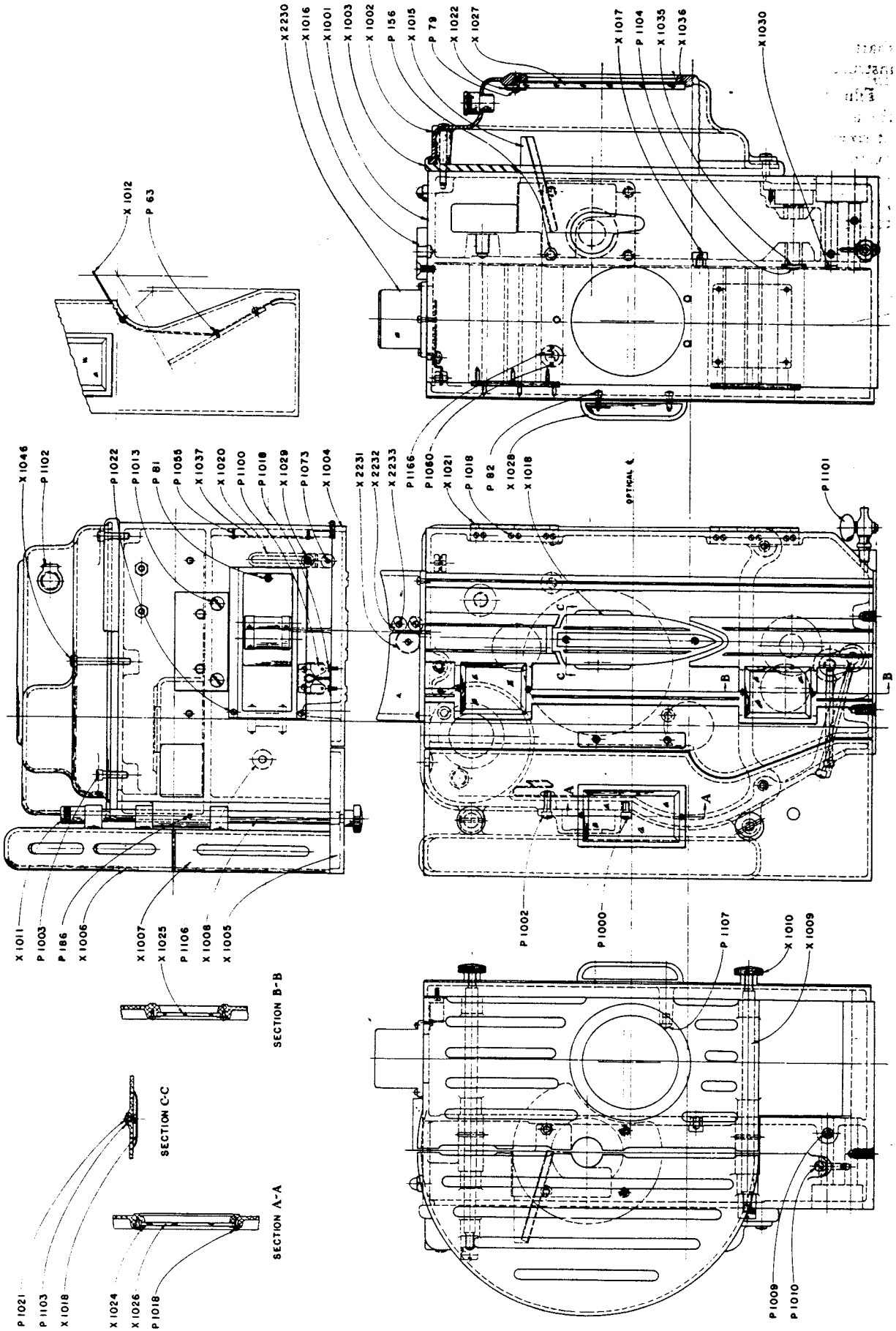
In some cases the intermediate gear shaft is also provided with a Gitz fitting which also extends through to the film side just above the sound pinion fitting. Two or three drops of Brenkert oil every 24 hours is sufficient for this bearing.

CAUTION: Care must be exercised in oiling these points as they are directly above guide rollers of the soundhead. These points should be wiped dry after lubricating.

OPERATING HINTS

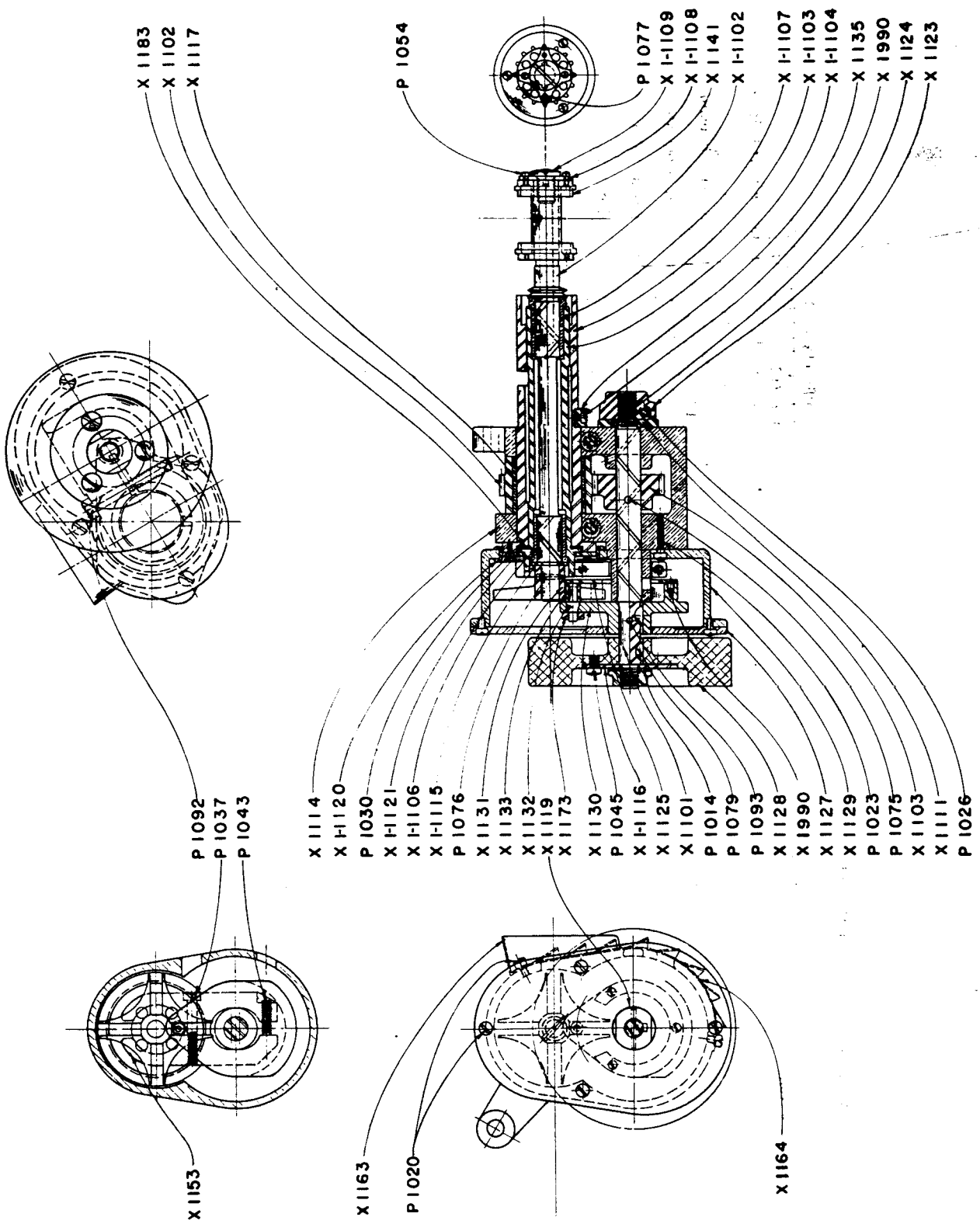
1. Keep projectors clean both inside and out. This prevents accumulation of gritty dust and grime which causes film damage and excessive wear on tension pads, sprockets and rollers. Clean film trap and gate shoes often with a stiff brush and Carbona or equal cleaner.
2. Be careful about "rule of thumb" adjustments. They may impair the efficiency of your projector needlessly. Do not attempt any adjustment before complete understanding of its function and the results to be expected are understood.
3. Keeping the correct tension on the film is most essential for quiet operation. The film gate is provided with two adjustments for this correction of tension. Always run film with the lightest pressure that will project a steady picture. This setting will prevent wear and undercutting of intermittent sprocket teeth also lessen wear on film track and film pressure shoes.
4. The proper size of upper and lower loops above and below the film gate must be maintained for quiet operation and to prevent "loop slap." A loop the height of two fingers width above the entrance at top of gate is correct. The bottom loop should form an arc of seven frames on the film between intermittent sprocket tension shoe and the lower sprocket pad roller.
5. Both upper feed and lower holdback sprockets have double pad rollers. Be careful not to "crimp" the film between these rollers when threading. If an extra sprocket hole is left between these rollers on the sprocket, film damage as well as excessive noise will result. Make sure film is firmly around each sprocket before closing pad rollers. Keep rollers free and clean.
6. The fire shutter is opened by a push rod, X-1968. See Diagram No. 14A. This rod is provided with an oil impregnated thrust bearing on the governor end to lessen friction. Sometimes when the projector is new a squeaking noise may develop between the ball and oil impregnated thrust bearing. This does not indicate danger to nor does it effect the operation of the projector. If this happens a drop of oil or vaseline placed on this thrust bearing once a month will be sufficient to keep this bearing operating noiselessly.
7. When Brenkert changeovers are used with steep projection angles it is possible that the changeover shutter will "creep" down into the picture. This indicates that the guide rod adjustment is not tight enough. See section on changeover and adjust accordingly.
8. Never attempt adjustments on the intermittent, X-1100, in the projection room, since the proper tools are not available. The intermittent should be returned to the factory for any necessary readjustment.
9. If a film break occurs and the film "piles-up" in projector causing an excessive load, the shear strip X-1729, will shear to protect the gears. This is indicated by the continued running of the sound mechanism while the projector will remain stopped. Clear out film and insert spare shear strip. Projector is now ready to continue operating.
10. If the glass panels in film side door or quarter panel should become broken by accident, replace at once. If left out, the aperture cooling will be affected. Always operate with the operating side door closed. This will assure maximum cooling of the film trap and baffles.
11. If drive side cover, X-1002, is removed for any reason, make sure that the gasket is replaced correctly. When removing this cover, the gasket has a tendency to adhere to the main housing. If care is not exercised in replacing, it might become crimped resulting in a leak around this cover. In replacing cover be sure to tighten all screws evenly to assure firm contact all around gasket.
12. Use only Brenkert approved lubricant in projector. "Any Oil" will not lubricate the mechanism properly. Heavy oils will cause excessive loading of the projector and result in a drop in speed.
13. After draining and when refilling oil reservoir be sure drain cock is closed tightly. Watch gauge for correct level. These precautions prevent oil leakage. Keep oil shipping containers well covered and in clean storage space when not in use. Use only Brenkert approved lubricant.

DIAGRAM No. 1
HOUSING UNIT
BRENKERT BX-40 & BX-80 PROJECTORS



PART NO.	DETAIL PARTS	PART NO.	
X-1001	Main housing	P-156	Nut; oil baffle (1/4 x 20)
X-1002	Gear Cover housing (see assem. X-3001)	P-186	Pin; housing to stud (3/8" x 7/8")
X-1003	Gasket; cover to housing	P-1000	Screw (Fil. Hd. 1/4 x 20 x 3/8")
X-1004	Housing door (see assem. X-3002)	P-1002	Screw; upper oil baffle fastening (Fil. Hd. 1/4 x 20 x 3/8")
X-1005	Quarter panel (see assem. X-3003)	P-1003	Screw; gear cover (Fil. Hd. 1/4 x 20 x 7/8")
X-1006	Shutter housing; left side	P-1009	Screw; double face idler shaft to main housing (Fil. Hd. 1/4 x 20 x 3 1/4")
X-1007	Shutter housing; right side	P-1010	Screw; main housing to soundhead drive shaft (Fil. Hd. 1/4 x 20 x 4")
X-1008	Upper shaft; shutter housing mounting	P-1013	Screw; main housing to upper magazine sub plate (Flat Hd. 1/4 x 20 x 3/8")
X-1009	Lower shaft; shutter housing mounting	P-1018	Screw; door hinges and door and quarter panel glass clip (Fil. Hd. 6-32 x 1/4")
X-1010	Stud nut; quarter panel side	P-1021	Screw; door emblem (French hd. 6-32 x 1/4")
X-1011	Stud nut; left side shutter guide	P-1022	Screw; main housing to upper film trap (Fil. Hd. 6-32 x 3/8")
X-1012	Ventilation baffle in quarter panel	P-1055	Screw; main housing to name plate (No. 4 drive screw)
X-1015	Oil baffle	P-1060	Pin; escutcheon (Brass 1/16 x 1/4")
X-1016	Sub plate; upper magazine	P-1073	Pin; door stop (5/32 x 13/32")
X-1017	Screw insert nut	P-1100	Door latch
X-1018	Emblem	P-1101	Pet cock
X-1020	Door Stop	P-1102	Oil cup; gear guard cover
X-1021	Door hinge	P-1103	Washer; name plate
X-1022	Retaining clip; gear cover window	P-1104	Welsh plug
X-1024	Retaining clip; door and quarter panel window	P-1106	Rubber stop; fire shutter
X-1025	Window; film side door	P-1107	Door bumper
X-1026	Window; quarter panel	P-1166	Tag; Underwriter's label
X-1027	Window; gear cover		
X-1028	Handle; film side door		
X-1029	Shoulder screw; door stop		
X-1030	Plug; double face idler shaft bearing plug		
X-1035	Gasket; oil seal under welsh plug		
X-1036	Gasket; gear cover glass		
X-1037	Name plate		
X-1046	Screw; upper gear cover mounting screw (1/4 x 17/8")		
X-2230	Casting; upper film valve (see assem. X-3000)		
X-2231	Roller; large upper film valve roller		
X-2232	Roller; small upper film valve roller		
X-2233	Screw; roller pivot		
	WASHERS—PINS—SCREWS		
P-63	Screw; ventilation baffle screw (O.H. 6-32 x 3/16")		
P-79	Screw; gear cover window retaining clip (R.H. 8-32 x 3/8")		
P-81	Screw; upper film valve (Fil. Hd. 8-32 x 1/2")		
P-82	Screw; door handle screw (Fil. Hd. 8-32 x 3/8")		
	MINOR ASSEMBLIES		
	Assem. No.		
X-3000	Film valve assembly includes parts X-2230; X-2231; X-2232; X-2233. Assembled		
X-3001	Gear side cover includes parts X-1002; X-1027; X-1022; P-79; P-1102; X-1036. Assembled		
X-3002	Film side door includes parts X-1004; X-1025; X-1024; X-1018; P-1018; P-1021; P-1103; X-1020; P-1073; X-1028; P-82. Assembled		
X-3003	Rear panel assembly film side includes parts X-1005; X-1012; X-1026; X-1024; P-63; P-1018. Assembled		

**INTERMITTENT UNIT
BRENKERT BX-40 & BX-80 PROJECTORS**



X 1183
X 1102
X 1117

P 1054

P 1077
X 1-1109
X 1-1108
X 1141
X 1-1102

X 1-1107
X 1-1103
X 1-1104
X 1135
X 1990
X 1124
X 1123

P 1092
P 1037
P 1043

X 1114
X 1120
P 1030
X 1-1121
X 1-1106
X 1-1115
P 1076
X 1131
X 1133
X 1132
X 1119
X 1173
X 1130
P 1045
X 1-1116
X 1125
X 1101
P 1014
P 1079
P 1093
X 1128
X 1990
X 1127
X 1129
P 1023
P 1075
X 1103
X 1111
P 1026

X 1153

X 1163

P 1020

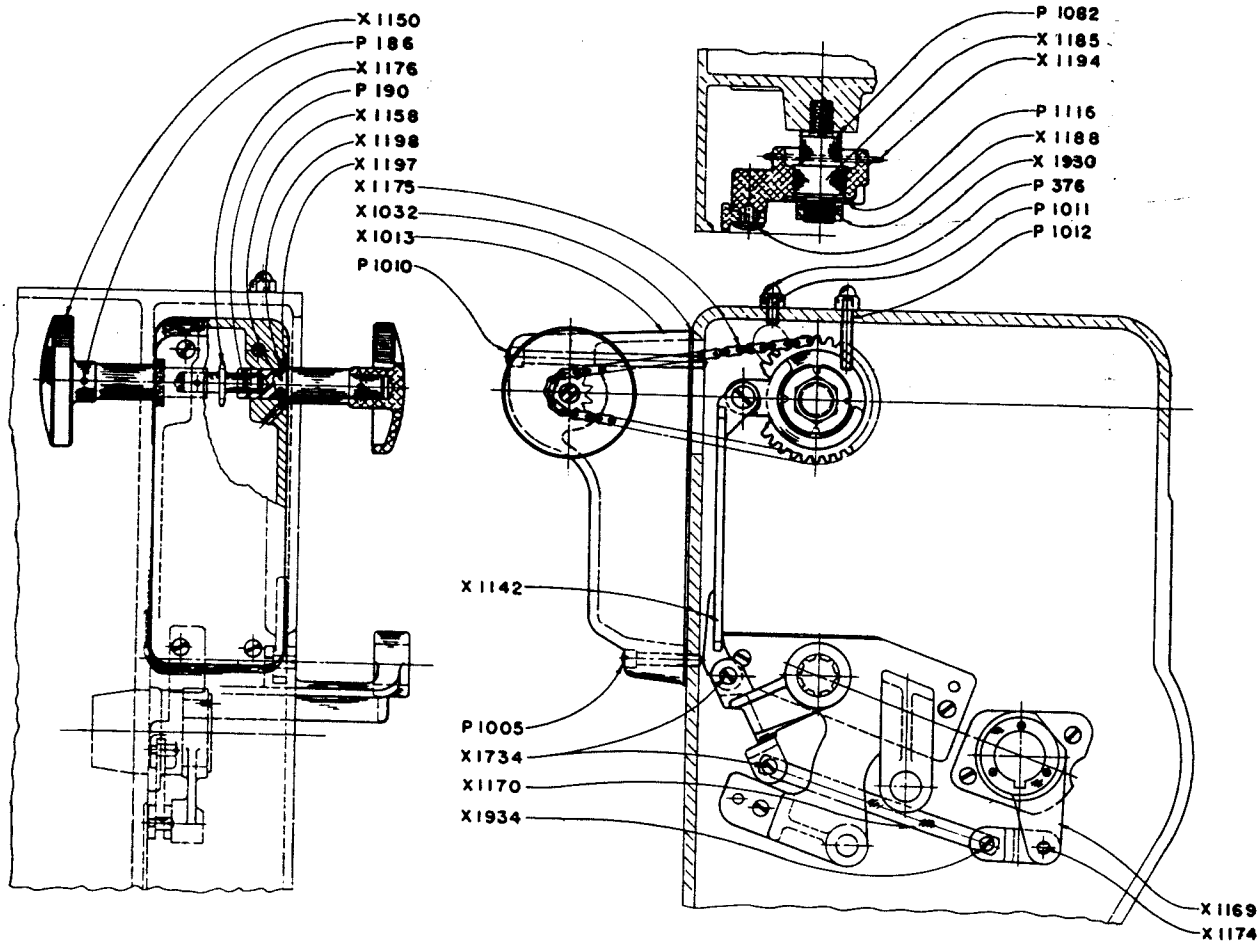
X 1164

PART NO.	DETAIL PARTS	PART NO.	
X-1101	Cam shaft (see assem. X-3101)	P-1023	Screw (Fil. Hd. 6-32 x 1/2"). Oil box to yoke fastening
X-1102	Intermittent gear; large (see assem. X-3104)	P-1026	Screw, cam lock nut (Fil. Hd. 6-40 x 1/2")
X-1103	Cam shaft gear	P-1030	Screw, retaining ring to outer sleeve (Flat Hd. 4-40 x 3/16")
X-1111	Cam shaft end thrust washer	P-1037	Screw, inner sleeve to yoke clamp (Fil. Hd. 10-24 x 1")
X-1114	Intermittent main frame	P-1043	Screw, inner sleeve to yoke clamp adj. (Hdless Set 10-32 x 3/8")
X-1117	Intermittent gear bushing; large (see assem. X-3104)	P-1045	Screw, flywheel to washer (Fil. Hd. 10-32 x 1/4")
X-1119	Flywheel nut	P-1052	Screw, shroud retainers (Flat Hd. 2-56 x 3/16")
X-1123	Lock nut; cam shaft	P-1054	Screw, sprocket to driving plate (Fil. Hd. 2-56 x 1/8")
X-1124	Washer to cam shaft pin	P-1075	Pin, cam gear to shaft (2/0 x 1" taper)
X-1125	Roller retaining cover	P-1076	Pin, star to shaft (4/0 x 5/8" taper)
X-1127	Intermittent oil box cover	P-1077	Pin, driving plate to sprocket
X-1128	Flywheel (see assem. X-3105)	P-1079	Woodruff key; cam and flywheel to shaft
X-1129	Intermittent oil box	P-1092	Screw, clamp yoke to outer sleeve (Hex. Hd. 1/4 x 28 x 1 1/2")
X-1130	Intermittent cam (see assem. X-3101)	P-1093	Cam to shaft pin (5/0 x 3/4" taper)
X-1131	Intermittent star wheel		
X-1132	Intermittent cam pin		
X-1133	Intermittent cam pin roller		
X-1135	Outer sleeve locating key		
X-1141	Intermittent sprocket (see assem. X-3100)		
X-1153	Intermittent inner sleeve to yoke clamp (lower)		
X-1163	Intermittent oil scoop (see assem. X-3106)		
X-1164	Intermittent screen (see assem. X-3106)		
X-1173	Intermittent cam pin nut		
X-1183	Inner sleeve spring washer		
X-1990	Screw (Fil. Hd. 2-56 x 7/32")		
X-1-1102	Intermittent star wheel shaft		
X-1-1103	Intermittent outer sleeve		
X-1-1104	Intermittent inner sleeve (see assem. X-3102 and X-3103)		
X-1-1106	Intermittent shaft bushing; short (see assem. X-3102)		
X-1-1107	Intermittent shaft bushing; long (see assem. X-3102)		
X-1-1108	Intermittent sprocket driving plate (see assem. X-3100)		
X-1-1109	Intermittent sprocket lock screw		
X-1-1115	Intermittent star shaft thrust washer		
X-1-1116	Intermittent fly wheel washer		
X-1-1120	Gasket, outer sleeve to oil box		
X-1-1121	Retaining ring Outer to inner sleeve		
	WASHERS—PINS—SCREWS		
P-1014	Flywheel to cam shaft lock washer		
P-1020	Screw (Fil. Hd. 6-32 x 3/16"). Oil box cover and scoop		

MINOR ASSEMBLIES

Assem. No.	
X-3100	Intermittent sprocket, double wear reversible type. Includes parts X-1141, X1-1108, P-1054, P-1077 assembled
X-3101	Intermittent cam complete. Includes parts X-1101, X-1130, X-1132, X-1133, X-1173, X-1125, X-1124, P-1052, P-1079, P-1093. Assembled
X-3102	Inner sleeve and shaft bearing assembly. Includes parts X1-1104, X1-1106, X1-1107. Assembled
X-3103	Intermittent inner sleeve and star shaft with star. Includes parts X1-1104, X1-1106, X1-1115, X1-1107, X1-1102, X-1131, P-1076. Assembled
X-3104	Intermittent gear; large. Includes parts X-1102, X-1117. Assembled
X-3105	Flywheel. Includes parts X-1128, X1-1116, P-1045. Assembled
X-3106	Intermittent oil scoop and screen. Includes parts X-1163, X-1164. Assembled
X-3107	Intermittent unit complete with sprocket. Includes all parts shown in diagram No. 2. Assembled

DIAGRAM No. 3
INTERMITTENT FRAMING UNIT
BRENKERT BX-40 & BX-80 PROJECTORS

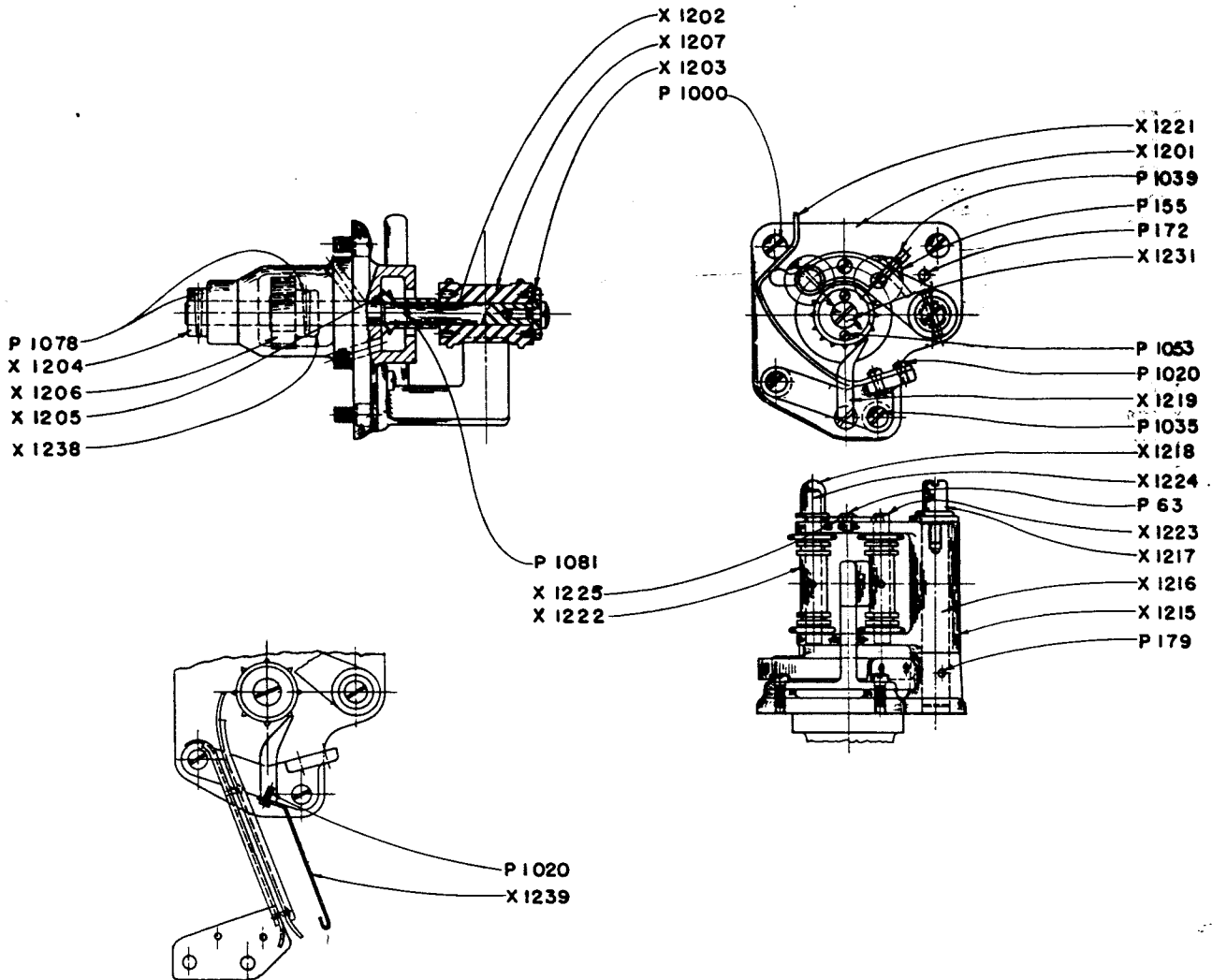


PART NO.	DETAIL PARTS
X-1013	Housing; framing handle (see assem. X-3400)
X-1032	Gasket; framing handle housing
X-1142	Vertical framing arm
X-1150	Framing knob
X-1158	Framing handle shaft
X-1169	Framing arm (see assem. X-3401)
X-1170	Horizontal framing link
X-1174	Intermittent retainer pin (see assem. X-3401)
X-1175	Framing chain
X-1176	Sprocket; small framing sprocket
X-1185	Screw; framing swivel screw
X-1188	Nut; framing lock nut
X-1194	Sprocket; large framing
X-1197	Washer; framing shaft
X-1198	Washer; framing shaft and oil shaft
X-1734	Screw; framing arm swivel pin
X-1930	Screw; vertical arm to sprocket
X-1934	Screw; horizontal link

PART NO.	WASHERS—SCREWS—PINS
P-186	Pin ($\frac{1}{8} \times \frac{7}{8}$ ")
P-190	Pin ($\frac{1}{8} \times \frac{5}{8}$ ")
P-376	Cap nut ($\frac{1}{4} \times 20$)
P-1005	Screw (Fil. Hd. $\frac{1}{4} \times 1\frac{1}{2}$ ")
P-1010	Screw (Fil. Hd. $\frac{1}{4} \times 4$ ")
P-1011	Screw (Headless set $\frac{1}{4} \times \frac{3}{4}$ ")
P-1012	Screw (Headless set $\frac{1}{4} \times 1\frac{1}{2}$ ")
P-1082	Lock washer
P-1116	Washer, framing lock spring

Assem. No.	MINOR ASSEMBLIES
X-3400	Framing handle and housing assembly with chain includes parts X-1013; X-1175; X-1150; X-1176; X-1158; X-1197; X-1198; P-186; P-190. Assembled
X-3401	Intermittent framing arm assembly, includes parts X-1169; X-1174. Assembled

DIAGRAM No. 4
LOWER FILM SPROCKET UNIT
BRENKERT BX-40 & BX-80 PROJECTORS

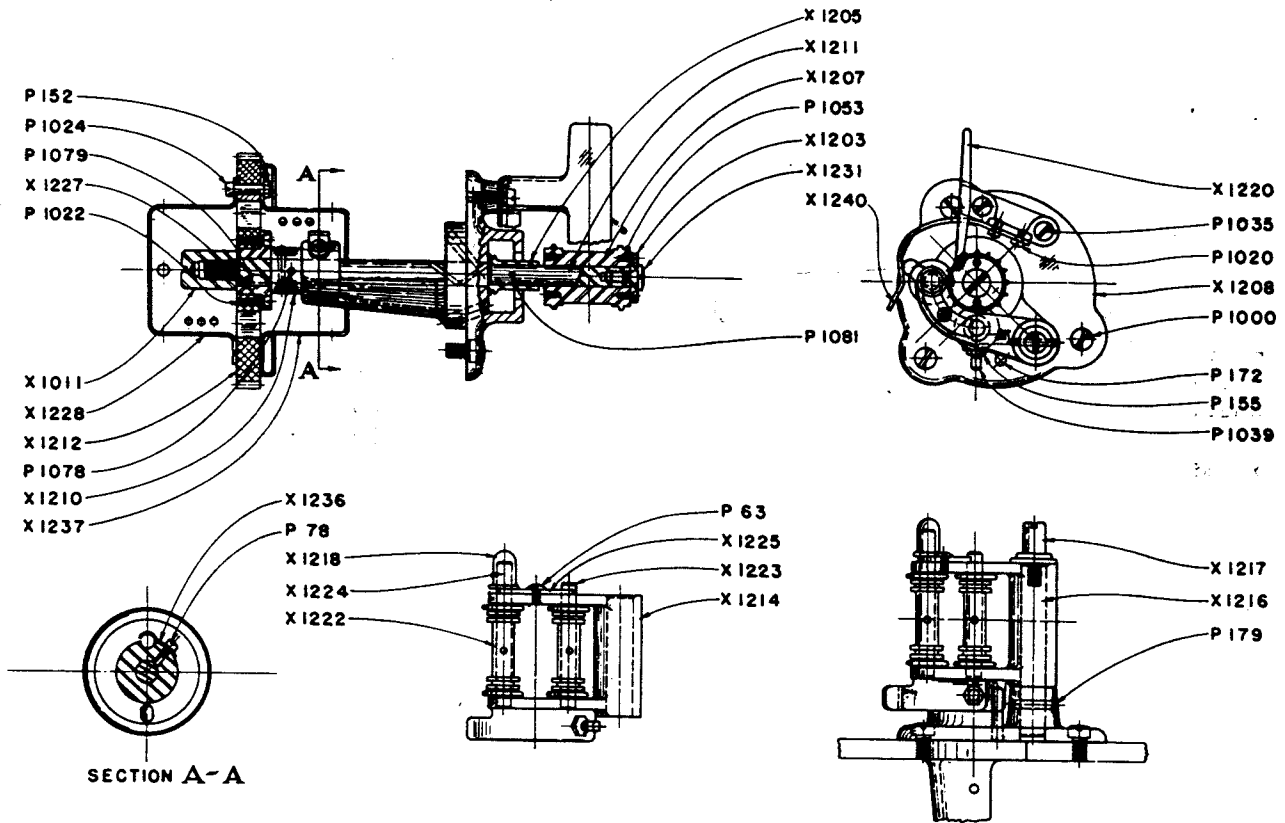


PART NO.	DETAIL PARTS
X-1201	Housing
X-1202	Sprocket shaft (see assem. X-3202)
X-1203	Plate; sprocket driving
X-1204	Collar; sprocket shaft
X-1205	Oil slinger; sprocket shaft
X-1206	Gear; sprocket shaft (see assem. X-3201)
X-1207	Sprocket (see assem. X-3200)
X-1215	Bracket; lower pad roller
X-1216	Shaft; pad roller bracket
X-1217	Retaining stud; pad roller bracket
X-1218	Pad Roller stud
X-1219	Film stripper
X-1221	Spring; lower pad roller
X-1222	Pad Roller
X-1223	Shaft; rear pad roller
X-1224	Shaft; front pad roller
X-1225	Retaining plate; pad roller shafts
X-1231	Retaining screw; sprocket
X-1238	Shroud; sprocket gear (see assem. X-3201)
X-1239	Stripper; lower film stripper for WE-211 sound-head only

PART NO.	WASHERS—PINS—SCREWS
P-63	Screw (O.H. 6-32 x 3/16")
P-155	Nut (Hex. 10-24)
P-172	Pin (3/16 x 7/8")
P-179	Pin (3/32 x 3/4")
P-1000	Screw (Fil. Hd. 1/4" x 3/8")
P-1020	Screw; Pad roller spring (Fil. Hd. 6-32 x 3/16")
P-1035	Screw (Fil. Hd. 10-24 x 3/8")
P-1039	Set Screw (Sq. Hd. 10-24 x 1/2")
P-1053	Screw (Fil. Hd. 2-56 x 1/4")
P-1078	Pin (3/0 x 3/4" taper)
P-1081	Pin (5/0 x 1/2" taper)

MINOR ASSEMBLIES	
Assem. No.	
X-3200	Lower film sprocket and drive plate includes parts X-1207; X-1203; P-1053 Assembled.
X-3201	Sprocket drive gear includes parts X-1206; X-1238. Assembled
X-3202	Sprocket shaft includes parts X-1202; X-1205. Assembled
X-3203	Lower sprocket unit includes all parts shown in diagram No. 4. Assembled

DIAGRAM No. 5
UPPER FILM SPROCKET UNIT
BRENKERT BX-40 & BX-80 PROJECTORS



PART NO.	DETAIL PARTS
X-1203	Sprocket driving plate (see assem. X-3300)
X-1205	Sprocket shaft oil slinger
X-1207	Upper film sprocket (see assem. X-3300)
X-1208	Upper sprocket shaft housing
X-1210	Upper sprocket shaft collar
X-1211	Upper sprocket shaft (see assem. X-3301)
X-1212	Sprocket drive gear (see assem. X-3302)
X-1214	Pad roller bracket
X-1216	Pad roller bracket shaft
X-1217	Bracket retaining screw
X-1218	Pad roller stud nut
X-1220	Upper film stripper
X-1222	Pad roller
X-1223	Pad roller shaft (rear)
X-1224	Pad roller shaft (front)
X-1225	Pad roller shaft retaining plate
X-1227	Sprocket drive gear insert (see assem. X-3302)
X-1228	Main oil distributor (front)
X-1231	Sprocket retaining screw
X-1236	Clip, oil tube fastening
X-1237	Main oil distributor (rear)
X-1240	Pad roller spring (upper)
X-1011	Nut; upper sprocket gear shaft

WASHERS—PINS—SCREWS

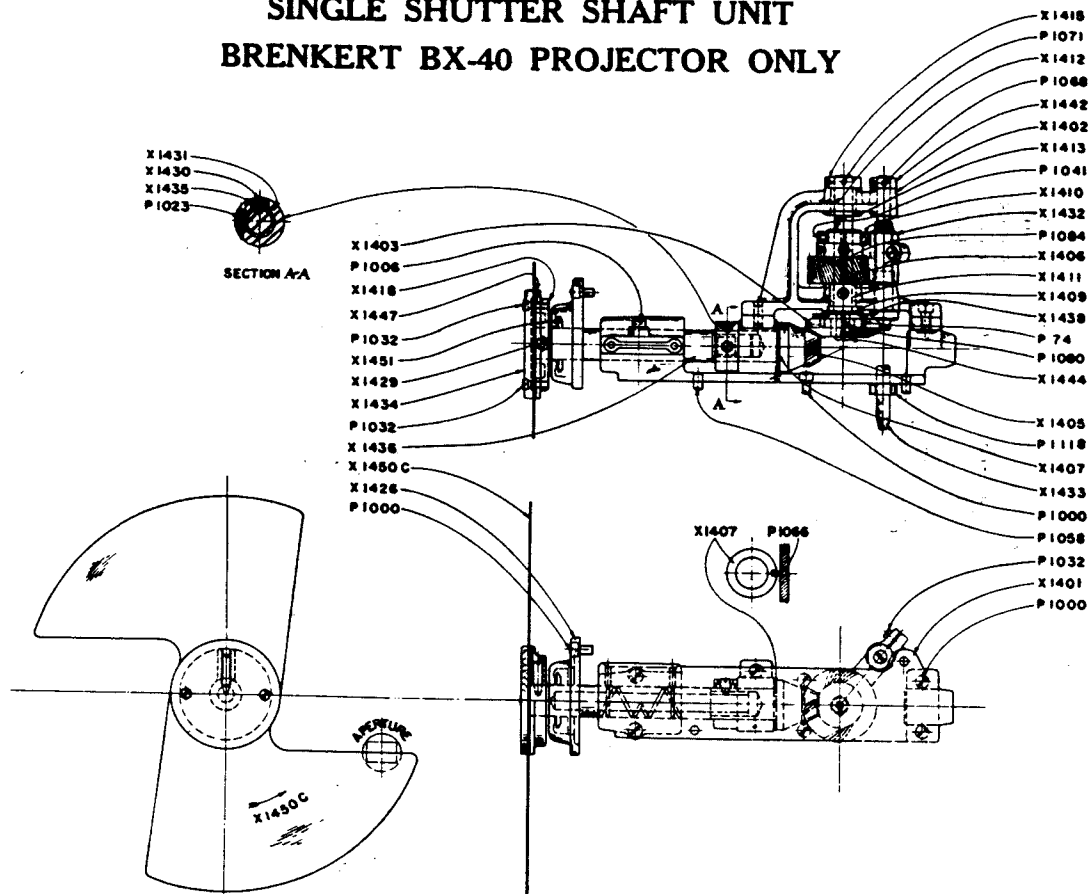
P-63	Screw (Oval Hd. 6-32 x 3/16")
P-78	Screw (Fil. Hd. 8-32 x 1/4")

PART NO.	DETAIL PARTS
P-152	Nut (Hex. 6-32)
P-155	Nut (Hex. 10-24)
P-172	Pin (3/16 x 7/8")
P-179	Pin (3-32 x 3/4")
P-1000	Screw (Fil. Hd. 1/4 x 3/8")
P-1020	Screw (Fil. Hd. 6-32 x 3/16")
P-1022	Screw (Fil. Hd. 6-32 x 3/8")
P-1024	Screw (Fil. Hd. 6-32 x 5/8")
P-1035	Screw (Fil. Hd. 10-24 x 3/8")
P-1039	Screw (Square Hd. 10-24 x 1/2")
P-1053	Screw; drive plate locking (Fil. Hd. 2-56 x 1/4")
P-1078	Pin (3/0 x 3/4" taper)
P-1079	Woodruff key; gear locking
P-1081	Pin (5/0 x 1/2" taper)

MINOR ASSEMBLIES

Assem. No.	DETAIL PARTS
X-3300	Upper film sprocket and drive plate. Includes parts X-1207, X-1203, P-1053. Assembled
X-3301	Sprocket shaft. Includes parts X-1211, X-1205, P-1081. Assembled
X-3302	Sprocket drive, gear. Includes parts X-1212, X-1227, P-1022. Assembled
X-3303	Upper sprocket unit complete. Includes all parts shown in Diagram No. 5. Assembled

DIAGRAM No. 6
SINGLE SHUTTER SHAFT UNIT
BRENKERT BX-40 PROJECTOR ONLY



PART NO.	DETAIL PARTS
X-1401	Shutter shaft casting (large)
X-1402	Shutter shaft casting (small) (see assem. X-3600)
X-1403	Gear; spiral bevel (phenolic) (see assem. X-3600 & X-3604)
X-1405	Gear; spiral bevel pinion
X-1406	Gear; double face adjusting drive (see assem. X-3600)
X-1407	Bevel pinion thrust washer
X-1409	Bevel gear thrust washer
X-1410	Nut; double face gear retainer
X-1411	Bushing; bevel gear shaft (flanged)
X-1412	Bushing; bevel gear shaft (plain)
X-1413	Shaft; bevel drive gear (see assem. X-3600)
X-1415	Collar; bevel gear drive shaft
X-1418	Shutter blade flange
X-1426	Housing; shutter oil slinger
X-1429	Set screw; cone point (long)
X-1430	Set screw; cone point (short)
X-1431	Thrust collar; shutter shaft
X-1432	Yoke; shutter adjusting
X-1433	Shaft; shutter timing
X-1434	Flange retainer; shutter blade
X-1435	Nut
X-1436	Shaft; shutter blade drive
X-1438	Shroud; phenolic bevel gear back (see assem. X-3604)
X-1442	Collar; adjusting yoke thrust
X-1444	Screw; phenolic bevel gear to shaft
X-1447	Gasket; shutter blade to flange
X-1450C	Shutter blade (see assem. X-3501)
X-1451	Oil slinger; shutter drive shaft

PART NO.	WASHERS—PINS—SCREWS
P-74	Screw (Flat Hd. 6-32 x 3/8")
P-1000	Screw (Fil. Hd. 1/4 x 3/8")
P-1006	Screw (Fil. Hd. 1/4 x 13/16")
P-1023	Screw (Fil. Hd. 6-32 x 1/2")
P-1032	Screw (Fil. Hd. 10-24 x 1/2")
P-1041	Screw (Cup Point Set 10-32 x 3/16")
P-1058	Dowel (1/4 x 1/2")
P-1066	Drive Pin (3/32 x 7/16")
P-1068	Pin (3/8 x 3/4")
P-1071	Pin (1/8 x 7/8")
P-1080	Key
P-1084	Key
P-1118	Oil seal; timing shaft

Assem. No.	MINOR ASSEMBLIES
X-3600	Main drive gear and bracket assembly; includes parts X-1402; X-1403; X-1406; X-1411; X-1409; X-1410; X-1432; X-1442; X-1415; X-1412; X-1444; X-1413; X-1433; P-1084; P-1071; P-1068; P-1032. Assembled
X-3501	Shutter blade and hub; includes parts X-1450C; X-1434; X-1418; X-1447; X-1429; P-1032. Assembled.
X-3603	Large spiral bevel gear (phenolic) and shaft; includes parts X-1403; X-1413; X-1438; X-1409; X-1444; P-74. Assembled.
X-3604	Large spiral bevel gear with hub attached. Includes parts X-1403; X-1438 (see assem. X-3603). Assembled.
X-3504	Shutter shaft unit complete. Includes all parts shown in diagram No. 6. Assembled. Note: Above does not include X-1426 housing flange and shutter blades & hubs.

PART NO.	DETAIL PARTS	PART NO.	WASHERS—PINS—SCREWS
X-1401	Shutter shaft casting (large)	P-74	Screw (Flat Head 6-32 x 3/8")
X-1402	Shutter shaft casting (small)	P-1000	Screw (Fil. Hd. 1/4 x 3/8")
X-1403	Gear; large spiral bevel (See assem. X-3600 and X-3604)	P-1006	Screw (Fil. Hd. 1/4 x 1 3/8")
X-1404	Gear; bevel pinion internal shaft	P-1023	Screw (Fil. Hd. 6-32 x 1/2")
X-1405	Gear; bevel pinion external shaft	P-1032	Screw (Fil. Hd. 10-24 x 1/2")
X-1406	Gear; double faced adjusting drive (See assem. X-3600)	P-1036	Screw (Fil. Hd. 10-24 x 5/16")
X-1407	Washer; bevel pinion thrust (large)	P-1041	Screw (Allen Cup Point 10-32 x 3/16")
X-1408	Washer; bevel pinion thrust (small)	P-1058	Dowel (1/4 x 1/2")
X-1409	Washer; gear thrust	P-1061	Pin (1/16 x 1/2")
X-1410	Nut; double faced gear retainer	P-1066	Lock pin (3/32 x 7/16")
X-1411	Bushing; bevel gear shaft (flanged)	P-1068	Pin (1/8 x 3/8")
X-1412	Bushing; bevel gear shaft (plain)	P-1071	Pin (1/8 x 7/8" drive)
X-1413	Shaft; bevel gear drive	P-1078	Pin (3/0 x 3/4" taper)
X-1415	Collar; bevel gear drive shaft	P-1080	Key
X-1417	Shaft; external shutter drive	P-1084	Key
X-1418	Flange; inner shutter holding	P-1118	Oil seal timing shaft
X-1419	Oil slinger; internal shaft		
X-1420	Retainer washer; outer shutter blade		
X-1421	Flange; outer shutter blade holding		
X-1424	Bushing; internal shutter shaft		
X-1425	Oil slinger; internal shutter shaft		
X-1426	Housing; inner shutter oil slinger		
X-1427	Shaft; internal shutter drive		
X-1428	Collar; internal shaft thrust		
X-1429	Set screw; cone point (long)		
X-1430	Set screw; cone point (short)		
X-1431	Collar; outer shutter shaft (large)		
X-1432	Yoke; shutter adjusting		
X-1433	Shaft; shutter timing		
X-1434	Flange; internal shutter retaining		
X-1435	Nut		
X-1438	Shroud; phenolic gear (See assem. X-3604)		
X-1442	Collar; shutter adjusting shaft		
X-1444	Screw; bevel gear to shaft		
X-1447	Gasket; inner shutter blade mounting		
X-1448	Gasket; outer shutter blade mounting		
X-1450A	Inner shutter blade (See assem. X-3601)		
X-1450B	Outer shutter blade (See assem. X-3602)		
X-1451	Oil slinger; external shutter shaft		

MINOR ASSEMBLIES

Assem. No.	Description
X-3600	Main drive gear and bracket assembly; includes parts X-1402; X-1403; X-1406; X-1411; X-1409; X-1410; X-1432; X-1442; X-1415; X-1412; X-1444; X-1413; X-1433; P-1084; P-1071; P-1068; P-1032. Assembled.
X-3601	Inner shutter blade and hub; includes parts X-1450A; X-1434; X-1418; X-1447; X-1429; P-1032; Assembled.
X-3602	Outer shutter blade and hub; includes parts X-1450B; X-1421; X-1420; X-1448; X-1429; P-1036. Assembled.
X-3603	Large spiral bevel gear and shaft; includes parts X-1403; X-1413; X-1438; X-1409; X-1444; P-74. Assembled.
X-3604	Large spiral bevel gear with hub attached. Includes parts X-1403; X-1438. Assembled. (See assem. X-3603)
X-3605	Double shutter shaft unit complete. Includes all parts shown in diagram No. 7. Assembled. (Above does not include X-1426 housing flange and shutter blades & hubs.)

DIAGRAM No. 10
OIL PUMP UNIT (LATE DESIGN)
BRENKERT BX-40 & BX-80 PROJECTORS

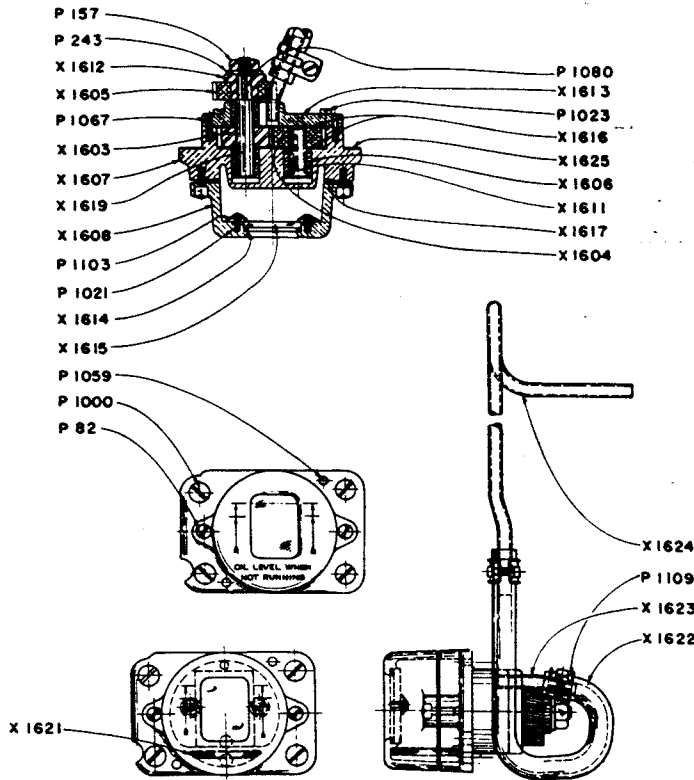
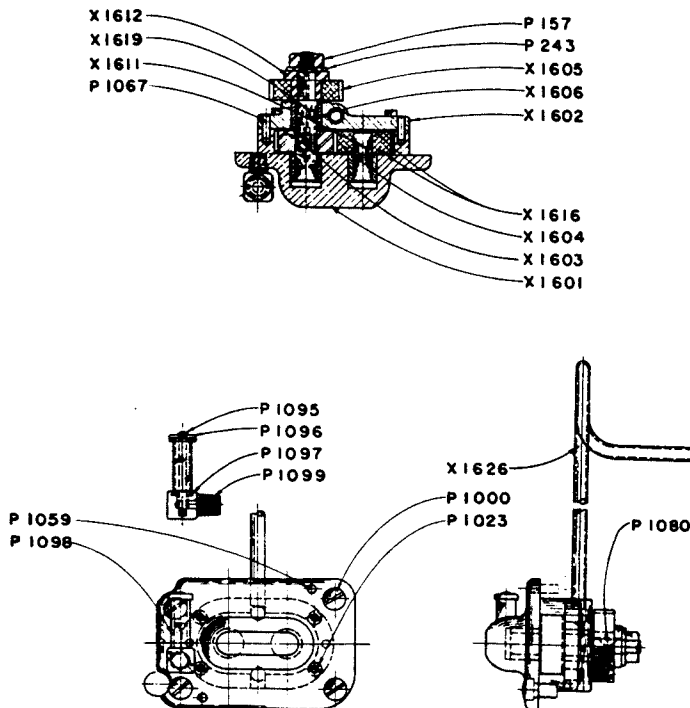


DIAGRAM No. 11

OIL PUMP UNIT (EARLY DESIGN)
BRENKERT BX-40 & BX-80 PROJECTORS



PART NO.	DETAIL PARTS
X-1603	Main shaft gear (see assem. X-3800)
X-1604	Second gear (see assem. X-3801)
X-1605	Drive gear (see assem. X-3802)
X-1606	Bushing; all shafts
X-1607	Pump main body (see assem. X-3807)
X-1608	Cover; (external) (see assem. X-3806)
X-1611	Shaft; second gear mounting (see assem. X-3801)
X-1612	Shroud; main drive gear (see assem. X-3802)
X-1613	Cover; internal (see assem. X-3808)
X-1614	Gasket
X-1615	Glass gauge sight
X-1616	Gear thrust plate
X-1617	Gasket; cover seal
X-1619	Shaft; main gear mounting (see assem. X-3800)
X-1621	Screen; oil filter
X-1622	Hose; oil feed line (neoprene)
X-1623	Lower tube section
X-1624	Upper tube section
X-1625	Pump to main frame fibre gasket

WASHERS—PINS—SCREWS

P-82	Screw; gauge holding cover (Fil. Hd. 8-32 x 3/4")
P-157	Nut (Hex. 1/4 x 28)
P-243	Washer (17/64" I.D.)
P-1000	Screw (Fil. Hd. 1/4 x 3/4")
P-1021	Screw (French Hd. 6-32 x 3/4")
P-1023	Screw (Fil. Hd. 6-32 x 1/2")
P-1059	Dowel (3/16 x 1/2")
P-1067	Pin (1/8 x 3/4")
P-1080	Woodruff key
P-1103	French washer
P-1109	Clamp; hose to oil tube

MINOR ASSEMBLIES

Assem. No.	DETAIL PARTS
X-3806	Cover and glass; includes parts X-1608; X-1615; X-1614; P-1103; P-1021 Assembled
X-3807	Pump main body; include sparts X-1607; X-1606. Assembled
X-3808	Pump gear cover (internal) includes parts X-1613; X-1606. Assembled
X-3810	Oil pump unit complete (late design) Includes all parts shown in diagram No. 10 except oil tube. Assembled

PART NO. DETAIL PARTS

X-1601	Pump main body (see assem. X-3805)
X-1602	Pump cover (internal) (see assem. X-3803)
X-1603	Main shaft gear (see assem. X-3800)
X-1604	Gear, second gear (see assem. X-3801)
X-1605	Drive gear (see assem. X-3802)
X-1606	Bushing; all shafts
X-1611	Shaft; second gear mounting (see assem. X-3801)
X-1612	Shroud; main drive gear (see assem. X-3802)
X-1616	Gear thrust plate
X-1619	Shaft; main gear mounting (see assem. X-3800)
X-1626	Oil tube (early design)

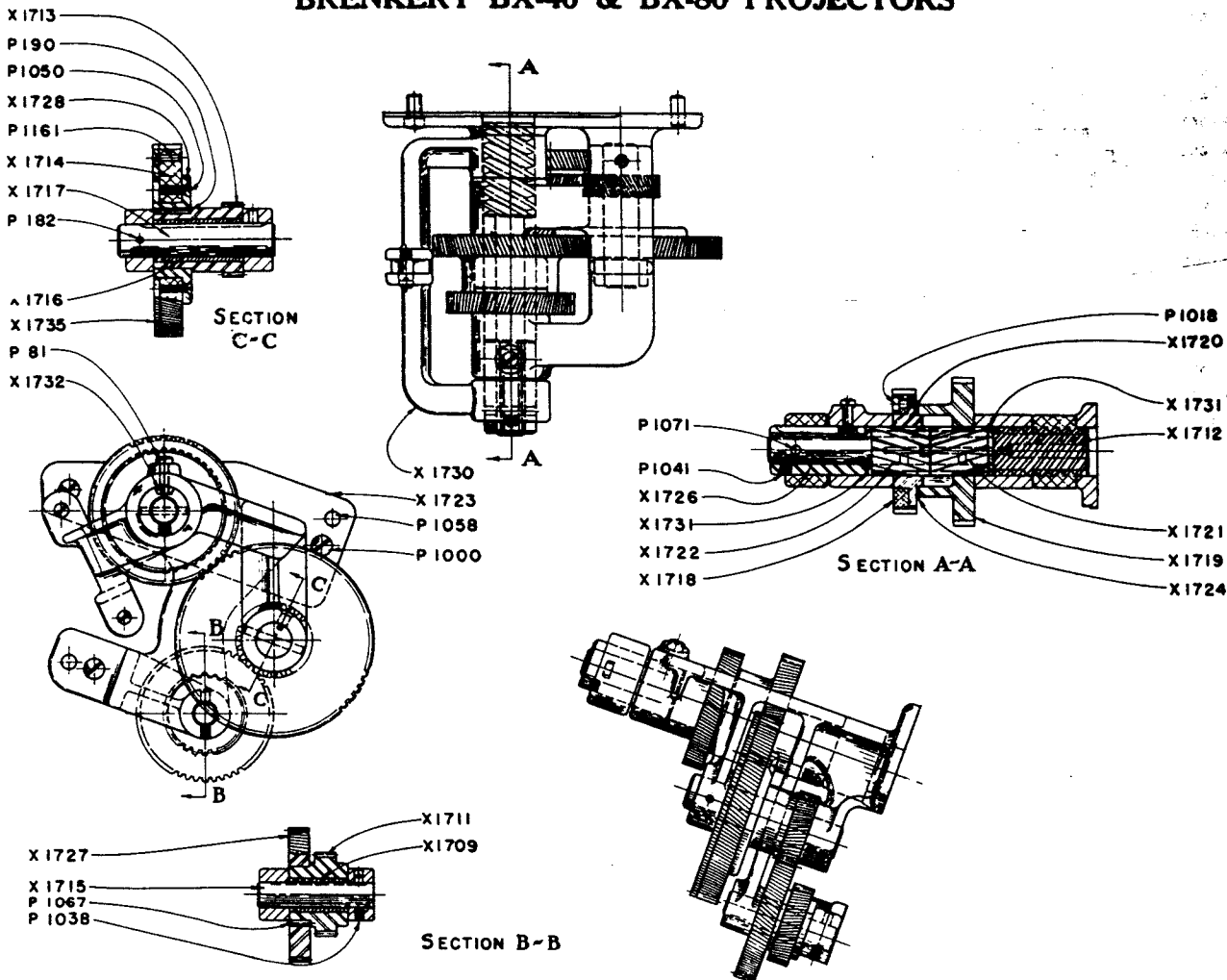
WASHERS—PINS—SCREWS

P-157	Nut (Hex. 1/4 x 28)
P-243	Washer (17/64" I.D.)
P-1000	Screw (Fil. Hd. 1/4 x 3/4")
P-1023	Screw (Fil. Hd. 6/32 x 1/2")
P-1059	Dowel (3/16 x 1/2")
P-1067	Pin (1/8 x 3/4")
P-1080	Woodruff key
P-1095	Oil gauge glass mounting screw
P-1096	Oil gauge glass retainer cap
P-1097	Oil gauge glass cork gasket
P-1098	Oil gauge glass
P-1099	Oil gauge 90° threaded fitting

MINOR ASSEMBLIES

Assem. No.	DETAIL PARTS
X-3800	Main gear; includes parts X-1603; X-1619; Assembled
X-3801	Second gear. Includes parts X-1604; X-1611 Assembled
X-3802	Drive gear; includes parts X-1605; X-1612 Assembled
X-3803	Pump internal cover; includes parts X-1602; X-1606 Assembled
X-3804	Oil gauge; includes parts P-1098; P-1095; P-1096; P-1097; P-1099. Assembled
X-3805	Pump main body; includes parts X-1601; X-1606 Assembled
X-3809	Oil pump unit complete (early design) Includes all parts shown on diagram No. 11 except oil tube. Assembled

DIAGRAM No. 12
SHUTTER COMPENSATOR UNIT
BRENKERT BX-40 & BX-80 PROJECTORS

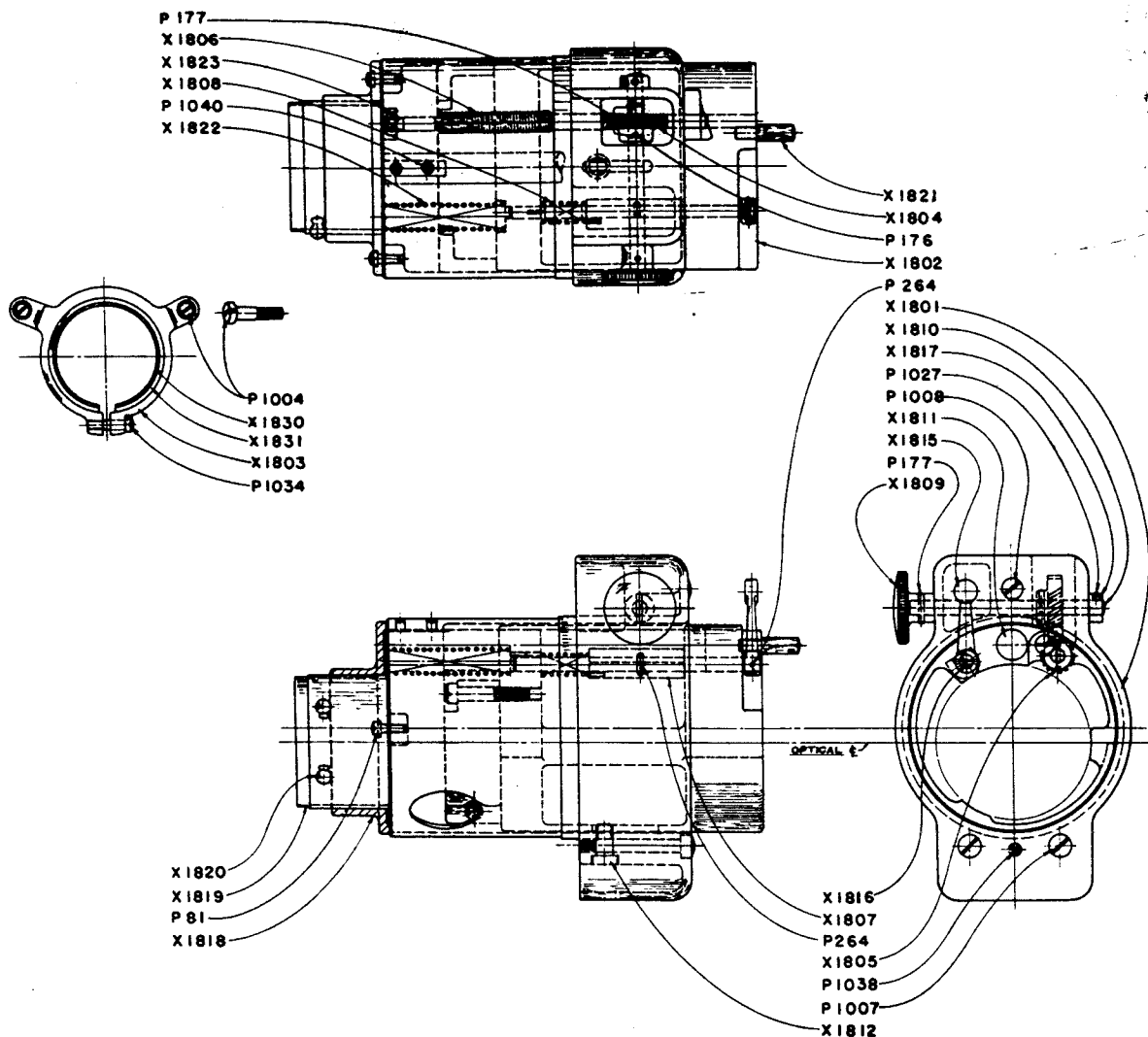


PART NO.	DETAIL PARTS
X-1709	Bushing; Cluster gear (see assem. X-3902)
X-1711	Gear; Cluster gear (see assem. X-3902)
X-1712	Shaft; spline operating
X-1713	Gear; idler (see assem. X-3900)
X-1714	Gear; intermediate drive (see assem. X-3900)
X-1715	Shaft; idler gear
X-1716	Bushing; gear cluster; (see assem. X-3900)
X-1717	Shaft; cluster gear
X-1718	Gear (see assem. X-3901)
X-1719	Gear; spline shaft drive
X-1720	Shroud (see assem. X-3901)
X-1721	Spline nut (left hand)
X-1722	Spline nut (right hand)
X-1723	Housing
X-1724	Washer; thrust between spline gears
X-1726	Sleeve; spline retaining
X-1727	Gear; cluster idler (see assem. X-3902)
X-1728	Insert; intermediate drive gear (see assem. X-3900)
X-1729	Safety shear pin
X-1730	Compensating arm
X-1731	Washer; spline shaft thrust
X-1732	Taper key; sleeve guide
X-1735	Shroud; intermediate drive gear (see assem. X-3900)

PART NO.	WASHERS—PINS—SCREWS
P-81	Screw (Fil. Hd. 8-32 x 1/2")
P-182	Pin (1/8 x 1 1/4")
P-190	Pin (1/8 x 5/8")
P-1000	Screw (Fil. Hd. 1/4 x 3/8")
P-1018	Screw (Fil. Hd. 6-32 x 1/4")
P-1038	Screw (Cup Pt. Set 10-24 x 1/4")
P-1041	Screw (Cup Pt. Set 10-32 x 3/16")
P-1050	Screw (Flat Hd. 8-32 x 3/8")
P-1058	Dowel (1/4 x 1/2")
P-1061	Rivet (3/32 x 1 1/2")
P-1067	Pin (1/8 x 3/8")
P-1071	Pin (1/8 x 7/8")

Assem. No.	MINOR ASSEMBLIES
X-3900	Intermediate drive gear. Includes parts X-1714, X-1735, X-1728, X-1713, X-1716, P-190, P-1161. Assembled
X-3901	Spline gear. Includes parts X-1718, X-1720, P-1018. Assembled
X-3902	Cluster idler gear. Includes parts P-1067, X-1727, X-1711, X-1709. Assembled.
X-3903	Shutter compensator unit complete. Includes all parts shown in diagram No. 12. Assembled

DIAGRAM No. 13
LENS MOUNT UNIT
BRENKERT BX-40 & BX-80 PROJECTORS



PART NO. DETAIL PARTS

X-1801	Housing casting
X-1802	Sleeve casting
X-1803	Clamp; sleeve to series No. 1 lens (see assem. X-4002)
X-1804	Gear; lens focus (large)
X-1805	Gear; lens focus (small)
X-1806	Shaft; threaded focusing
X-1807	Cam; series No. 2 lens locking
X-1808	Spring; cam tension
X-1809	Knob; lens focusing (see assem. X-4001)
X-1810	Shaft; knob operating (see assem. X-4001)
X-1811	Shaft; inner sleeve guide
X-1812	Pin; sleeve aligning
X-1815	Lever; cam shaft operating
X-1816	Shaft; cam mounting
X-1817	Collar; focus shaft
X-1818	Collar; light shield
X-1819	Sleeve; light shield split sleeve (see assem. X-4000)
X-1820	Knob; split sleeve operating
X-1821	Lens locating pin
X-1822	Spring; sleeve thrust
X-1823	Nut; focus shaft thrust
X-1830	Sleeve; No. 1 lens adapter (small)
X-1831	Sleeve; No. 1 lens adapter (large)

PART NO.

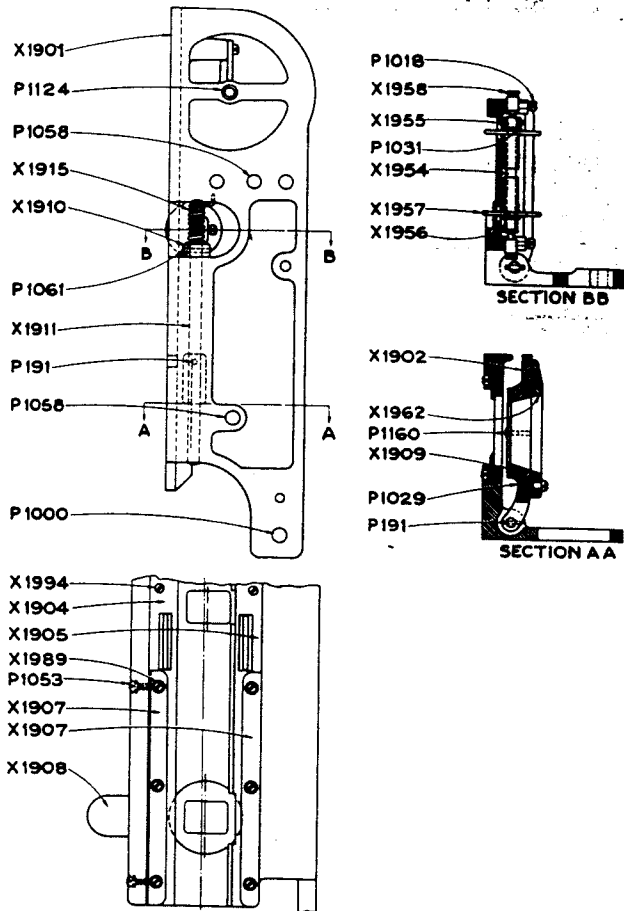
WASHERS—PINS—SCREWS

P-81	Screw (Fil. Hd. 8-32 x 1/2")
P-176	Pin (3/32 x 5/8")
P-177	Pin (3/32 x 1/2")
P-264	Pin (3/32 x 7/16")
P-1004	Screw (Fil. Hd. 1/4 x 1 1/4")
P-1007	Screw (Fil. Hd. 1/4 x 2")
P-1008	Screw (Fil. Hd. 1/4 x 2 1/4")
P-1027	Screw (Cup Point Set 4-40 x 1/8")
P-1034	Screw (Fil. Hd. 10-24 x 5/8")
P-1038	Screw (Cup Point Set 10-24 x 1/4")
P-1040	Screw (Cup Point Set 10-24 x 3/16")

MINOR ASSEMBLIES

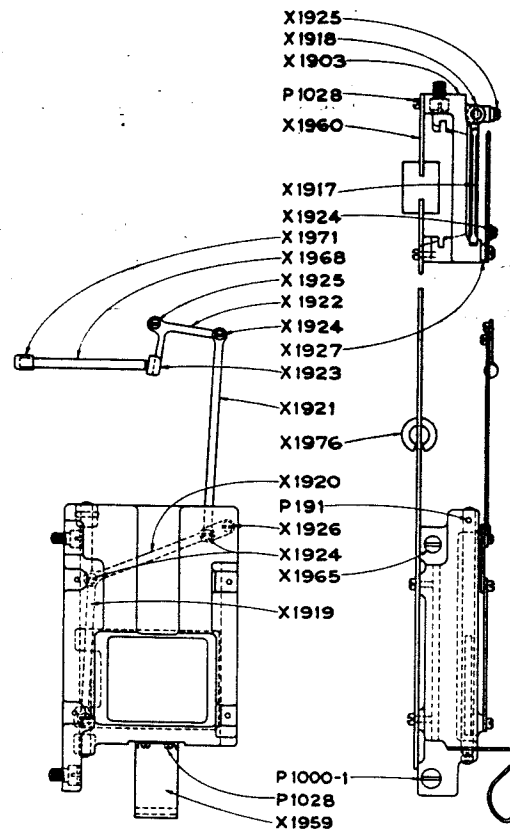
Assem. No.	
X-4000	Light shield split sleeve; includes parts X-1819 X-1820. Assembled.
X-4001	Focusing knob and shaft; includes parts X-1809; X-1810; P-177. Assembled.
X-4002	Number one lens adapter assembly; includes parts X-1803; X-1830; X-1831; P-1034; P-1004; Assembled
X-4003	Lens mount unit complete. Includes all parts shown in diagram No. 13. Assembled

DIAGRAM No. 14
FILM TRAP PLATE UNIT
BRENKERT BX-40 & BX-80 PROJECTORS



PART NO.	DETAIL PARTS
X-1901	Main casting
X-1902	Retaining plate aperture (see assem. X-4108)
X-1903	Housing, fire shutter frame casting
X-1904	Film slide strip plain (left side)
X-1905	Film slide strip chamfered (right side)
X-1907	Film slide guide strip
X-1908	Film aperture plate (removable)
X-1909	Secondary aperture plate (see assem. X-4108)
X-1910	Thrust collar
X-1911	Shaft; aperture retainer
X-1915	Spring
X-1917	Fire shutter
X-1918	Fire shutter guide shaft
X-1919	Fire shutter connecting link (lower)
X-1920	Fire shutter connecting link (intermediate)
X-1921	Fire shutter connecting link (upper)
X-1922	Fire shutter angle link (see assem. X-4109)
X-1923	Fire shutter angle link button (see assem. X-4109)
X-1924	Screw; link connecting 1/4" long
X-1925	Shoulder screw 5/16" long
X-1926	Shoulder screw 7/16" long
X-1927	Collar; link screw spacing
X-1954	Shaft; adjustable guide roller (see assem. X-4107)
X-1955	Collar; adjustable guide roller locating (see assem. X-4107)
X-1956	Spring; guide roller tension (see assem. X-4107)
X-1957	Roller; adjustable film guide
X-1958	Pivot pin; roller shaft mounting
X-1959	Film stripper
X-1960	Plate; air cooling baffle
X-1962	Insulator; heat from cooling baffle
X-1965	Shoulder screw; fire shutter frame swivel
X-1968	Rod; fire shutter operating (see assem. X-4110)

DIAGRAM No. 14A
FIRE SHUTTER FRAME UNIT



PART NO.	DETAIL PARTS
X-1971	Bushing; push rod thrust (see assem. X-4110)
X-1976	Shutter stop bumper (rubber)
X-1989	Screw; film guide strip (4-40 x 3/8" spec.)
X-1994	Screw; film slide strip (4-40 x 1/4" spec.)

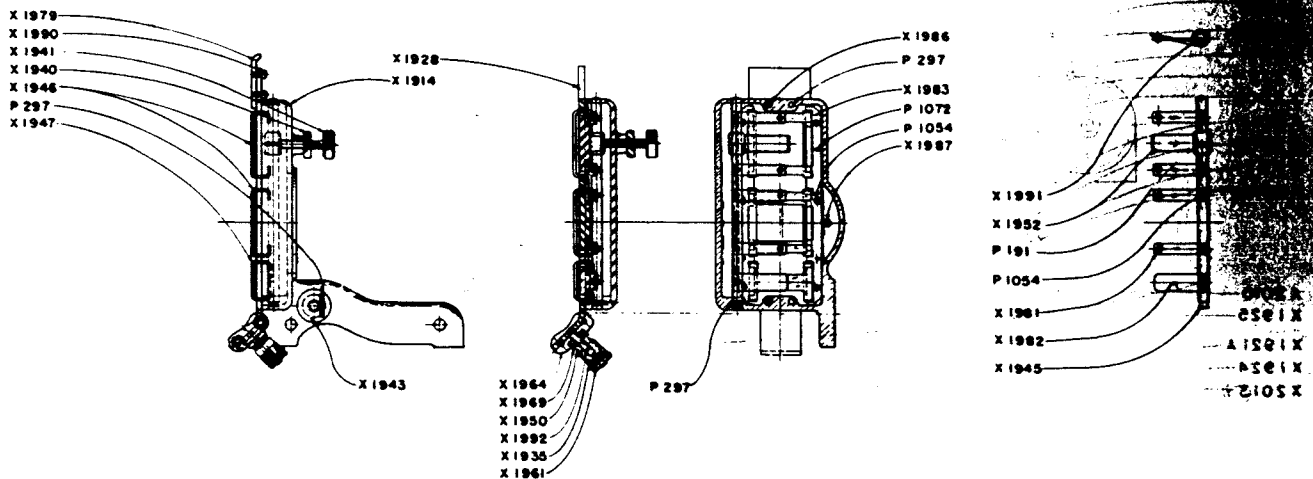
WASHERS—PINS—SCREWS

P-191	Pin (1/16 x 3/8")
P-1000	Screw (Fil. Hd. 1/4 x 3/8")
P-1018	Screw (Fil. Hd. 6-32 x 1/4")
P-1028	Screw (Fil. Hd. 4-40 x 1/4")
P-1029	Screw (Fil. Hd. 4-40 x 3/8")
P-1031	Screw (Flat Point Set 4-48 x 1/8")
P-1053	Screw (Fil. Hd. 2-56 x 1/4")
P-1058	Dowel (1/4 x 1/2")
P-1061	Pin; (1/16 x 1/2")
P-1124	Bushing; fire shutter operating rod
P-1160	Pin (Round Head 1/16 x 3/16")

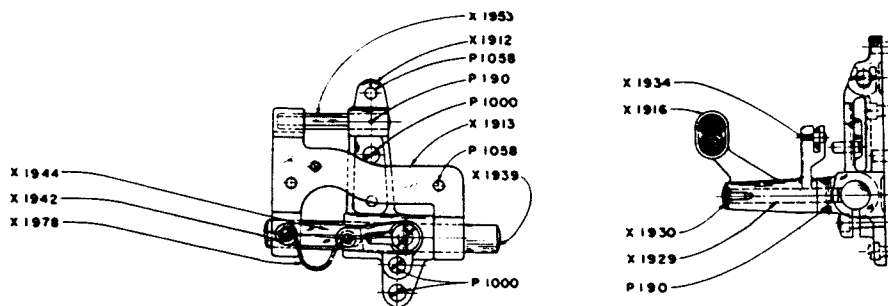
MINOR ASSEMBLIES

Assem. No.	DETAIL PARTS
X-4107	Lateral film guide roller assembly; includes parts X-1957; X-1956; X-1954; X-1955; P-1031; Assembled
X-4108	Film aperture retaining bracket; includes parts X-1902; X-1909; P-1160. Assembled
X-4109	Fire shutter angle link; includes parts X-1922; X-1923. Assembled
X-4110	Governor push rod; includes parts X-1968; X-1971; Assembled
X-4111	Film trap unit. Includes all parts shown in diagram No. 14. Assembled
X-4112	Fire shutter frame unit with fire shutter and connecting links. Includes all parts shown in diagram 14A except X-1960 baffle. Assembled

**DIAGRAM No. 15
FILM GATE UNIT
BRENKERT BX-40 & BX-80 PROJECTORS**



**DIAGRAM No. 16
FILM GATE SUB BASE UNIT
BRENKERT BX-40 & BX-80 PROJECTORS**



PART NO.	DETAIL PARTS
X-1912	Sub plate casting (see assem. X-4105)
X-1913	Casting; sub base, movable
X-1914	Main casting (see assem. X-4100)
X-1916	Gate operating lever
X-1928	Plate; pad retaining (see assem. X-4102)
X-1929	Stud; gate lever swivel
X-1930	Screw; gate lever retaining
X-1934	Screw; toggle link connecting
X-1935	Nut; sprocket pad tension adjusting
X-1939	Shaft; sub base guiding
X-1940	Nut; upper pad spring adjusting
X-1941	Screw; upper pad spring adjusting
X-1942	Screw; toggle link swivel
X-1943	Screw; gate mounting
X-1944	Link; gate closing
X-1945	Shaft; sprocket pad adjusting (see assem. X-4101)
X-1946	Pad; film tension pad (upper)
X-1947	Pad; film tension pad (lower)
X-1950	Spring; sprocket pad tension
X-1952	Arm; upper and lower pad adjusting
X-1953	Shaft; gate guide (Small)
X-1961	Nut; sprocket pad lock
X-1964	Pad; intermittent sprocket
X-1969	Spring seat washer
X-1978	Spring; gate closing
X-1979	Film guide pad (right and left)
X-1981	Spring; upper pad tension
X-1982	Spring; lower pad tension
X-1983	Guide strip; film pad seating
X-1986	Screw; 6-32 x 1/4" Fil. Hd. (spec.)
X-1987	Screw; 6-32 x 1/8" Fil. Hd. (spec.)
X-1990	Screw; 2-56 x 7/32" Fil. Hd. (spec.)
X-1991	Washer (square); tension spring to shaft
X-1992	Lower film pad stud

PART NO. WASHERS—PINS—SCREWS

P-190	Pin (1/8 x 5/8")
P-191	Pin (1/16 x 3/8")
P-297	Pin (3/32 x 3/8")
P-1000	Screw (Fil. Hd. 1/4 x 3/8")
P-1054	Screw (Fil. Hd. 2-56 x 1/8")
P-1058	Dowel (1/4 x 1/2")
P-1072	Pin (1/16 x 3/16")

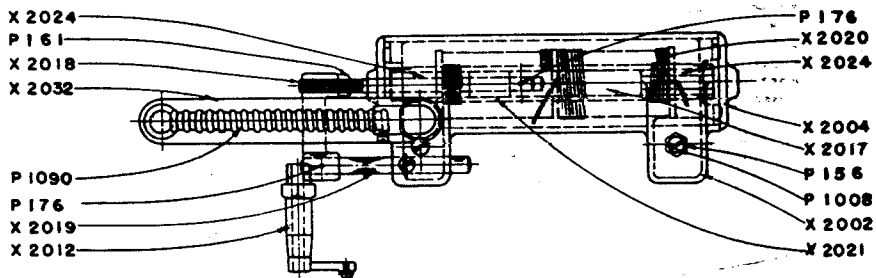
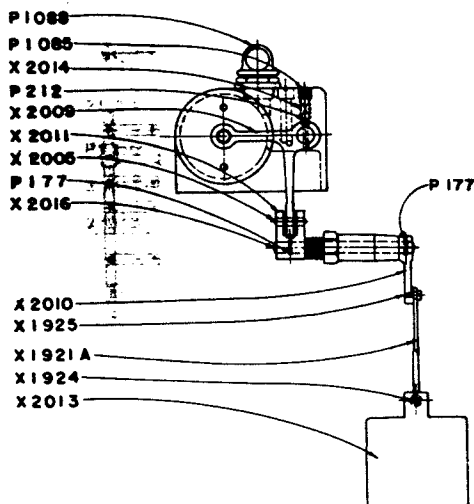
**MINOR ASSEMBLIES
(DIAGRAM No. 15)**

Assem. No.	Description
X-4100	Main casting of gate with attaching screw and pressure regulating screw. Includes parts X-1940; X-1941; X-1943; P-297; Assembled
X-4101	Pressure springs assembly. Includes parts X-1991; X-1952; X-1981; X-1982; X-1945; P-191; P-1054. Assembled
X-4102	Pressure pads and retainer plate assembly. Includes parts X-1928; X-1979; X-1986; X-1990; X-1946; X-1947; X-1983; X-1992; P-1054; P-1072. Assembled
X-4103	Complete gate unit ready to attach to sub base. Includes all parts shown in diagram No. 15 assembled.

**DIAGRAM No. 16
GATE SUB BASE**

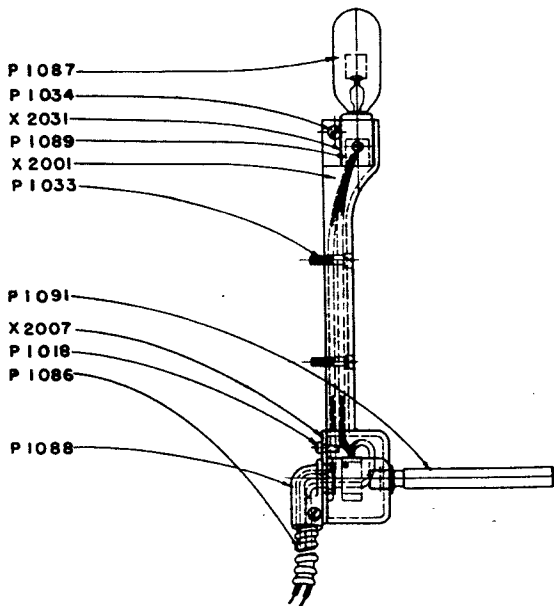
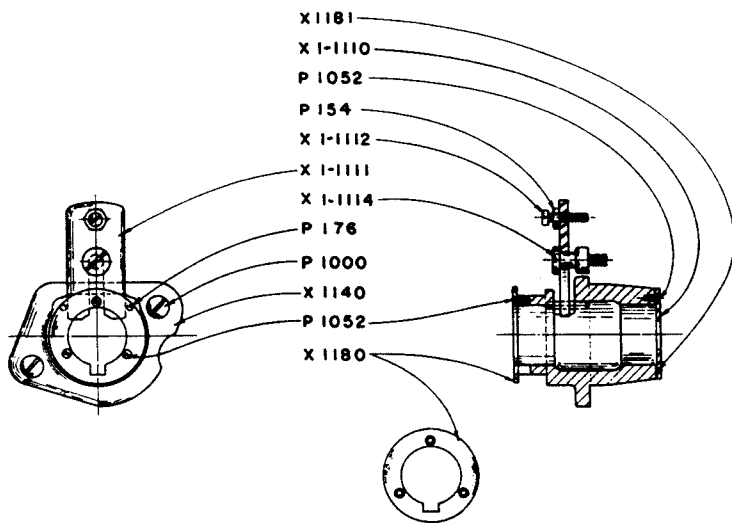
Assem. No.	Description
X-4105	Sub plate casting with upper guide shaft and handle swivel stud. Includes parts X-1912; X-1953; X-1929; P-190; Assembled
X-4106	Sub plate unit complete. Includes all parts shown in diagram No. 16. Assembled

**DIAGRAM No. 18
CHANGEOVER UNIT**



**DIAGRAM No. 19
INTERMITTENT HOLDING UNIT**

**DIAGRAM No. 17
PILOT LIGHT UNIT**



BRENKERT BX-40 & BX-80 PROJECTORS

DIAGRAM No. 17 and No. 18
PILOT LIGHT AND CHANGEOVER
X-2000

PART NO.	DETAIL PARTS
X-1924	Screw; shutter fastening
X-1925	Screw; link to crank fastening
X-1921-A	Link; shutter to crank connecting
X-2001	Pilot light main bracket (see assem. X-4205)
X-2002	Main housing (see assem. X-4202 & X-4204)
X-2004	End plate; main housing
X-2005	Pin; changeover operating
X-2007	Switch cover; pilot light
X-2009	Piston arm actuating fork (see assem. X-4200)
X-2010	Crank (long)
X-2011	Crank (short)
X-2012	Bushing (hex); main frame to swivel shaft
X-2013	Shutter (see assem. X-4201)
X-2014	Springs; guide shaft damping
X-2016	Swivel shaft (see assem. X-4201)
X-2017	Armature
X-2018	Drive rod
X-2019	Shaft; piston guide (see assem. X-4200)
X-2020	Magnet coil assembly (see assem. X-4203)
X-2021	Tube; coil mounting (see assem. X-4203)
X-2024	Bumper; plunger stop (rubber)
X-2031	Insulator; lamp socket
X-2032	Bracket; BX cable support

WASHERS—PINS—SCREWS

P-156	Nut (1/4 x 20 Hex mounting screw retaining)
P-161	Nut (5/16-24 Hex stroke adjusting)
P-176	Pin (3/32 x 5/8")
P-177	Pin (3/32 x 1/2")
P-212	Ball (1/4" dia.)

PART NO.	DETAIL PARTS
P-1008	Screw (Fil. Hd. 1/4 x 2 1/4")
P-1018	Screw (Fil. Hd. 6-32 x 1/4")
P-1033	Screw (Fil. Hd. 10-24 x 3/4")
P-1034	Screw (Fil. Hd. 10-24 x 5/8")
P-1085	Screw (Headless Set Screws 5/16 x 5/16")
P-1086	BX Cable No. 14-2 wire (4 ft. long)
P-1087	Lamp bulb 15w mazda T-8-110v.
P-1088	90° BX cable connector
P-1089	Lamp socket candelabra base screw type
P-1090	BX Cable; No. 14—3 wire 4 1/2 ft. long
P-1091	Switch; pilot light (special)

MINOR ASSEMBLIES

Assem. No.	DETAIL PARTS
X-4200	Shutter actuating fork and shaft. Includes parts X-2009; X-2019; P-176 assembled
X-4201	Connecting link; cranks and shutter. Includes parts X-2005; X-2011; X-2016; X-2010; X-1925; X-1921-A; X-1924; X-2013; P-177 assembled
X-4202	Magnet unit complete; includes housing with magnet, fork, connecting wires, attaching screws. Includes all parts shown in diagram 18 except minor assembly X-4201 assembled.
X-4203	Field winding assembly; includes parts X-2020; X-2021, assembled
X-4204	Changeover unit complete. Includes all parts shown in diagram No. 18 assembled
X-4205	Pilot light unit complete. Includes all parts shown in diagram No. 17, except P-1087 mazda lamp. Assembled

DIAGRAM No. 19
INTERMITTENT HOLDING UNIT

PART NO.	DETAIL PARTS
X-1140	Intermittent to main frame holding casting (see assem. X-4301)
X-1180	Retainer washer. Intermittent framing arm.
X-1181	Oil seal gasket
X1-1110	Oil retainer washer
X1-1111	Intermittent clamp plate (see assem. X-4300)
X1-1112	Clamp screw
X1-1114	Clamp pivot screw

WASHERS—PINS—SCREWS

P-154	Lock nut (10-32)
P-176	Guide pin (3/32 x 5/8")

PART NO.	DETAIL PARTS
P-1000	Screw (1/4 x 3/8")
P-1052	Screw (Flat Hd. 2-56 x 3/16")

MINOR ASSEMBLIES

Assem. No.	DETAIL PARTS
X-4300	Intermittent locking clamp; includes parts X1-1111; X1-1112; P-154 assembled
X-4301	Intermittent holding unit less clamp assembly including parts X-1181; X1-1110; X-1140; X-1180; P-176; P-1000; P-1052 assembled

DIAGRAM No. 20
MISCELLANEOUS ACCESSORIES

PART NO.	DETAIL PARTS	PART NO.	ASSEMBLY
X-2434	17-TOOTH DRIVE GEARS FOR RCA AND ERPI SOUNDHEADS	X-4402	Clamp and bolt assembly for third screw clamping of Brenkert projector to RCA PS-24 soundhead. Includes all above parts.
X-2433	RCA Soundheads PS-22; PS-24; MI-1040; MI-1050; MI-9050	P-1173	THIRD POINT MOUNTING FOR RCA MI-9050 SOUNDHEAD
X-2435	WE-208A soundhead	P-156	Bolt 1/4 x 3/4"
X-2436	WE-206A soundhead	P-418	Nut Lockwasher
X-2429	WE-7400 soundhead	X-4403	Bolt and nut for third screw clamping of Brenkert projector to RCA MI-9050 soundhead. Includes parts P-1173; P-156; P-418
X-2408	PULLEYS REQUIRED ON WE 206-A, 208A SOUNDHEADS FOR DRIVING TAKEUP REEL WHEN USED WITH BRENKERT PROJECTORS		ASSEMBLY
P-1044	Split pulley		
	Clamp screw		
X-4406	Pulleys and screws complete, includes parts X-2408; P-1044. Assembled		FILM GUIDE STRIP ALIGNING TOOL
	DRIVE GEARS FOR ERPI 209 & 211 SOUNDHEADS	X-1993	Casting
X-2401	Pulley; drive takeup reel	X-1995	End plate
X-2402	Pulley bushing	P-1054	Screw
X-2403	Shaft for drive gear	X-4404	Tool for aligning film guide strip of trap plate with intermittent sprocket. Includes parts X-1993; X-1995; P-1054. Assembled.
X-2404	17-tooth gear with long hub		ASSEMBLY
X-2405	Spacing collar for lower magazine shaft		MISCELLANEOUS ACCESSORIES
X-2406	Thrust washer	X-2437	Lubricating oil for Brenkert projectors (1 pt.)
P-1015	Set screw; headless 5/16 x 20	X-2438	Lubricating oil for Brenkert projectors (1 gallon)
P-1136	Oil cup	P-1163	Sealing compound for sealing various units of Brenkert projector to main frame (see instruction manual)
X-4400	Drive gear, shaft, pulley and pulley spacer assembly required on WE-209, 211 soundheads when used with Brenkert projectors. Includes all above parts.	P-1174	Lens extension tube and locating ring for using series No. 1 projector lens. Complete assembly
	THIRD POINT MOUNTING FOR RCA SOUNDHEADS MI-1040-50	P-1175	Lens extension tube and locating ring for using series No. 2 projector lens. Complete assembly
X-2409	Clamp	P-1111	Tube only
X-2431	Bolt	P-1112	Locating collar only
P-159	Nut	P-1113	Adapter collar for series No. 1 lens
P-1152	Lock washer	P-1114	Threaded ring; tube to lens
	ASSEMBLY	P-1170	Clamp screw of locating collar
X-4401	Clamp and bolt assembly for third screw clamping of Brenkert projector to RCA soundheads MI-1040; MI-1050. Includes all above parts.	P-1171	Clamp screw of Series No. 1 lens adapter
	THIRD POINT MOUNTING FOR RCA PS-24 SOUNDHEAD		MASSACHUSETTS REQUIREMENTS
X-2418	Clamp	X-2421	Cover
X-2432	Bolt	P-63	Screw
P-159	Nut	X-4405	Cover for slit of film valve with attaching screws. Includes X-2421 and P-63. Assembled.
P-1152	Lock washer	P-1172	Film valve assembly