

# Film-Tech

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# INSTRUCTIONS

# *Peerless* **MAGNARC** TRADE MARK REG. **CINEARC**

Carbon Arc Lamphouse

TYPE "J" SPECIAL

TYPE "K" DELUXE

7 - 62

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**THE STRONG ELECTRIC CORP.**  
87 CITY PARK AVE., TOLEDO, OHIO

## SETTING UP

PLACE THE LAMPHOUSE ON THE PROJECTOR PEDESTAL and clamp it firmly to the projector base with the attaching screws furnished. CAUTION: Do not open the reflector door until the lamphouse is securely fastened, as its weight may cause the lamp to over-balance.

REMOVE THE REFLECTOR RETAINING CLIP, and while holding the reflector at a slight angle, pass the hole in the reflector over the negative guide and under the two other retaining clips. Then push inward on the reflector until its outer rim is back on the front edge of the reflector frame. Replace screw and reflector retaining clip and push forward on the rear of the reflector to make sure that the outer edge is touching all three retaining clips.

ALIGN THE LAMP with the Projector as instructed in Optical Alignment Procedure Section of this manual.

THIS LAMP MAY BE OPERATED with any rectifier or a 110 volt direct current service or with any multiple arc type generator, providing the current capacity of the rectifier or motor generator is sufficient for the current rating of the carbons to be used in each lamp. The ballast rheostat used with the generator or direct current service should be of sufficient capacity to drop the voltage to the required arc voltage.

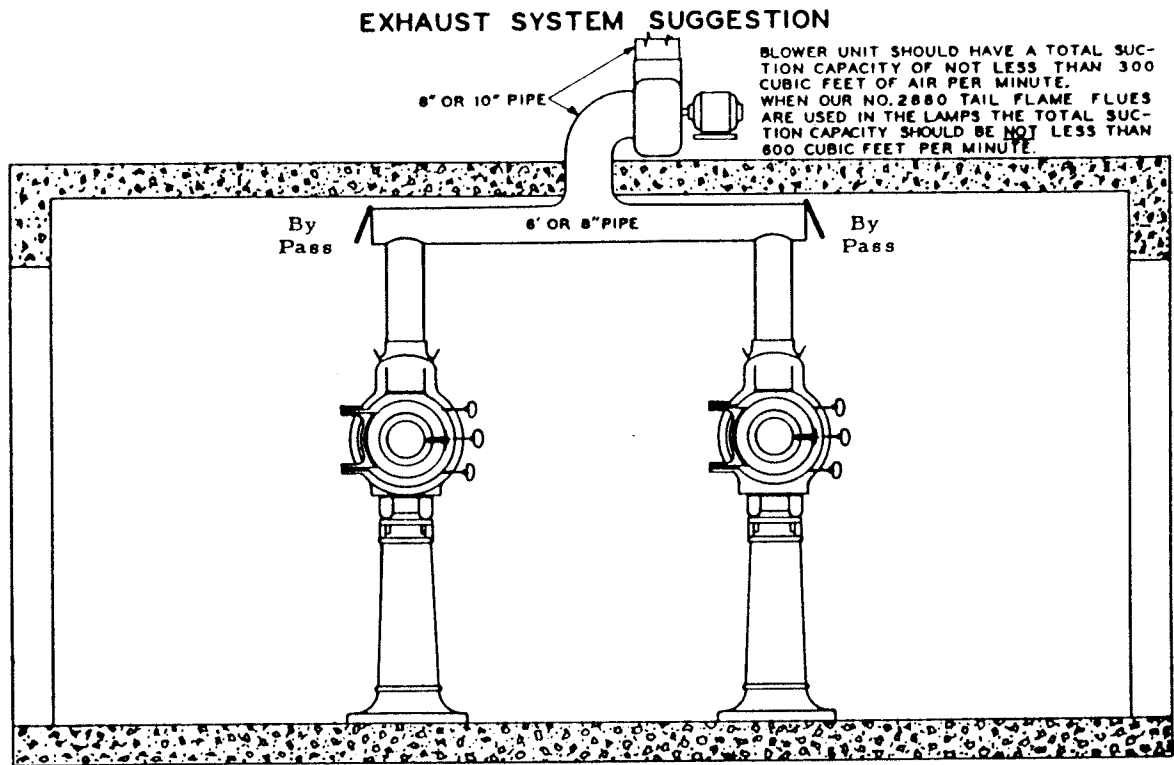
THE CURRENT RANGE of the Peerless Magnarc is from 45 to 80 amperes at 34 to 46 volts. For a particular current rating, use the proper carbon combination and positive carbon guide as shown in the Adjustment Section of this manual.

CONNECT THE LAMPHOUSE ARC SUPPLY LEADS to the power supply connections through the table switch to the generator or directly to the rectifier as the case may be. CAUTION: If a rectifier is used, the direct current or arc circuit must be connected directly from the rectifier to the lamphouse with no fuse or switch in this circuit.

CONNECT THE CARBON TRIM ALARM (Deluxe Lamps Only) supply leads to a 6 volt A. C. source. See Wiring Diagram. Do not use higher than 6 volts on this circuit because by so doing you will shorten the life of the lamp bulbs as well as the colored plastic domes that cover them.

ENCLOSE THE LAMPHOUSE PILOT LIGHT LEADS in a length of flexible conduit and connect to a current supply. This may often be found at the projector motor switch or at some convenient 110 V. A. C. outlet in the projection room.

THE PEERLESS MAGNARC operates at relatively low arc voltage and care should be taken to guard against air drafts which could disturb the arc. If forced draft is employed in the vent pipes, by-pass openings should be installed in the exhaust piping as shown in the illustration.



THE MAXIMUM DRAFT that can be used for any particular amperage is determined by the stability of the arc flame. The by-pass opening in each lamp chimney duct should be opened a little at a time with the arc burning until any unsteadiness of the flame at the crater is eliminated.

A 6" CHIMNEY OUTLET is provided on the Peerless Magnarc and additional piping should be 6" or larger. Where forced ventilation is not employed, care should be taken that no down draft will occur, as it too will cause disturbance to the arc.



## OPTICAL ALIGNMENT PROCEDURE

This operation should always be accomplished by the use of our PEERLESS Magnarc Optical Alignment Appliance which consists of:

1 No. M2653 Alignment Disc  
1 No. M2654 7 and 8 M/M Alignment Rod  
OR  
1 No. M2749 9 M/M Alignment Rod

1 No. M15885 Alignment Disc  
1 No. M15886 Alignment Rod

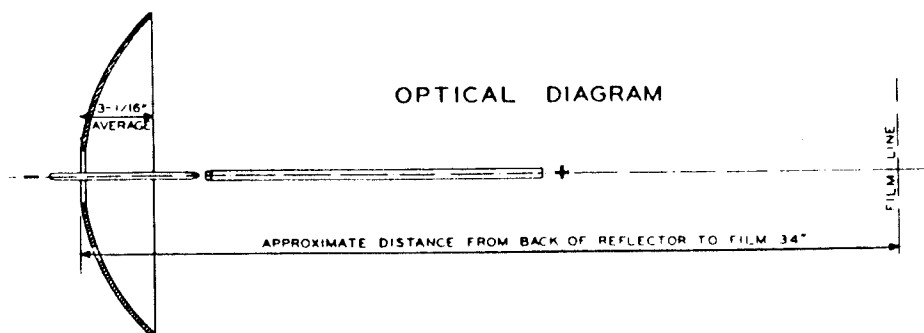
In addition to the above parts you should provide yourself with one catalogue No. M15881 Dummy Lens Barrel. If this Dummy Lens Barrel is not already on hand it may be ordered from your local dealer. Complete alignment procedure is illustrated in the diagrams.

The above listed parts provides means for accurately aligning the optical axis of PEERLESS Magnarc lamps with the optical axis of the projection lens, and also, to precisely set the correct working distance, between the positive carbon crater and the projector mechanism aperture, this in turn, will automatically place the reflector vertex, at its correct focal position.

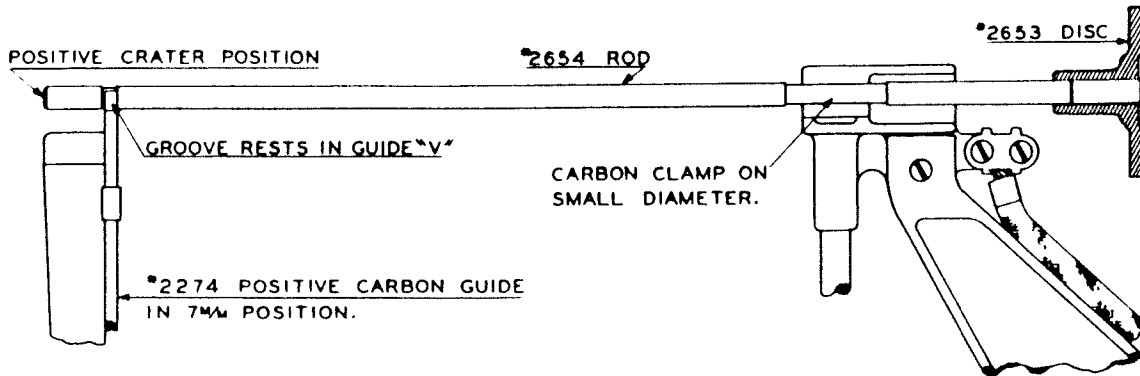
Figures 1 and 2 illustrate the proper use of Rods No. M2654 and M2749 in lamps equipped to use either the 7 x 7 M/M, 7 x 8 M/M or 8 x 9 M/M carbon trim.

To set the lamphouse in its correct position from the projector mechanism aperture, first loosen the screws which hold the lamphouse to the lamphouse table casting on the pedestal, so it may be moved forward or backward as needed. Place all parts of the alignment appliance in position shown in Figure 3, and adjust the lamphouse, toward or away from the aperture to bring about the condition illustrated in Figure 3, and retighten the lamphouse position screws.

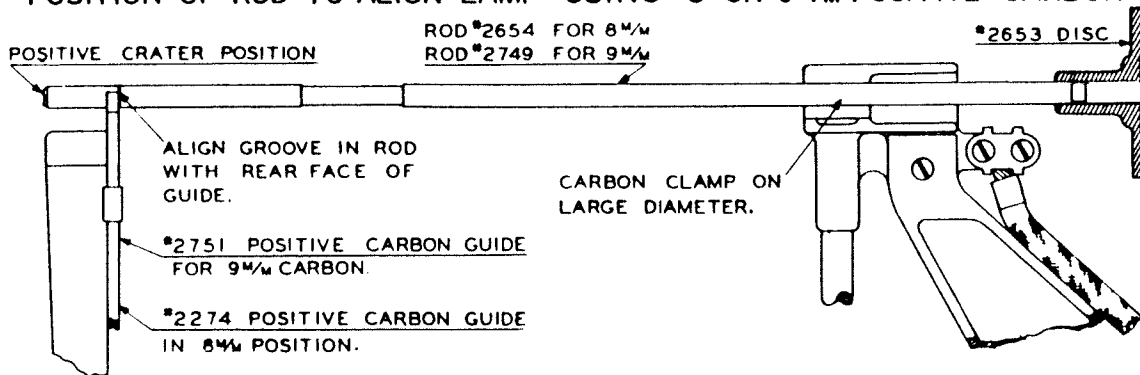
Align the lamp axis with the projection lens axis. By means of the adjustment at the top of the projection pedestal, for the lamphouse table casting, centralize the rims and parallel the faces of the two discs, after which retighten all adjustments for a permanent setting of the lamphouse support table.



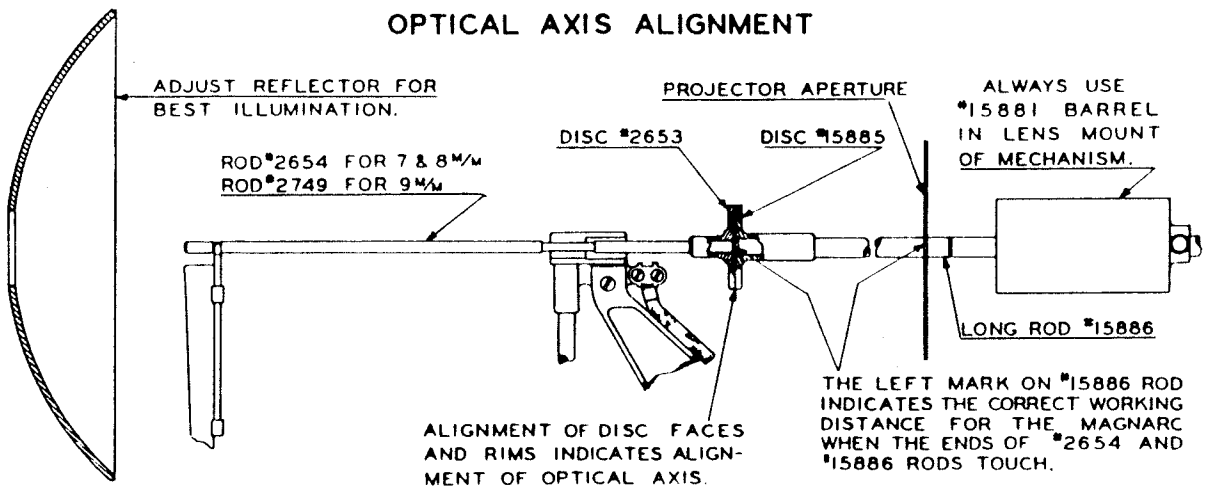
—FIG. 1—  
 POSITION OF ROD TO ALIGN LAMP USING 7MM POSITIVE CARBON



—FIG. 2—  
 POSITION OF ROD TO ALIGN LAMP USING 8 OR 9MM POSITIVE CARBON



—FIG. 3—  
 OPTICAL AXIS ALIGNMENT



## OPERATION

TRIM THE POSITIVE by first throwing the positive carriage lever clockwise and sliding the entire positive carbon carriage toward the front of the lamp. Next, turn the positive carbon clamp lever toward the reflector and insert the butt end of the positive carbon in the clamp with the pointed end of the carbon resting in the "V" slot of the positive carbon guide. Line up the tip of the carbon with the front edge of the carbon guide chute and clamp the carbon in that position.

TO TRIM THE NEGATIVE, open the rear door and move the negative carbon clamp to its rear-most position. Raise the negative carbon clamp lever and insert the carbon into the side of the carbon clamp, pushing the carbon forward through the negative carbon guide until the end of the negative carbon projects approximately 1-3/8" beyond the front end of the carbon guide. Clamp in that position.

TO MAKE PRELIMINARY ADJUSTMENTS on operation of lamp, turn the power on and strike the arc by means of the negative manual control knob. As soon as the arc strikes, back off very quickly and adjust the negative carbon so the arc gap is approximately 1/4 inch.

AFTER A CRATER IS FORMED, push inward on the positive manual control knob and adjust the positive carbon until its crater face is in the same vertical plane as the front edge of the carbon guide chute.

REFLECTOR TILT ADJUSTMENT for vertical and horizontal centering of the spot on the aperture is by means of the top and bottom knobs located on the rear door.

PRELIMINARY ADJUSTMENT OF LIGHT to the screen may be made while the projector is running but without film. However, the final reflector focusing is best done while projecting a picture.

OBSERVE WHETHER THE PROJECTED IMAGE of the carbons are in the approximate center of the arc image screen. If not, loosen the arc image mirror swivel screw and adjust the mirror.

OBSERVE WHETHER THE PROJECTED IMAGE OF THE positive carbon coincides with the vertical "positive" line on the arc image screen. If it does not, the image may be placed on the line by slightly loosening the screw that holds the arc image support assembly to the window frame and turn the assembly clockwise or counterclockwise, and re-tighten the mounting screw. Before making this adjustment, see that the positive carbon crater itself is in



same vertical plane as the front edge of the carbon chute. The negative carbon should then be adjusted by hand until the image of its end is even with the vertical "Negative" line on the screen.

THE RATE OF FEED OF THE POSITIVE carbon is controlled by a rheostat which is connected in the field circuit of the arc feed motor. The speed of this motor determines the rate of feed of both carbons. Since the arc control motor is connected across (in multiple with) the arc, its speed is effected by the voltage of the arc. It is therefore essential that the arc gap shown on the image screen be constantly maintained. By means of the rheostat control knob (located on the front casting, operators side) the speed of the motor may be increased or decreased until the image of the carbon crater is constantly held in register with its line on the carbon image screen.

#### IMPORTANT

If it is found that the negative carbon is not maintaining its position during the adjustment of the positive feed, it is essential to manually maintain its correct position.

THE RATE OF FEED OF THE NEGATIVE CARBON is regulated by the negative adjusting screw located on the rear casting just beneath the bottom hinge. By turning clockwise on this screw the stroke of the feed lever is increased and a greater length of negative carbon is moved forward at each stroke; conversely, by turning the screw counterclockwise the amount of negative carbon fed at each stroke is decreased. Observe the image of the negative carbon on the arc image screen and increase or decrease the rate of negative feed until the image of the negative carbon end maintains its position on the negative line of the arc image screen.

DAILY OPERATION OF THE LAMP requires adjusting the lamp manual feed knobs only when the arc is struck. If it is necessary to adjust the lamp feed knobs during the remainder of the burn, it indicates improper functioning and the Adjustment Section should be consulted.

## ADJUSTMENTS

### TO ALIGN CARBONS

THE MOST SATISFACTORY POSITIVE CRATER is a crater whose face is at right angles to the center axis of the carbon.

IF THE POSITIVE CRATER persists to burn with an angular crater face it indicates that negative carbon axis is not in correct relation to the positive carbon.

TO CORRECT THIS CONDITION, the entire negative carbon feed assembly may be raised, lowered or moved sideways while the arc is burning in relation to the positive carbon by means of the Upper Adjusting Wing for vertical movement and Lower Adjusting Wing for horizontal movement.

### ADJUSTING NEGATIVE FRICTION CLUTCH

AN ADJUSTABLE FRICTION CLUTCH is provided for the negative carbon feed. The clutch friction may be increased or decreased by tightening or loosening the large nut located on the extreme left end of the negative feed clutch shaft. This nut is locked in position by a small set screw. Upon loosening this set screw the nut may be screwed in or out to tighten or loosen the friction clutch until the desired degree of friction is obtained. For ease in rapid arc striking, the friction should not be excessive and only sufficient to insure accurate feed of the negative carbon.

### ADJUSTMENT OF POSITIVE CARBON GUIDE

SHOULD THE POSITIVE CARBON GUIDE at any time become burned or require replacement, it may be taken out by removing the sliding chute and unscrewing its retainer screw which holds it to the support casting.

SHOULD IT BECOME NECESSARY to remove the guide support casting, care should be taken when replacing same to see that the positive carbon, when in the guide slot, is in lateral alignment with the negative carbon before tightening the screws at its base.

### ADJUSTMENT OF NEGATIVE CARBON GUIDE

CARE SHOULD BE TAKEN to see that the end of the negative carbon is supported by the "V" slot at the end of the negative guide, rather than by the rack gear to which the negative carbon clamp is mounted. This may be determined by inserting a short carbon in the carbon holder and upon moving

the carbon holder forward make sure that the carbon lifts up slightly upon entering the "V" slot at the end of the carbon guide. If the carbon does not rest in the "V" slot, slightly loosen the two attaching screws of the negative carbon guide, and raise the guide until the carbon rests in the "V" slot at the front end of the guide.

THIS GUIDE should not be raised so high as to remove all vertical play between the "V" slot and negative carbon, as the carbon should float, with the "V" slot its only guidance.

#### TO REMOVE ARC CONTROL MOTOR AND DRIVE GEAR ASSEMBLY

THE ARC FEED MOTOR together with the entire arc feed assembly, upon which it is mounted, may readily be removed from the PEERLESS MAGNARC by first disconnecting the three colored motor lead wires. Next, remove the positive sub-base assembly as directed below which makes accessible the two 1/4-20 attaching screws securing the arc feed assembly to the front casting.

#### TO REMOVE ENTIRE POSITIVE SUB-BASE ASSEMBLY FROM LAMPHOUSE

THE ENTIRE POSITIVE SUB-BASE ASSEMBLY may be removed from the lamphouse by removing the negative push rod which is accomplished by first removing the cotter pin that retains it and pulling the push rod out through the rear of the lamphouse.

NEXT REMOVE THE LONG HOLD-DOWN SCREW located on the rear end of the positive base cover. Disconnect the asbestos wire from the positive carbon clamp. The entire burner assembly may then be slid toward the reflector and disengaged from its locating dowel pin in the front of the lamphouse base casting and taken out of the lamphouse.

#### TO REMOVE NEGATIVE CARBON ASSEMBLY

THE ENTIRE NEGATIVE CARBON ASSEMBLY may be removed from the PEERLESS MAGNARC by first removing the lock nut from the upper Adjusting Wing and the adjustment sleeve nut from the lower adjusting Wing, then remove the taper pin from the negative drive universal joint.

## MAINTENANCE

A GOOD GRADE OF LUBRICATING OIL, the same as used in the motion picture projector, may be employed to lubricate the Peerless Magnarc. It is recommended that the oil be used sparingly as all parts of the Peerless Magnarc are very slow moving and a few drops of oil in each oil hole (once a week) should suffice.

### CAUTION

Do not use graphite, or any lubricant containing graphite, on Peerless Magnarc Lamps.

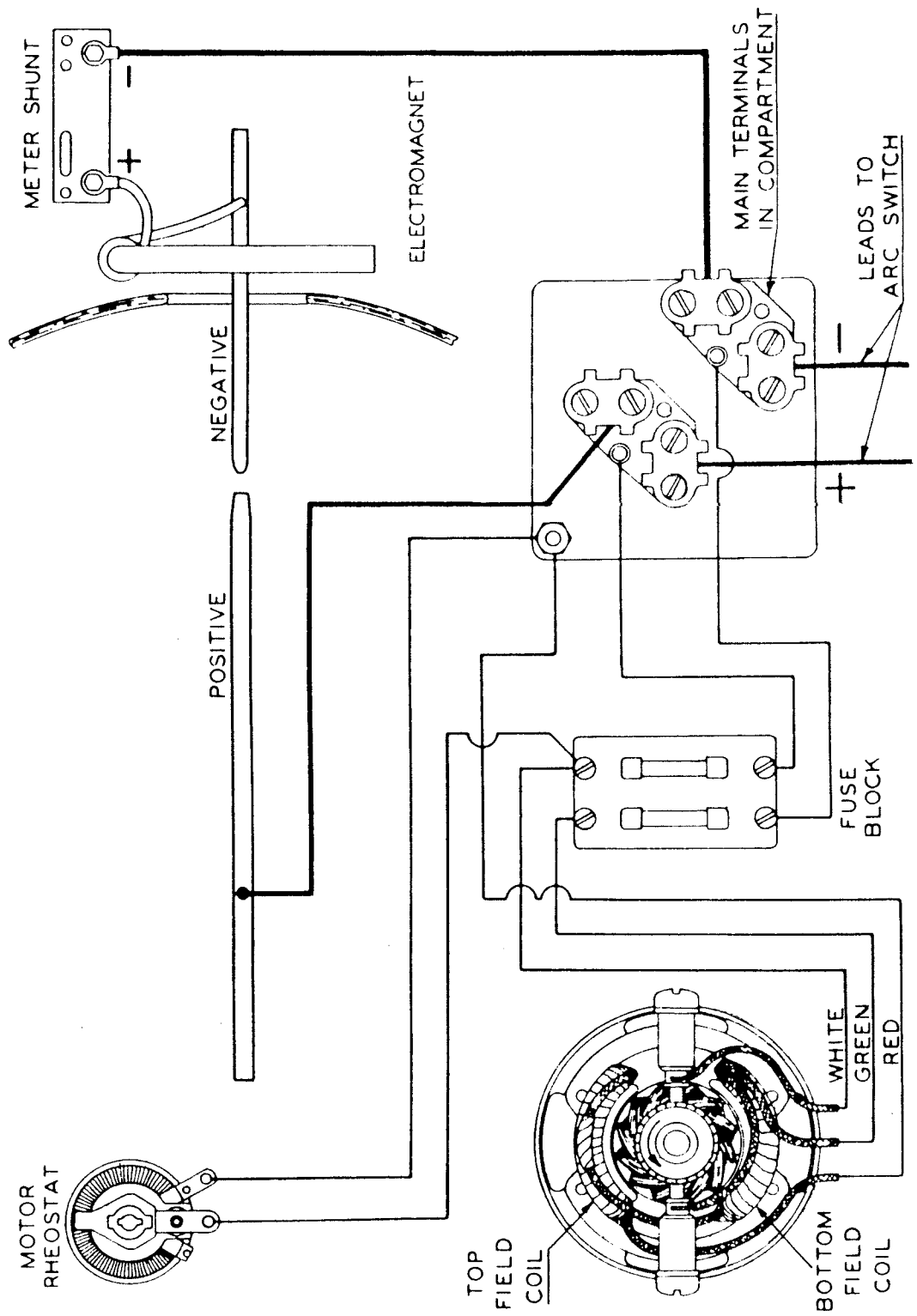
KEEP THE LAMPHOUSE CLEAN. A removable ash tray, located directly under the arc is provided in the Peerless Magnarc. This tray may be removed by first opening the reflector door. When replacing the tray, care should be used to see that its top edge is placed underneath the drip pan stop pins so that it cannot come in contact with the lower part of the positive carbon guide. Care should also be taken to prevent accumulation of the metallic drippings, from the carbons, on lamp parts and cause a ground. We advise against the use of sand or any abrasive substance in the removable tray because of the damage it can cause to the bearings and mechanism of the lamp.

CLEANING THE REFLECTOR should become a daily habit as even the small amount of white soot which accumulates on the reflector in a day, if allowed to remain, will start to scum the reflector and will become difficult, if not impossible to remove.

FOR THIS DAILY CLEANING of the reflector the use of a soft dry cloth is all that is necessary.

THOROUGHLY CLEAN THE SURFACE OF THE REFLECTOR (once every week) with Bon Ami or a similar cleansing agent, which will not scratch the glass. If maximum light efficiency of the lamp is to be maintained, it is essential that the mirror be kept in perfect condition.

# METER CARBON AND MOTOR WIRING DIAGRAM



POSITIVE CARBON GUIDE AND ECCENTRIC ADJUSTMENT

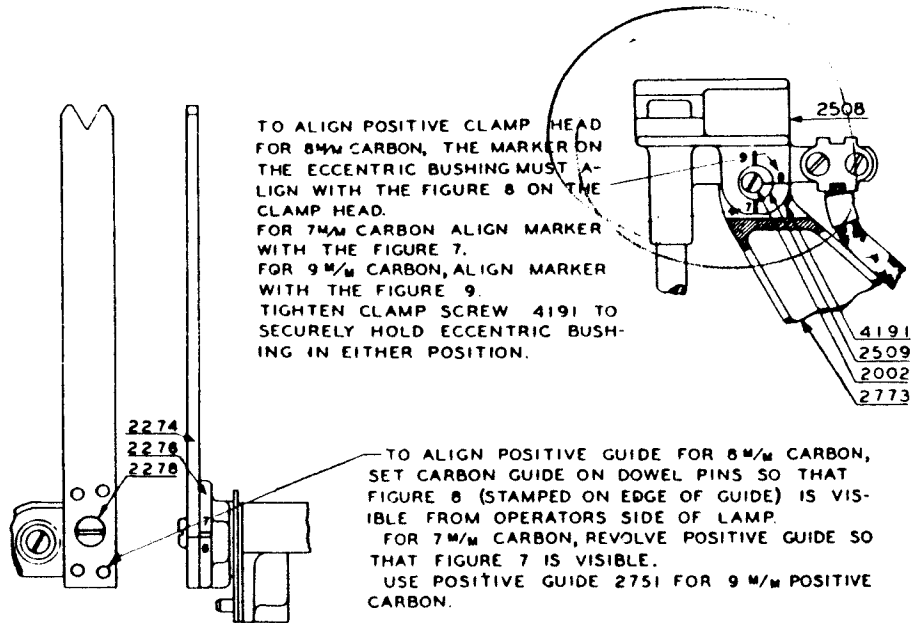
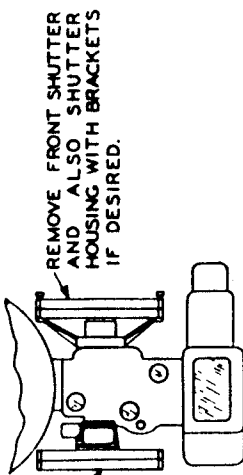


TABLE OF CARBON COMBINATIONS, ARC VOLTAGES AND AMPERAGES

COPPER COATED "HI" CARBONS	AMPERAGE RANGE	ARC VOLTAGE RANGE
7 <sup>M/W</sup> POSITIVE } 6 <sup>M/W</sup> NEGATIVE }	45 - 50	33 - 37
8 <sup>M/W</sup> POSITIVE } 7 <sup>M/W</sup> NEGATIVE }	60 - 70	36 - 40
9 <sup>M/W</sup> POSITIVE } 8 <sup>M/W</sup> NEGATIVE }	72 - 80	41 - 46

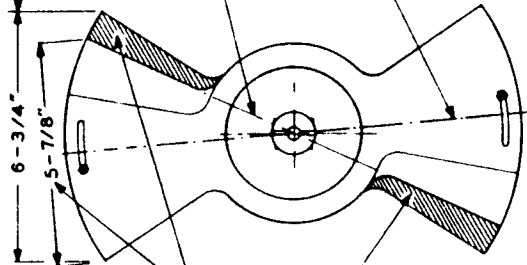
## "E-7" AND SUPER SIMPLEX DOUBLE OR REAR SINGLE SHUTTER ALTERATIONS.



REMOVE FRONT SHUTTER AND ALSO SHUTTER HOUSING WITH BRACKETS IF DESIRED.

**IMPORTANT:**  
USE REAR SHUTTER ONLY. FIRST TRIAL SHOULD BE WITH THE STANDARD REAR SHUTTER COMPLETELY NARROWED TO 8-3/4" FROM CORNER TO CORNER ACROSS BLADES. UNDER NO CIRCUMSTANCES SHOULD YOU CUT BLADES MORE THAN TO THE 5-7/8" WIDTH SHOWN IN THE DIAGRAM BELOW. THE USE OF ONLY THE REAR SHUTTER IS PREFERABLE AS ONLY THEN DOES APERTURE HEAT INCREASE AT THE SAME RATE AS THE GAIN IN ILLUMINATION.

THE REGULAR REAR SHUTTER WHEN COMPLETELY NARROWED MEASURES 6-3/4" FROM CORNER TO CORNER ACROSS BLADES.



IN SOME CASES EACH SHUTTER BLADE MAY BE NARROWED TO 5-7/8" WIDE AS SHOWN HERE. NEVER CUT TO LESS THAN 5-7/8".

LINE OF CUT SHOULD PASS THROUGH CENTRE POINT OF SHUTTER HUB, IF MADE.

ALIGN WITH CENTRE OF APERTURE OPENING AT MID POINT OF INTERMITTENT SPROCKET MOVEMENT.

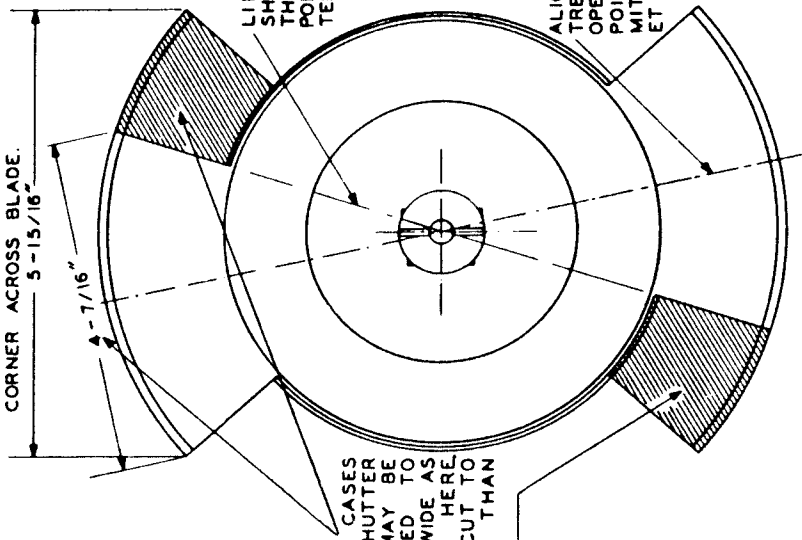
**NOTE:**  
THIS ALTERATION WILL INCREASE THE NET SCREEN ILLUMINATION 9% AND UP TO 25% IF SHUTTERS WERE SET AT 84° WIDTH.

### FOR DRIVE IN USE ONLY

WITH PEERLESS MAGNARC OR HY-CANDESCENT LAMPS.

## "XL" SIMPLEX SHUTTER ALTERATIONS.

THE REGULAR "XL" REAR SHUTTER IS 5-15/16" FROM CORNER TO CORNER ACROSS BLADE.



IN SOME CASES EACH SHUTTER BLADE MAY BE NARROWED TO 4-7/16" WIDE AS SHOWN HERE. NEVER CUT TO LESS THAN 4-7/16".

LINE OF CUT SHOULD PASS THROUGH CENTRE POINT OF SHUTTER.

ALIGN WITH CENTRE OF APERTURE OPENING AT MID POINT OF INTERMITTENT SPROCKET MOVEMENT.

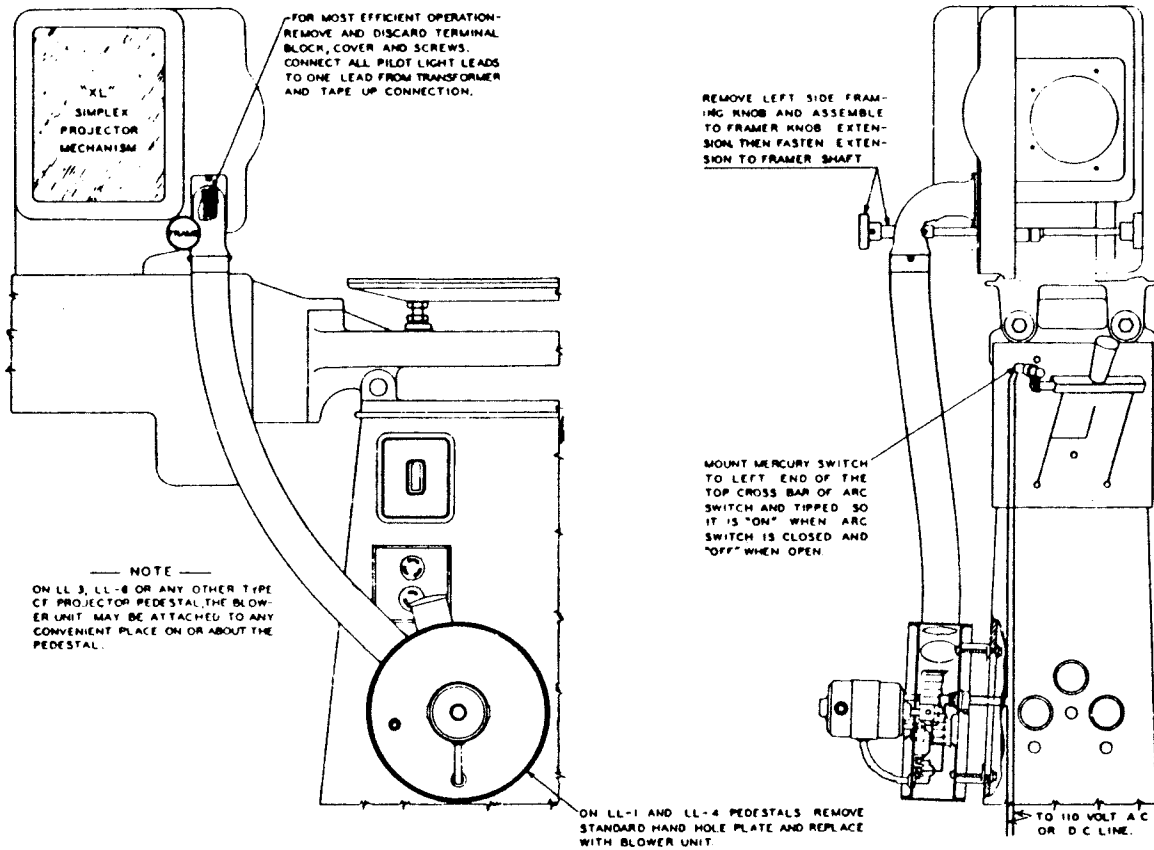
**NOTE:**

THIS ALTERATION WILL INCREASE THE NET SCREEN ILLUMINATION UP TO 25% AS COMPARED TO THE STANDARD 84° XL SHUTTER BLADES.

### FOR DRIVE IN USE ONLY

WITH PEERLESS MAGNARC OR HY-CANDESCENT LAMPS.

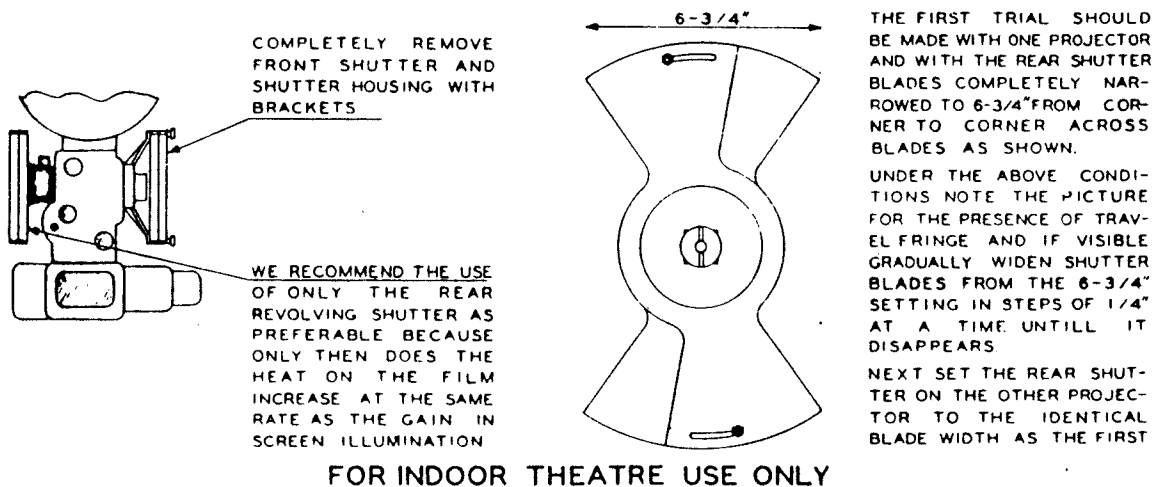
## "XL" SIMPLEX MECHANISM INSTALLATION.



### NOTE

THE PEERLESS MAGNARC "XL" MECHANISM COOLING UNIT MUST NOT BE MISTAKENLY UNDERSTOOD TO FUNCTION AS A LIGHT HEAT FILTER UNIT, AS ITS ONLY PURPOSE IS TO REDUCE TO A MINIMUM THE INTERNAL TEMPERATURE OF THE PARTS INSIDE THE "XL" MECHANISM SIGHT BOX WHEN A 70-80 AMPERE SUPREX TYPE ARC IS USED AS THE ILLUMINATION SOURCE. ADDITIONAL INFORMATION AND PRICES CAN BE HAD ON APPLICATION

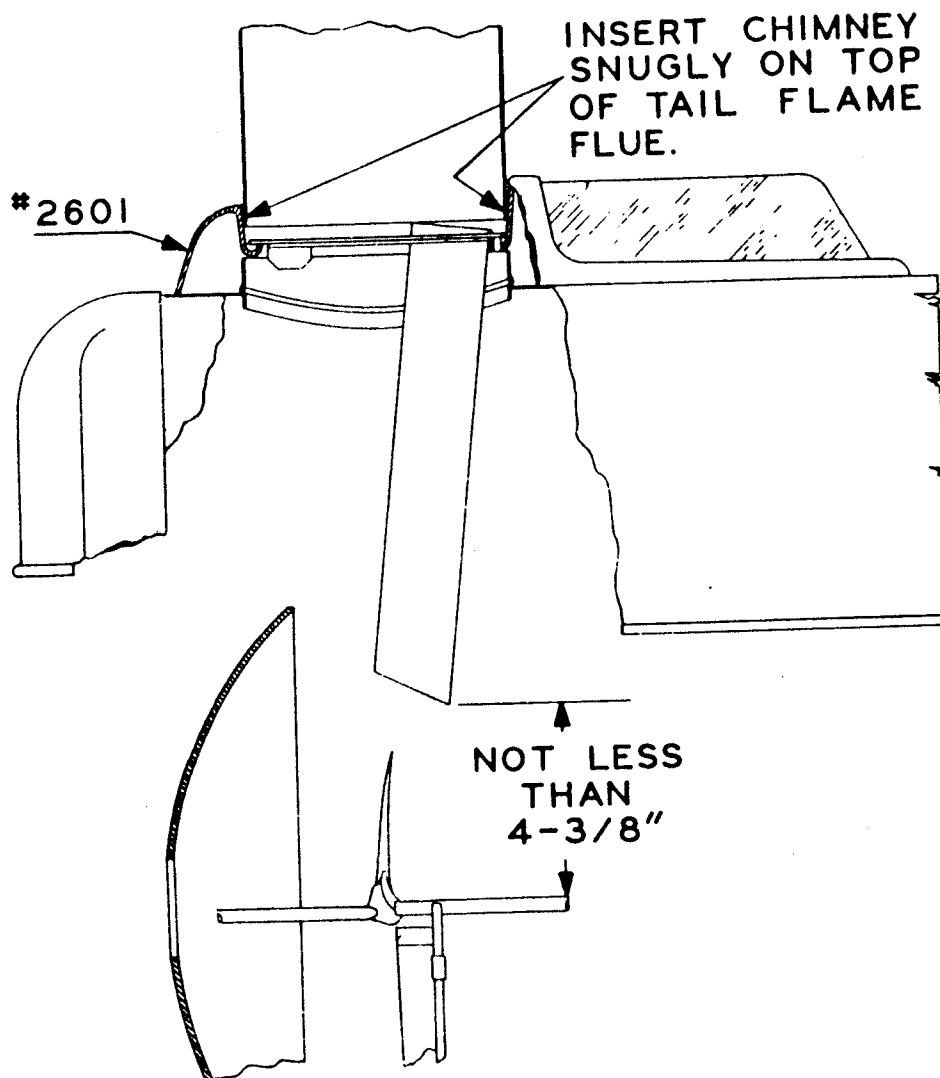
## SUGGESTED ALTERATIONS FOR "E-7" AND SUPER SIMPLEX DOUBLE SHUTTER MECHANISMS





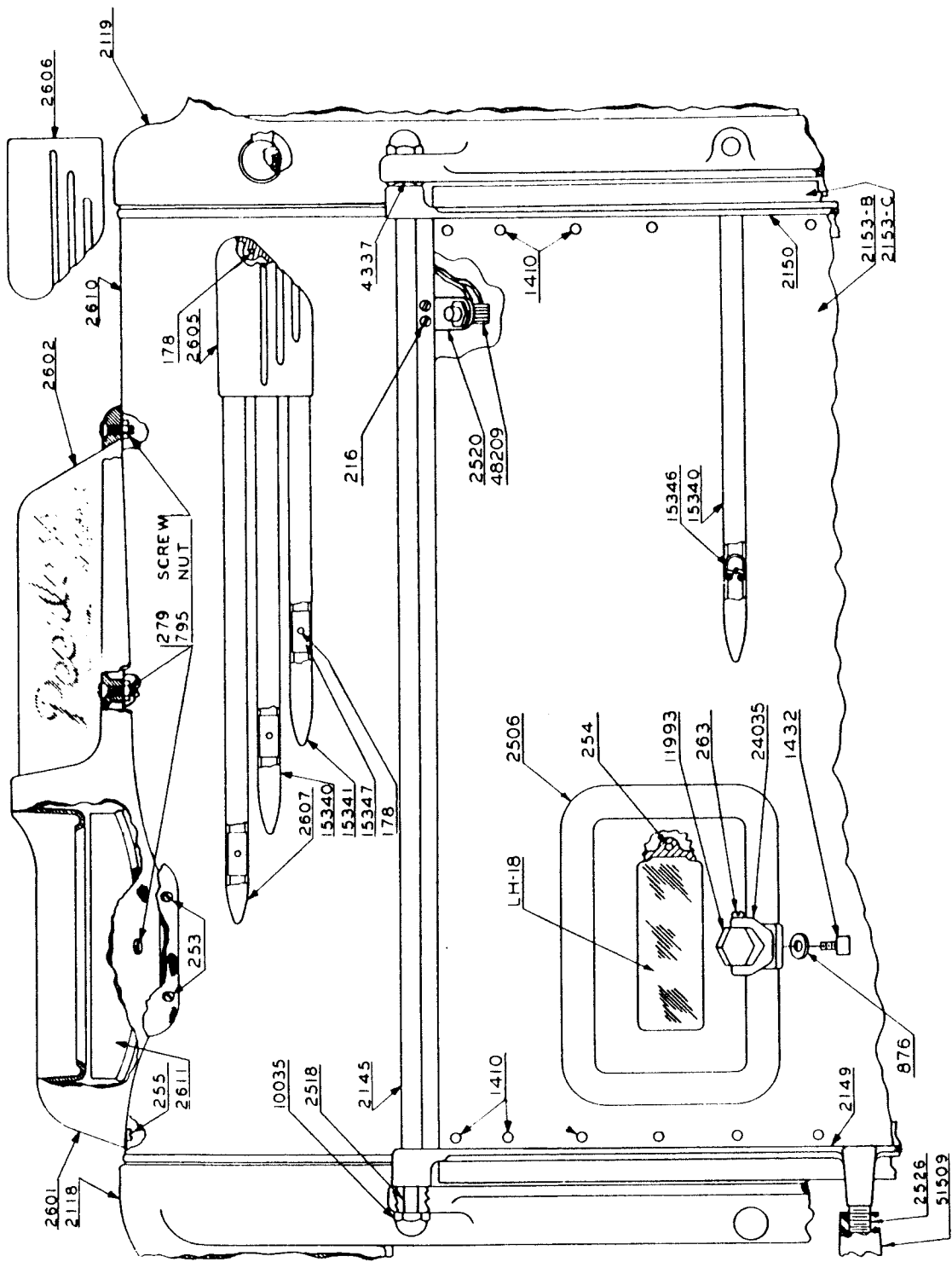
## No. 2880 POSITIVE TAIL FLAME FLUE

When burning at higher current ranges of from 65 to 80 amperes, primarily in "Drive-Ins" and also theatres having rather steep angles of projection, the use of our new No. 2880 Tail Flame Flue has proven very effective as an adjunct to lamphouse ventilation, and by reducing the accumulation of carbon ash on the reflectors first surface.

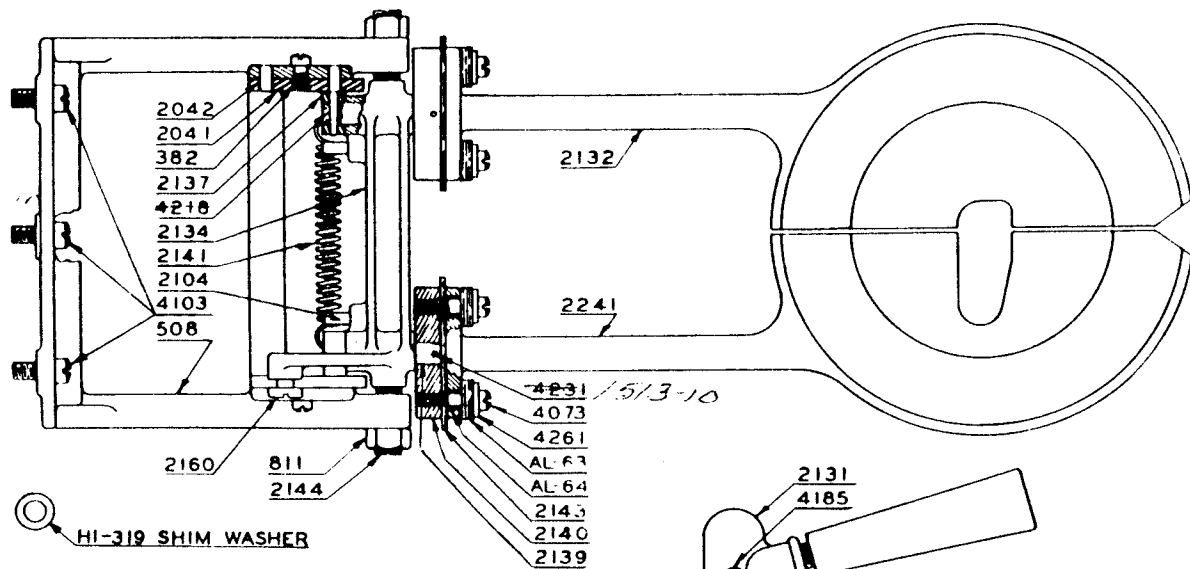


Even in theatres having an almost horizontal projection axis, because of longer burning periods, which in turn subjects reflectors to a higher degree of hazard than heretofore, our No. 2880 Tail Flame Flue should contribute greatly to prolonging its normal useful life and this, at a higher degree of reflectivity.

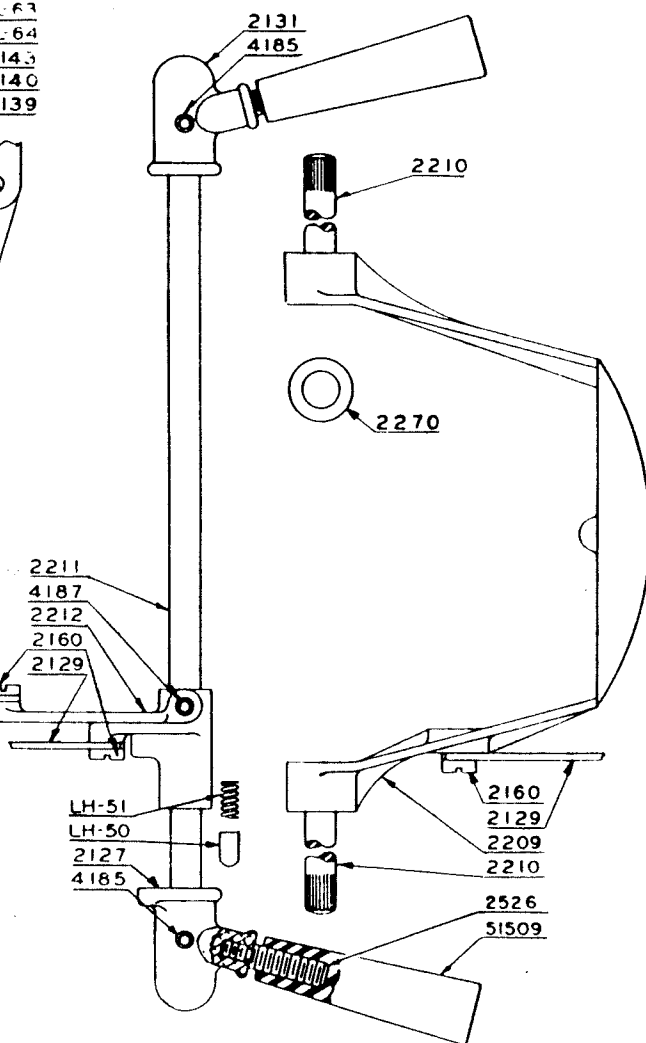
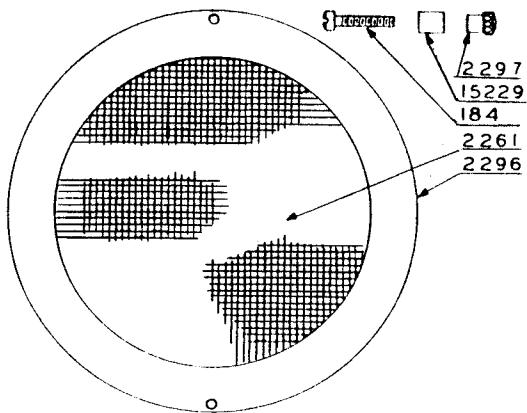
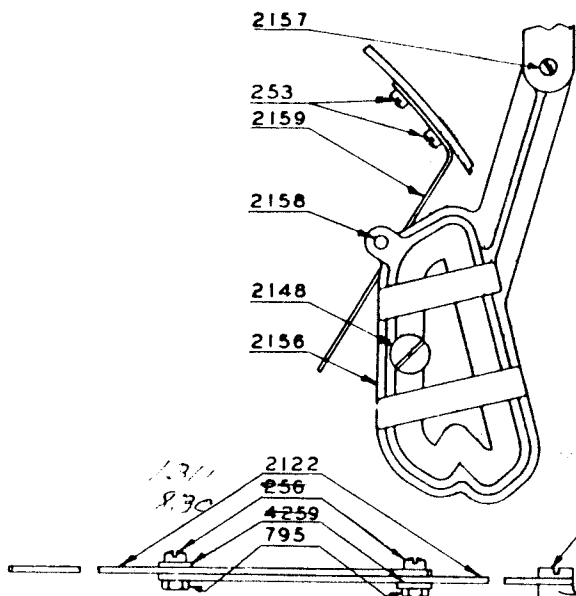
The No. 2880 Tail Flame Flue is not included as a regular part of either a "De Luxe" or "Special" model Magnarc. It must be purchased separately.

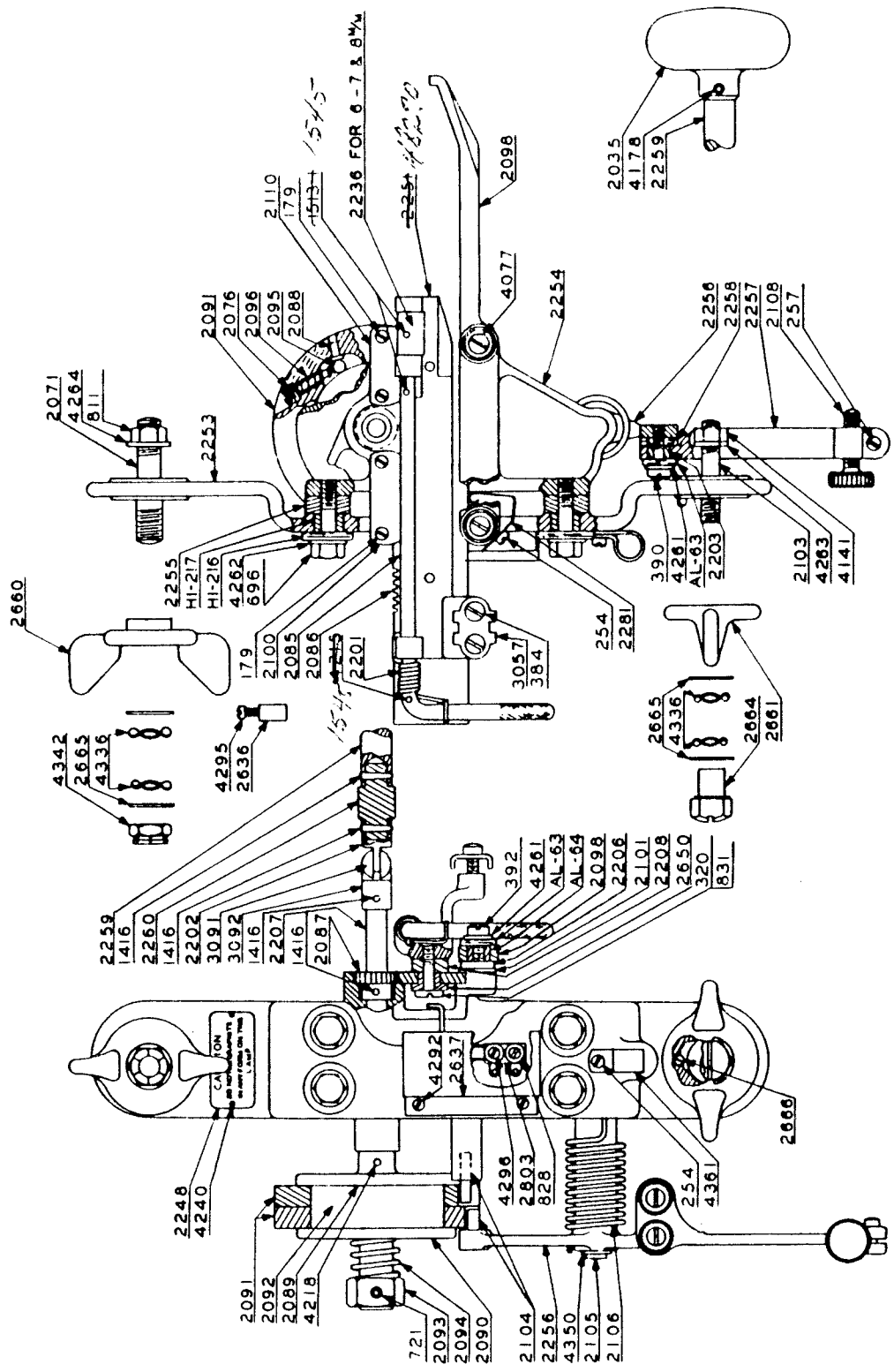


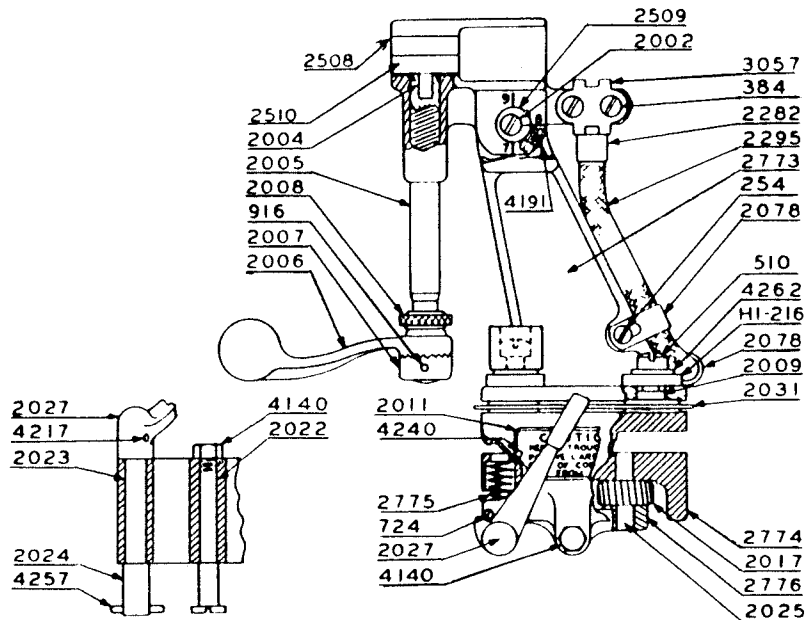
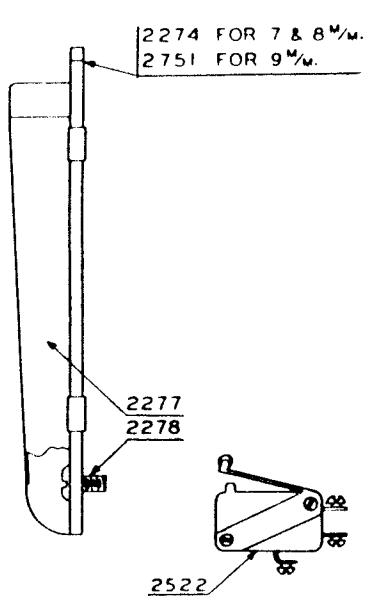
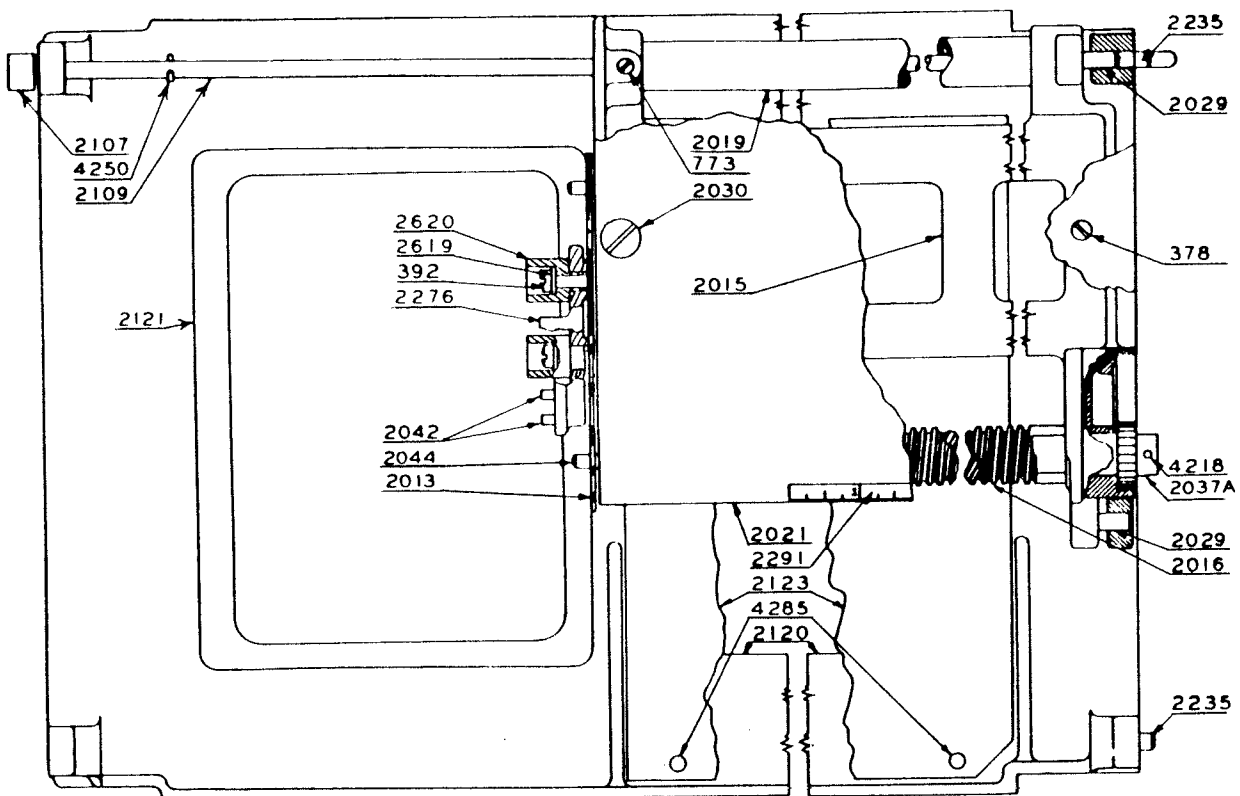


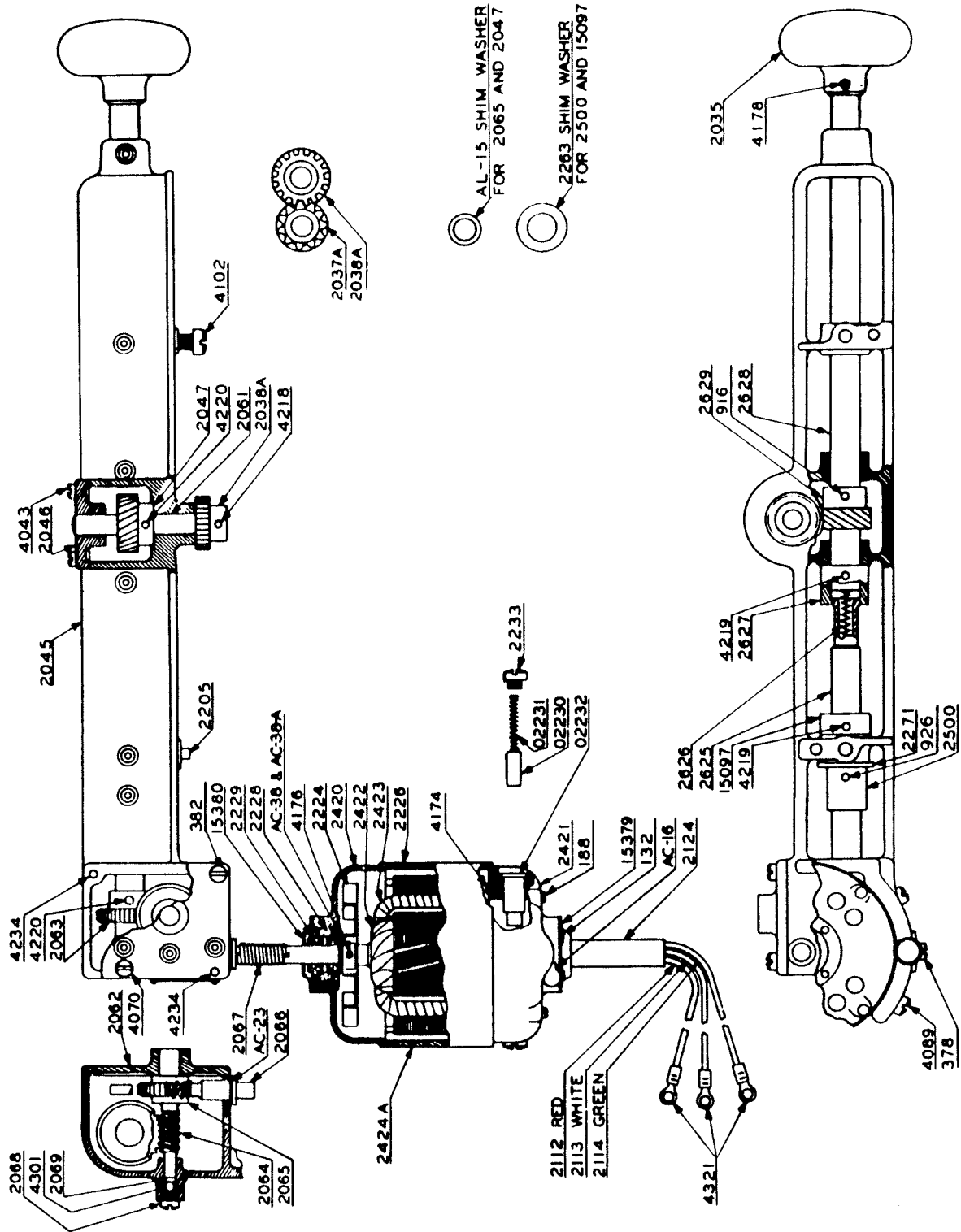


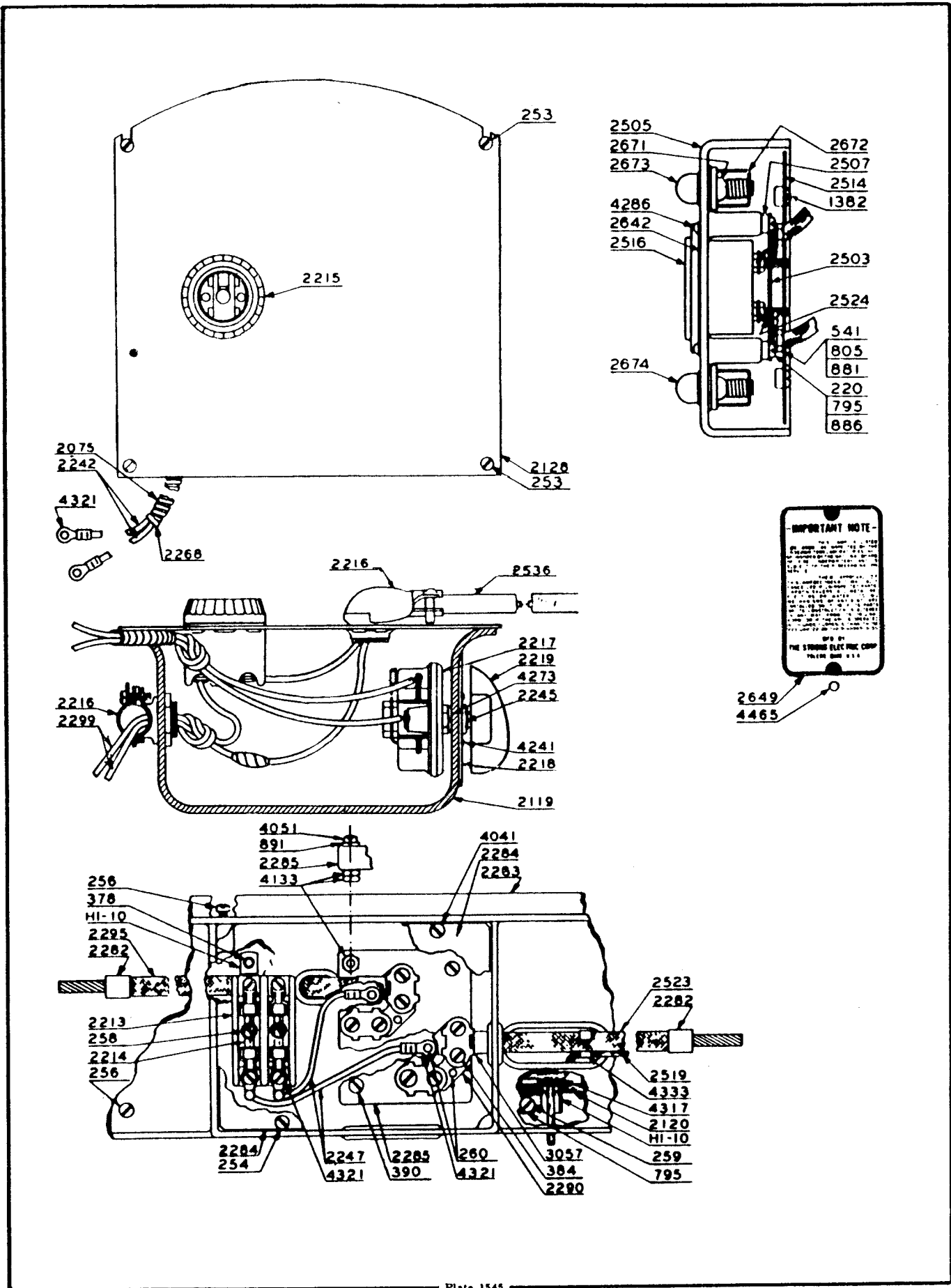
HI-319 SHIM WASHER



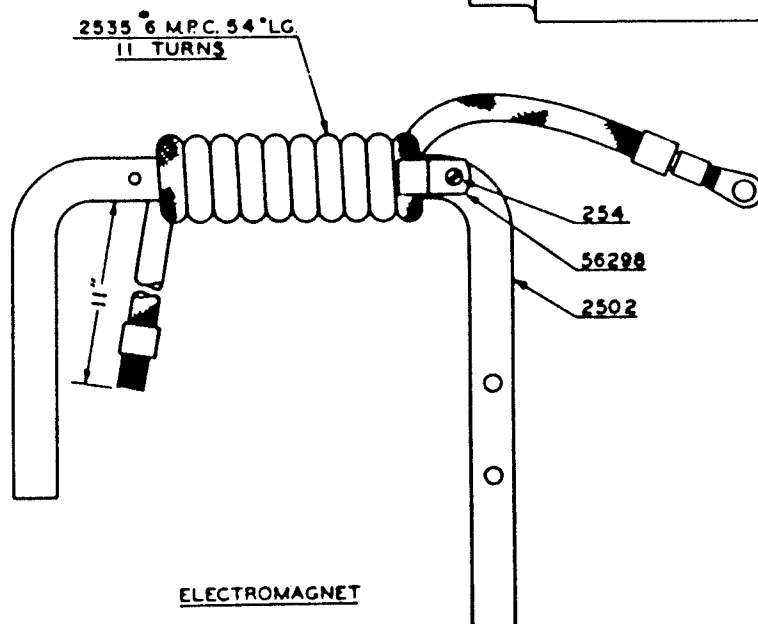
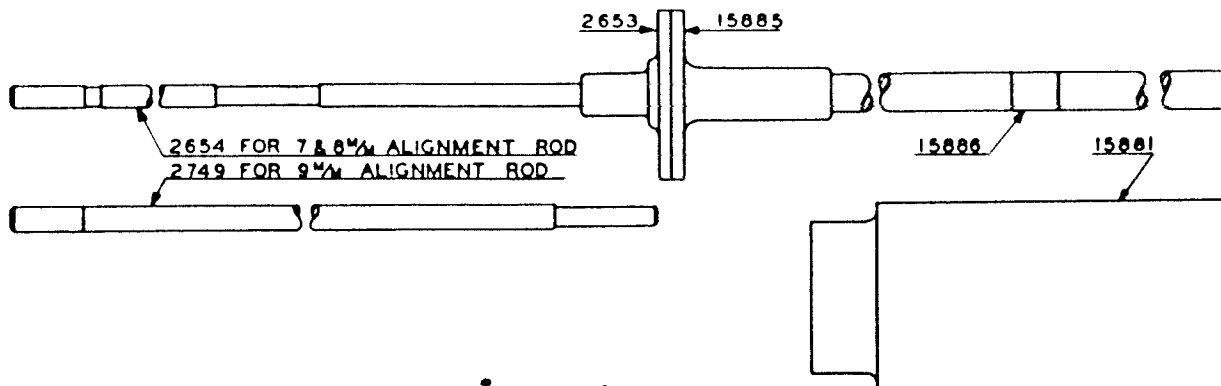
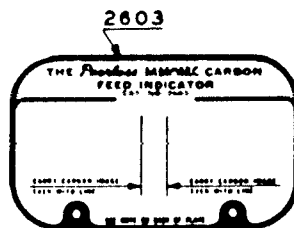
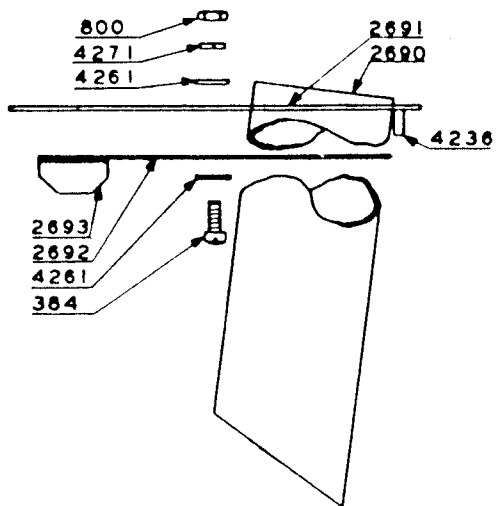












AC-16	Oil Cup
AC-23	Fibre Thrust Washer
AC-38	Thin Thrust Washer
AC-38A	Thick Thrust Washer
AL-15	Shim Washer
AL-47	Reflector Retainer Clip
AL-63	Mica Washer
AL-64	Insulator Bushing
HI-10	Wire Clip
HI-216	Mica Washer
HI-217	Mica Washer
HI-319	Shim Washer
LH-18	Door Glass
LH-50	Dowser Hub Plunger
LH-51	Plunger Spring
178	Screw #6-32 x 3/16" Fil. Hd.
179	Screw #6-32 x 1/4" Fil. Hd.
184	Screw #6-32 x 5/8" Fil. Hd. Mach.
220	Screw #8-32 x 1/2" Rd. Hd.
253	Screw #8-32 x 3/16" Fil. Hd.
254	Screw #8-32 x 1/4" Fil. Hd.
255	Screw #8-32 x 5/16" Fil. Hd.
256	Screw #8-32 x 3/8" Fil. Hd.
257	Screw #8-32 x 7/16" Fil. Hd.
258	Screw #8-32 x 1/2" Fil. Hd.
259	Screw #8-32 x 5/8" Fil. Hd.
260	Screw #8-32 x 3/4" Fil. Hd.
261	Screw #8-32 x 7/8" Fil. Hd.
279	Screw #8-32 x 3/4" Oval Hd.
320	Screw #10-32 x 3/4" Rd. Hd.
378	Screw #10-32 x 1/4" Fil. Hd.
382	Screw #10-32 x 3/8" Fil. Hd.
384	Screw #10-32 x 7/16" Fil. Hd.
386	Screw #10-32 x 1/2" Fil. Hd.
390	Screw #10-32 x 3/4" Fil. Hd.
392	Screw #10-32 x 7/8" Fil. Hd.
398	Screw #10-32 x 1-1/4" Fil. Hd.
507	Screw 1/4-20 x 1/2" Fil. Hd.
508	Screw 1/4-20 x 5/8" Fil. Hd.
510	Screw 1/4-20 x 7/8" Fil. Hd.
541	Screw 1/4-20 x 1/2" Bd. Hd.
696	Screw 1/4-28 x 1" Hex Hd.
773	Set Screw 1/4-20 x 3/8 Hdless, Cup Pt.
795	Nut #8-32 Steel

830	Washer Brass #8-7/16"
1311	Screw, 8-32 x 3/8" Bd. Hd.
1513-10	Roll Pin .094 x .625
800	Nut #10-32 Steel
805	Nut 1/4-20 Steel
814	Nut 3/8-24 Steel
822	Nut 5/16-24 Steel
828	Washer #6 x 3/8 O. D.
831	Washer #10
852	Washer 1/4 Steel
854	Washer 3/8" Steel
881	L'Washer 1/4" Split Ring
886	L'Washer #8 Split Ring
891	L'Washer #8 Shakeproof (Int.)
916	Taper Pin 2/0 x 3/4"
926	Taper Pin 2/0 x 1"
1382	Screw #8-32 x 3/16" Bd. Hd.
1402	L'Washer 3/8" Shakeproof
1410	Drive Screw #6 x 3/8" Type "U"
1416	Taper Pin 3/0 x 1/2"
1439	Set Screw #10-32 x 1/4 Cup Pt. , Socket Hd.
1475	Cotter Pin, 1/16 x 3/8 Stn. Stl.
1545	Taper Pin 5/0 x 1/2" Stn. Stl.
M2002	Positive Head Swivel Screw
M2004	Steel Pin (Order M2511)
M2005	Positive Clamp Screw
M2006	Positive Clamp Lever
M2007	Positive Lever Clutch
M2008	Positive Lever Nut
M2009	Insulator Washer
M2011	Chute Caution Plate
M2012	Reflector
M2013	Positive Guide Insulator
M2015	Base (Order M2364)
M2016	Positive Feed Screw
M2017	Gear (Order M2376)
M2019	Saddle Guide Tube
M2021	Sub Base Cover
M2022	Saddle Clutch Bar Screw
M2023	Saddle Handle Shaft
M2024	Saddle Clutch Block
M2025	Shaft (Order M2376)
M2027	Pos. Carriage Lever
M2029	Dowel
M2030	Screw
M2031	Insulator Plate
M2035	Knob (Order M2325)
M2037A	Gear (25T.) Pos. Lead Screw (Sold only as Set M2350A)
M2038A	Gear (31T.) Motor (Sold only as Set M2350A)
M2041	Plate, Douser Cam (Order M2331)
M2042	Dowel Pin

M2044	Stop Pin
M2045	Arc Feed Cstg. (Order M2419)
M2046	Helical Gear Cover
M2047	Positive Helical Gear, Upper
M2061	Upper Positive Helical Gear Shaft
M2062	Cover, Gear
M2063	Secondary Worm Gear
M2064	Secondary Worm (Order M2415)
M2065	Worm Gear, Primary (Order M2415)
M2066	Primary Worm
M2067	Motor Coupling Spring
M2068	Secondary Worm Thrust Screw
M2069	Secondary Worm Thrust Disc
M2071	Negative Post Stud, Upper
M2074	Push Plunger Bushing
M2075	Rheostat Lead Conduit
M2076	Screw & Stud
M2078	Positive Lead Clip
M2085	Negative Carbon Clamp Lever
M2086	Negative Rack
M2087	Rack Pinion
M2088	Clutch Outer Race Button
M2089	Friction Sleeve
M2090	Friction Disc
M2091	Outer Race (Order M2412)
M2092	Inner Clutch Race
M2093	Friction Spring Nut
M2094	Friction Spring
M2095	Clutch Roller
M2096	Clutch Roller Spring
M2098	Negative Carbon Guide
M2100	Rack Gib, Upper Rear
M2101	Rack Gib, Lower
M2103	Negative Post Stud, Lower
M2104	Dowel Pin
M2105	Negative Lever Stud
M2106	Negative Lever Spring
M2107	Button (Order M2400)
M2108	Negative Adjusting Screw
M2109	Rod (Order M2400)
M2110	Rack Gib, Upper Front
M2112	Red Motor Lead Wire
M2113	White Motor Lead Wire
M2114	Green Motor Lead Wire
M2115	Door Casting, Refl. (Order M2312)
M2116-SA	Rear Door Hinge
M2118	Back Casting (Order M2305)
M2119	Front Casting (Order M2304)

M2120 Lamphouse Base (Order M2303)  
M2121 Drip Pan  
M2122 Rear Dowser Link  
M2123 Base Panel  
M2124 Motor Lead Sheath  
M2126-G Wire Edge - Top (Order M2610A)  
M2127 Dowser Handle Hub, Right  
M2128 Cover, Rheostat  
M2129 Front Dowser Link  
M2131 Dowser Handle Hub, Left  
M2132 Reflector Dowser, Left  
M2133 Dowser Support Frame  
M2134 Trunnion Cstg. (Order M2338)  
M2137 Dowser Cam  
M2139 Shaft, Cam Flange (Order M2335 or M2336)  
M2140 Flange (Order M2336 or M2335)  
M2141 Dowser Cam Spring  
M2143 Dowser Insulator Plate  
M2144 Trunion Pivot Screw  
M2145 Side Door Hinge Rod  
M2148 Latch Guide Screw  
M2149 Rear Right Door Channel  
M2150 Front Right Door Channel  
M2151 Rear Left Door Channel  
M2152 Front Left Door Channel  
M2153-B Outer Panel, Door (Order M2310)  
M2153-C Inner Panel, Door (Order M2310)  
M2153-D Spark Guard (Order M2310)  
M2154-B Outer Panel, Door (Order M2307)  
M2154-C Inner Panel, Door (Order M2307)  
M2154-D Spark Guard (Order M2307)  
M2156 Latch (Order M2309)  
M2157 Door Latch Screw  
M2158 Right Latch Pin  
M2159 Right Latch Spring  
M2160 Dowser Link Screw  
M2161 Rear Door Latch Spring  
M2162 Door Opening Plunger  
M2163 Plunger Spring  
M2164 Reflector Door Latch Spring  
M2165 Reflector Door Latch Shaft  
M2166 Reflector Door Latch Button  
M2168 Reflector Door Hinge Pin  
M2170 Refl. Frame (Order Set M2329)  
M2171 Main Support Guide Stud (Order M2330)  
M2172 Reflector Bracket (Order M2329)  
M2173 Support, Refl. Frame (Order M2330)  
M2174 Focus Lock Link

M2175	Reflector Pressure Spring
M2178	Reflector Drum Slide Rod
M2179	Lower Adjustment Lever
M2180	Upper Adjustment Lever
M2181	Lever Pivot Stud
M2182	Drum Swivel Stud
M2184	Focus Link Screw
M2185	Reflector Adjustment Rod, Upper
M2186	Reflector Adjustment Rod, Lower
M2189	Reflector Focusing Screw
M2192-S	Reflector Clip (Plain)
M2192-SA	Reflector Clip (Threaded)
M2194	Reflector Door Catch
M2195	Reflector Adj. Spring, Lower
M2196	Reflector Adj. Spring, Upper
M2197	Focusing Screw Washer
M2201	Negative Eccentric Shaft Spring
M2202	Yoke, Universal (Order M2403)
M2203	Insulator Bushing
M2205	Arc Feed Dowel
M2206	Negative Guide Insulator
M2207	Negative Clutch Shaft
M2208	Negative Holder Insulator
M2209	Front Dowser
M2210	Front Dowser Shaft
M2211	Dowser Handle Shaft
M2212	Dowser Bell Crank
M2213	Fuse Block
M2214	Motor Fuse
M2215	Pilot Lamp Socket
M2216	Pilot Lead Elbow
M2217	Motor Rheostat
M2218	Rheostat Dial
M2219	Rheostat Knob
M2224	Armature Fan
M2225	Motor End Bell for Shaft End (Order M2420)
M2226	Field Housing
M2228	Bearing Oil Washer
M2229	Armature Bearing
M02230	Motor Brush, Flat
M02231	Brush Spring, Flat Brush
M02232	Brush Holder, Flat Brush
M2233	Brush Holder Cap
M2235	Lamphouse Base Dowel Pin
M2236	Negative Eccentric
M2240	Focusing Screw Lock Nut
M2241	Reflector Dowser, Right
M2242	Lead Wire, Rheostat (Order M2430)

M2245 Rheostat Retainer Nut  
M2247 Lead Wire, Fuse (Order M2432)  
M2248 Caution Plate  
M2251 <sup>48270</sup> Carbon Holder  
M2253 Support, Neg. Rack (Order M2405)  
M2254 Neg. Rack (Order M2406)  
M2255 Rack Bracket Insulator  
M2256 Lever, Neg. Feed (Order M2399)  
M2257 Negative Feed Lever, Lower  
M2258 Feed Lever Insulator  
M2259 Negative Knob Shaft  
M2260 Negative Universal Insulator  
M2261 Light Stop Screen (Order M2315)  
M2263 Shim Washer  
M2268 Conduit Bushing  
M2270 Steel Shim Washer 1/32 Thick (Douser)  
M2271 Steel Shim Washer 1/16 Thick  
M2274 Positive Carbon Guide (7-8mm)  
M2276 Guide Support (7-8mm) (Order M2359)  
M2277 Guide Chute  
M2278 Guide Screw  
M2280 Rear Peep Glass Frame  
M2281 Rack Tipping Spring  
M2282 Main Lead Tape  
M2283 Side Panel  
M2284 Fuse Box Cover  
M2285 Main Terminal Block  
M2290 Main Terminal Base  
M2291 Positive Feed Scale  
M2292 Rear Peep Glass  
M2293 Lamphouse Name Plate  
M2294 Lead Wire, Long (Order M2523)  
M2295 Lead Wire, Short (Order M2334)  
M2296 Light Stop Screen Retaining Ring (Order M2315)  
M2297 Stop Ring Thumb Nut  
M2299 Pilot Light Leads, Set  
M2303 Lamphouse Base Casting with Panel  
M2304 Lamphouse Front Casting with Dial Plate  
M2305 Lamphouse Back Casting Assy.  
M2307 Door Assy. (L. H.)  
M2309 Right Door Latch & Pin  
M2310 Door Assy. (R. H.)  
M2312 Reflector Door Assy.  
M2314 Lamphouse Side Panel Assy.  
M2323 Neg. Adj. Shaft & Knob  
M2325 Knob & Set Screw  
M2326 Refl. Adj. Rod & Knob (upper)  
M2327 Refl. Adj. Rod & Knob (lower)

M2329 Refl. Frame with Springs & Slide Rods  
M2330 Reflector Support Casting with Stud  
M2331 Douser Cam Plate with Pin  
M2334 Main Lead Wire (short)  
M2335 Refl. Douser Cam Shaft & Flange (R. H. )  
M2336 Refl. Douser Cam Shaft & Flange (L. H. )  
M2337 Reflector Douser Bracket Assy.  
M2338 Douser Trunion Casting with Pins  
M2350A Positive Feed Gear Set  
M2359 Guide Support with Dowels  
M2361 7-8mm Pos. Carbon Guide Complete  
M2364 Sub Base with Dowels & Set Screw  
M2367 Pos. Sub Base Assy. Complete Less Gear (7-8mm)  
M2372 Pos. Carbon Clamp Complete  
M2376 Saddle Clutch Pinion with Shaft  
M2377 Positive Saddle Complete  
M2392 Neg. Carbon Clamp Assy.  
M2398 Clutch Feed Lever Complete, Less 2108 & 4043  
M2399 Feed Lever with Pin (upper)  
M2400 Neg. Push Rod with Button & Pin  
M2401 Neg. Feed Clutch Assy.  
M2403 Universal Joint with Pins  
M2405 Neg. Rack Support Casting Assy.  
M2406 Neg. Casting with Pins  
M2410 Neg. Unit Complete  
M2412 Outer Race with Button  
M2415 Secondary Worm with Primary Worm Gear  
M2419 Arc Feed Casting and Dowels  
M2420 Motor Front End Bell Casting Bearing & Oil Cup  
M2421 Motor Rear End Bell Casting with Bearing, Oil Cup  
and Brush Holders  
M2422 Motor Armature Complete  
M2423 Set of Motor Field Coils with Leads  
M2424A Motor, Arc Feed (with terminals)  
M2430 Motor Rheostat Lead with Terminal  
M2432 Motor Fuse Lead with Terminals  
M2500 Cam, Pos. Shaft Clutch  
M2501 Magnet Assembly  
M2502 Magnet  
M2503 Shunt  
M2504 Rear Door (Order M2528)  
M2505 Housing, Ammeter  
M2506 Window Frame  
M2507 Insulator, Shunt  
M2508 Clamp Head, Positive  
M2509 Eccentric, Pos. Clamp  
M2510 Clamp Shoe, Pos. (Order M2511)  
M2511 Pos. Clamp Shoe & Pin  
M2512 Pos. Clamp Head Assem.



M2514	Cover, Ammeter Housing
M2515	Rear Door Assem.
M2516	Ammeter (0-100 A.)
M2517	Ammeter Assem. (with Trim lights)
M2518	Hinge Pin, Side Doors
M2519	Harness Assem., Carbon Trim Alarm
M2520	Bracket, Switch Mounting
M2521	Bracket, Trim Switch Mounting
M2522	Trim Switch, Pos.
M2523	Lead Assem., Ammeter
M2524	Lead Assem., Shunt to Meter
M2525	Decal - Wiring Diagram
M2526	Stud, Door & Douser Handle
M2528	Rear Door Sub-Assem.
M2535	Wire Assem., Magnet
M2536	Conduit-Bushing Assem.
M2601	Chimney Base
M2602	Glass Name Plate
M2603	Arc Image Screen
M2605	Decorative Head R. H.
M2606	Decorative Head L. H.
M2607	12" Trim Moulding
M2610	Top Sheet Metal (Order M2610A)
M2610A	Top Sheet Metal Assy.
M2611	Lamphouse Top Collar
M2619	Insulator Washer
M2620	Guide Insulator
M2621	Insulator, Pos. Post
M2625	Drive Shaft
M2626	Clutch Spring
M2627	Knob Shaft Clutch
M2628	Knob Shaft
M2629	Lower Helical Gear
M2635	Switch (Order M2803)
M2636	Negative Alarm Switch Trip
M2637	Alarm Switch Cover
M2639	Lever (Order M2803)
M2642	Trim Alarm Plate
M2647	Underwriter's Approval Label
M2650	Negative Rack Bushing
M2651	Rear Door Handle
M2653	Alignment Disc
M2654	7 & 8mm Alignment Rod
M2660	Vertical Negative Adj. Wing
M2661	Horizontal Negative Adj. Wing
M2664	Sleeve Nut, Horizontal Adjustment
M2665	Thrust Washer
M2666	Adjustment Stud

M2671	Alarm Lamp
M2672	Alarm Lamp Socket
M2673	Red Lamp Dome
M2674	Green Lamp Dome
M2690	Tail Flame Flue Tube (Order M2881)
M2691	Tail Flame Flue Support Plate (Order M2881)
M2692	Tail Flame Flue Damper (Order M2882)
M2693	Damper Finger Grip (Order M2882)
M2749	Positive Optical Alignment Rod (9mm)
M2751	Positive Carbon Guide (9mm)
M2773	Positive Post
M2774	Positive Saddle
M2775	Saddle Clutch Spring
M2776	Saddle Clutch Bar
M2779	Lamphouse Assy.
M2800	Arc Feed Complete with Motor, Less Gear
M2801	Arc Feed, Less Motor, Sheath & Cover
M2803	Neg. Alarm Switch with Lever
M3057	Main Wire Clamp
M3091	Universal Ball
M3092	Yoke (Order Set M2403)
M4001	Screw #2-56 x 1/4" Rd. Hd.
M4083	Screw #12-24 x 5/8" Fil. Hd.
M4088	Screw #12-24 x 7/8" Fil. Hd.
M4089	Screw #12-24 x 7/16" Fil. Hd.
M4090	Screw #12-24 x 5/8" Flat Hd.
M4137	Nut #2-56 Hex
M4139	Nut #5-40 Hex (Special)
M4140	Nut 1/4-28 NF Hex
M4177	Set Screw #10-24 x 3/16" Cup Pt. Hex Socket Hd.
M4178	Set Screw #10-24 x 1/4" Cup Pt. Hex Socket Hd.
M4185	Set Screw 1/4-20 x 1/4" Cup Pt. Socket Hd.
M4187	Set Screw 1/4-20 x 5/16" Cup Pt. Socket Hd.
M4191	Set Screw #10-32 x 5/16" Cup Pt. Hdless
M4217	Taper Pin 2/0 x 1/2"
M4218	Taper Pin 2/0 x 5/8"
M4219	Taper Pin 2/0 x 7/8"
M4231	Dowel Pin 3/32 x 21/32 Steel
M4234	Dowel Pin 1/8 x 1/2 (special)
M4236	Pin
M4240	Escutcheon Pin #15 x 1/4" Steel
M4241	Escutcheon Pin #15 x 3/8" Steel
M4244	Escutcheon Pin #13 x 1/2" Brass
M4257	Cotter Pin 3/32 x 5/8" Stn. Stl.
M4259	Washer #8 Steel (1/2 x 11/64)
M4261	Washer 3/16" Steel (1/2 x 3/16)
M4271	Lockwasher
M4281	Rivet 3/32 x 3/16" Rd. Hd. (Alum.)

M4282	Rivet 3/32 x 5/16" Rd. Hd. Alum.
M4283	Rivet 1/16 x 3/16" Rd. Hd. Alum.
M4285	Drive Screw #6 x 1/4 Type "U"
M4286	Drive Screw #6 x 3/16"
M4292	Screw #5-40 x 3/16" Fil. Hd.
M4294	Screw #5-40 x 3/8" Fil. Hd.
M4296	Screw #5-40 x 5/8" Fil. Hd.
M4297	Screw #5-40 x 7/8" Fil. Hd.
M4301	Steel Ball 3/16"
M4317	Wire Strain, Relief
M4321	Terminal Lug
M4333	Wire Fastener
M4336	Spring Washer (Shakeproof)
M4337	Spring Washer (Shakeproof)
M4342	Lock Nut, Flexlock 7/16-20
M4350	Retaining Ring
M4361	Plastic Clamp 3/8"
M4456	Washer .172 I. D. x 3/8 O. D. x 1/32 Brass
M4465	Rivet 3/32 x 1/4 Bifurcated, Steel
10035	Acorn Nut
11035	Mirror Block (Order 11993)
11036	Mirror (Order Set 11993)
11037	Retaining Ring (Order 11993)
11993	Imager Mirror Assem.
M15097	Shaft Collar
M15229	Front Baffle Spacer
M15340	10" Trim Moulding
M15341	8" Trim Moulding
M15346	Narrow Moulding Clip
M15347	Screw Plate for 1/2" Moulding
M15379	Rear Motor Bearing Retainer
M15380	Front Motor Bearing Retainer
M15881	Dummy Lens
M15885	Alignment Disc
M15886	Alignment Rod
24035	Support, Arc Imager Mirror
48209	Pilot Light Switch
51509	Handle
56298	Wire Clamp

## PARTS LIST

All the prices are quoted f.o.b. Toledo and are subject to change without notice.

When ordering parts be sure to advise the serial numbers and the model of lamps in addition to the name of the parts wanted and how shipment is to be made.

There will be a minimum charge of ~~five~~ <sup>10.<sup>00</sup></sup> dollars on any one invoice and a service charge sufficient to cover the cost of handling on all merchandise returned to us for credit.