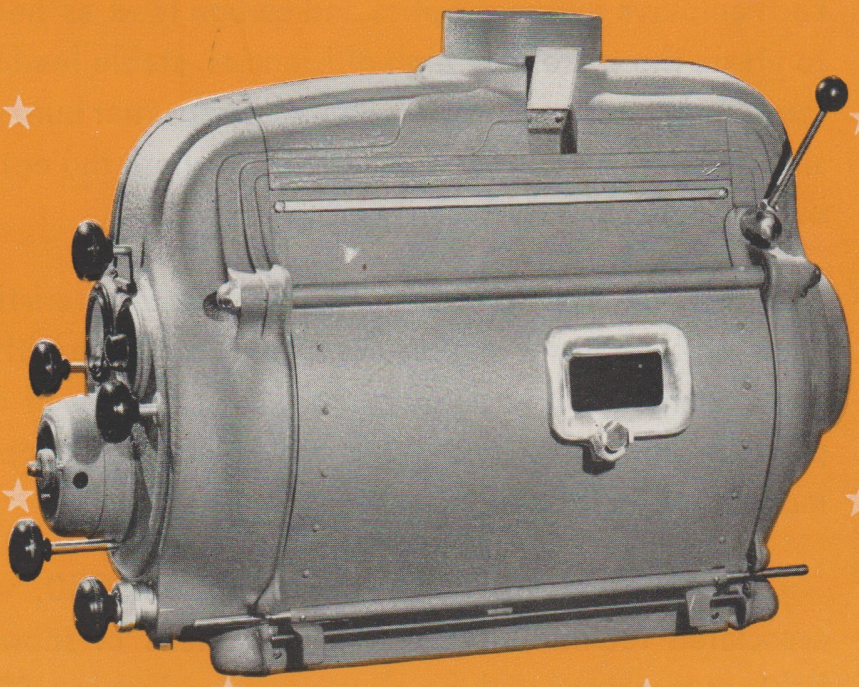
STRONG UTILITY

Types 14050 and 14046

HIGH INTENSITY PROJECTION ARC LAMPHOUSES



THE STRONG ELECTRIC CORPORATION *Toledo 2, Ohio*

THE STRONG UTILITY

High Intensity Projection Arc Lamphouses

THE STRONG UTILITY HIGH Intensity Projection Arc Lamp is offered in two models, the type 14050 for the moderate size theatre using a screen up to 18 feet in width; where the vivid brilliancy of high intensity projection, as used in first run theatres, has been heretofore denied by prohibitive operating costs, and the Type 14046 for larger theatres with screens up to 22 feet in width.

EACH OF THESE TWO LAMPS is built as a single capacity lamp, that is, to burn at one particular arc current. Each employs different optics and carbon feed as necessary to attain the extremely high efficiencies, stable feeding and carefree operation not attained with lamps that burn various size carbons at various amperages and where the optics and burning feeds are necessarily a compromise.

THE STRONG UTILITY projects that characteristic snow white high intensity light so essential to a picture with depth and definition and to the satisfactory projection of colored pictures. This new light makes the low intensity appear a muddy yellow by comparison.

THE STRONG UTILITY HIGH, Type 14050, with its associated rectifier, projects 7000 lumens of snow white light, as measured with no shutter, when burning 40 to 41 amperes, at which current the 6 mm. negative burns at 1 3/16 inches per reel of film and the 7 mm. copper coated Suprex carbon burns at 2 inches per reel, consuming only 1 KW of electricity at the arc. The approximate operating cost per hour for current and carbons is 15c.

The Projection Lighting Equipment, which you are using, represents the best efforts of the entire Strong organization. If at any time you have suggestions or desire aid in securing anticipated results, please feel free to write to the personal attention of

Harry H. Strong

THE EFFICIENCY of any projection equipment depends largely upon the care it receives at the hands of the projectionist and its built-in quality should not be jeopardized by careless handling.

SYSTEMATIC CLEANING and oiling and a thorough understanding of the burner mechanism and control system, as outlined on the following pages, are necessary to insure the excellence of performance that is a recognized feature of Strong products.

WHEN WRITING THE FACTORY regarding installation or difficulties, kindly outline your problem in detail, advising the type and serial numbers of the equipment, the current supply, number of amperes, kind and size of carbons used, or any other information that might assist us in diagnosing your trouble.

WHEN ORDERING PARTS be sure to advise serial number and model of the lamp and specify clearly the part numbers, in addition to the name of the parts wanted and how shipment is to be made.

PRICES on all Strong products including parts, are F.O.B. Toledo, Ohio and are subject to change without notice. There will be a minimum charge of one dollar on any one invoice and a service charge sufficient to cover the cost of handling on all merchandise returned for credit or exchange.

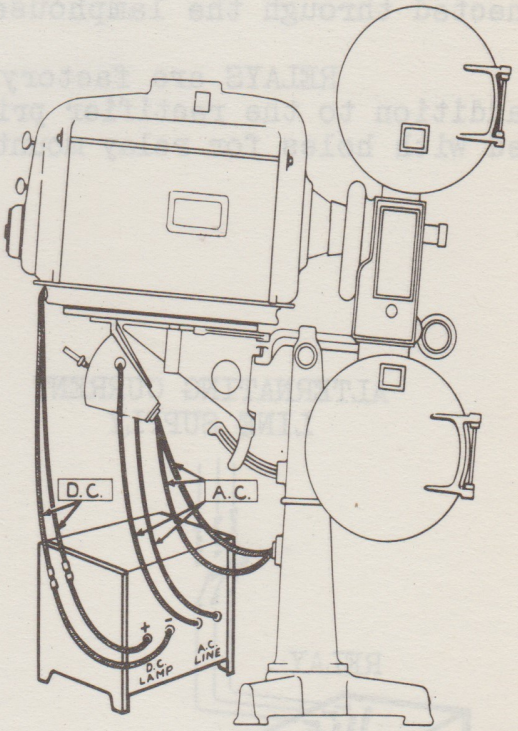
OUR GUARANTEE covers defects in material or workmanship, when the equipment is used normally and within its rated capacity. Our obligation under this standard warranty, is limited to repairing or replacing at our factory, any lamp or part thereof, which shall within one year after date of sale to the original purchaser, be returned to us with the transportation charges prepaid and which shall prove by our examination to be thus defective.

NO WARRANTY whatsoever is given in respect to condensers, carbons, rectifier tubes or elements, ammeters or any other parts or accessories not of our manufacture. These parts are usually warranted separately by their respective manufacturers.

CLAIMS resulting from damages in transit must be taken up immediately with the carrier upon receipt of merchandise, for the carrier assumes all responsibility when he accepts from us and signs for the merchandise in good order.

THE DIRECT CURRENT POWER supply equipment, whether rectifier or generator, must be of the correct electrical design to assure proper feeding of the carbons in this intermediate high intensity lamphouse. The potential drop across the arc is 27 volts at 40 amperes and the open circuit potential is 32 to 35 volts.

THE RECTIFIER is most conveniently located on the floor directly under the lamphouse. This arrangement is convenient for the projectionist and permits a simple, low cost wiring installation.



THE A.C. LINE; that is the input to the rectifier, whether single or multi-phase, should be wired through the lamphouse table switch; by that we mean the switch should be ahead of the rectifier so that the tubes are not lighted and the rectifier is 'dead' while the arc is not burning. At least No. 8 wire should be used for this power supply circuit.

THE DIRECT CURRENT or arc circuit must be connected directly from the rectifier to the lamphouse with no switch or fuse in this circuit, which should be No. 6 wire.

A THREE POLE KNIFE SWITCH should be installed at the lamphouse table when three phase rectifiers are used. We recommend a Trumbull No. 3081, three pole, single throw slate base switch.

FUSE PROTECTION for the individual 220 volt single phase rectifier should be 25 amperes, the two phase 15 amperes, and the three phase rectifier 15 amperes per phase. The direct current circuit from the rectifier to the lamphouse should not be fused.

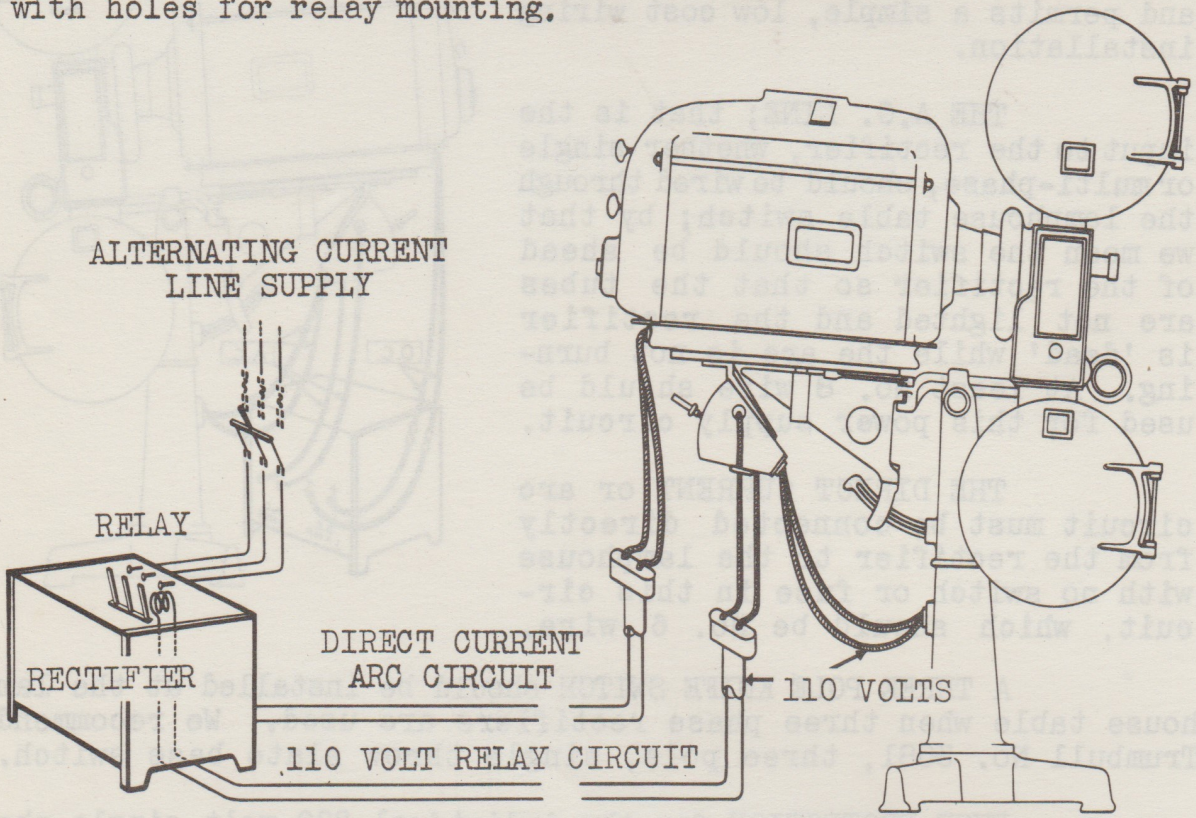
BALLAST RHEOSTATS may be used to cut down the output of a 70 or 80 volt generator or power from an 110 volt direct current central station service, which is connected through a double throw switch to supply only emergency direct current power.

OLD GENERATORS OR RECTIFIERS of 70 or 80 volts, such as have been used on the earlier type arcs, are not suitable as a regular power supply to the intermediate high intensity arc as regard consistant feeding of the carbons.

WHEN LOCAL CONDITIONS require that the rectifier be placed outside the projection room, it becomes necessary to connect a relay in the A.C. power circuit to the rectifier.

THE RELAY CIRCUIT to the rectifier is energized from any 115 volt, 60 cycle alternating current lighting circuit and connected through the lamphouse table switch with No. 14 wire.

RELAYS are factory installed, when so ordered, but at an addition to the rectifier price. However, all rectifiers are drilled with holes for relay mounting.



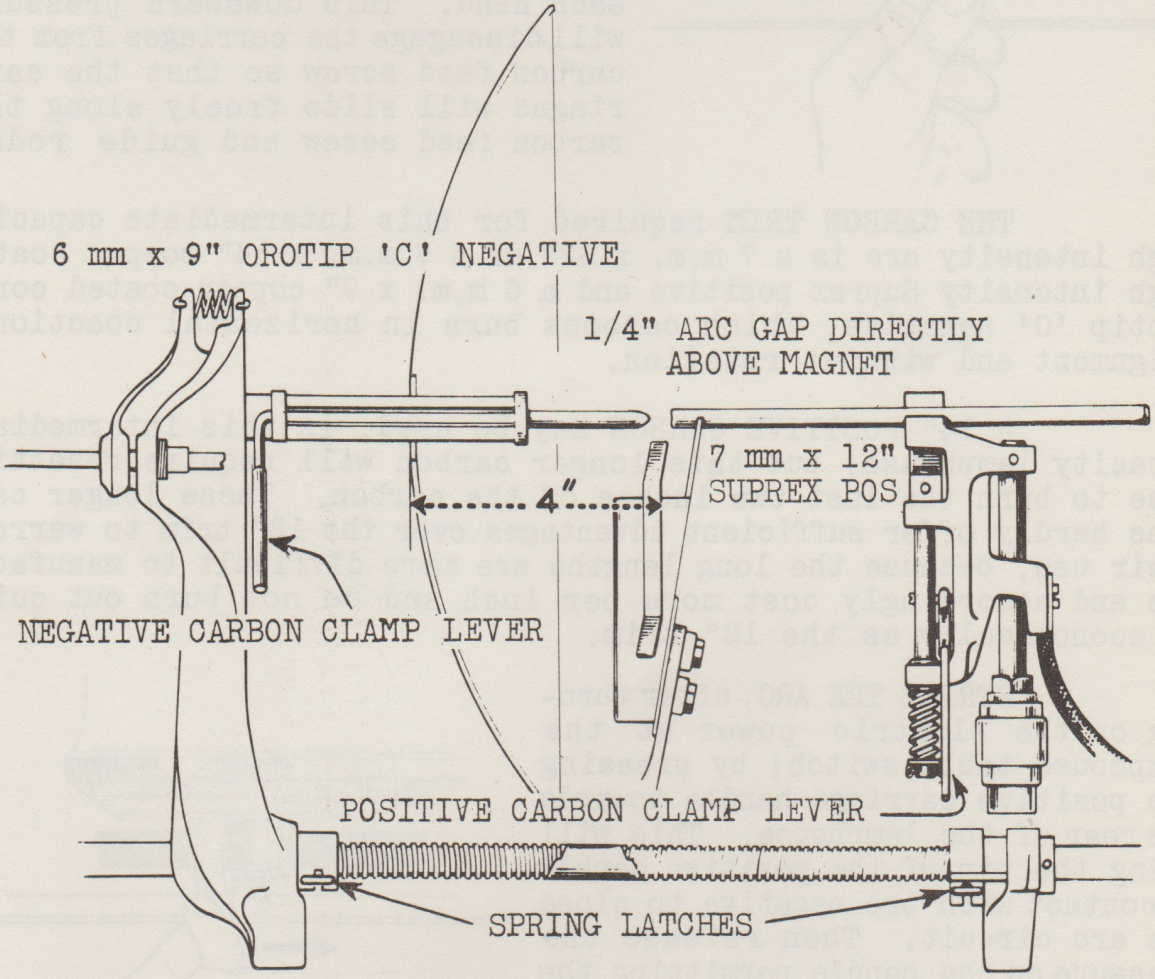
A 30 AMPERE FUSED KNIFE SWITCH should be connected to the alternating supply circuit just ahead of each rectifier so that all of the equipment will be dead when the switches are open.

ANY NEW GENERATOR which has been designed and built as a direct current power supply, expressly for this intermediate high intensity arc may be used, and should be connected according to the instructions accompanying that generator.

THE WIRING TO THE GENERATOR should be at least No. 8 and the direct current output from the generator to the lamphouse should be at least No. 6. The generator should not be more than fifty feet from the lamp unless a proportionately larger wire is used.

OPERATION

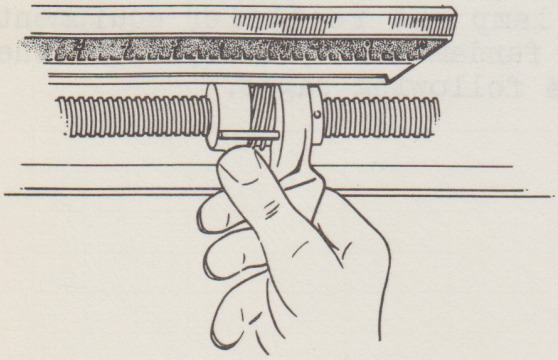
TO MASTER THE TECHNIQUE of high intensity projection requires a thorough knowledge of the lamp and rectifier equipment as well as full understanding of the fundamental principles of the high intensity arc as outlined in the following pages.



TO TRIM THE LAMP clamp the 7 m.m. carbon in the positive holder and the 6 m.m. in the negative holder. There should be a 1/4" gap between the positive and negative carbon tips and this gap should be directly above the tips of the supplemental magnets. This location of the carbons will assure approximate focus when the arc is first struck.

BEFORE TRIMMING the lamphouse separate the carbon carriages to the limit of their travel along the carbon feed screw and then set the focus adjustment to its mid position.

THE KNURLED FOCUS COLLAR, at the rear end of the lead screw, should be set at its mid position before trimming the lamp, to assure ample focus adjustment after the arc has been struck.

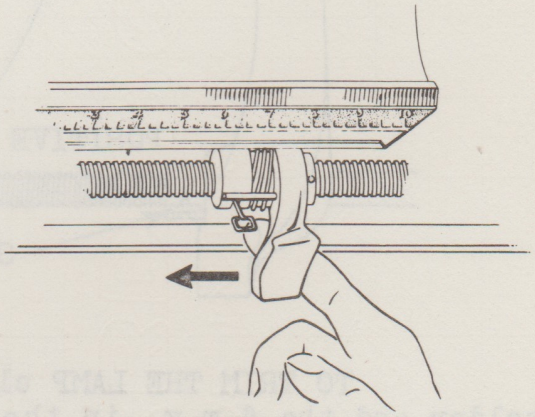


SEPARATE THE CARRIAGES that carry the carbons, to the full limit of their travel, by depressing their spring latches with the thumbs of each hand. This downward pressure will disengage the carriages from the carbon feed screw so that the carriages will slide freely along the carbon feed screw and guide rods.

THE CARBON TRIM required for this intermediate capacity high intensity arc is a 7 m.m. x 12" or a 7 m.m. x 14" copper coated high intensity Suprex positive and a 6 m.m. x 9" copper coated cored Orotip 'C' negative, which carbons burn in horizontal coactional alignment and without rotation.

A 14" POSITIVE CARBON may be used, in this intermediate capacity lamphouse, but this longer carbon will require resetting once to burn the last two inches of the carbon. These longer carbons hardly offer sufficient advantages over the 12" trim to warrant their use, because the long lengths are more difficult to manufacture and accordingly cost more per inch and do not burn out quite as economically as the 12" trim.

STRIKE THE ARC, after turning on the electric power at the lamphouse table switch; by pressing the positive carriage handle towards the rear of the lamphouse. This will bring the tip of the positive carbon in contact with the negative to close the arc circuit. Then release the pressure on the handle permitting the carbons to automatically separate to the proper distance, which establishes the arc.



THE ARC should be struck quickly to prevent damage to the arc crater and the possible blowing out of the positive carbon core which might deposit as black soot on the reflector.

AFTER THE ARC HAS BURNED two or three minutes or until the arc has settled down and the ammeter becomes steady, then manually adjust the arc gap length and arc focus so that the image of the carbon tips coincides with the lines on the arcescope screen. This will assure a proper arc gap length of 1/4".

TO MEASURE THE ARC GAP LENGTH, after the arc has been turned off, it is convenient to use, as a gauge, any 6 m.m. negative carbon, which is about 1/4" in diameter and accordingly should just barely squeeze between the positive and the negative carbon tips, when the arc gap length is 1/4".

THE PRELIMINARY ARC CURRENT SETTING to 40 or 41 amperes is by means of the direct current output adjustments on the rectifier or generator and this adjustment should be made when the arc gap length is exactly 1/4" and with the motor control rheostat set at its mid position, which is at points five or six. The arc focus adjustment should be set so the image of the burning carbon tips falls exactly on the lines of the arcescope screen.

THEN BURN THE ARC for twenty minutes without touching a single manual adjustment on either the lamp or rectifier and if at the end of this time the images of both burning carbon tips remain exactly on the arcescope lines, as originally set, the ammeter is still at 40 or 41 amperes and the arc gap has remained at 1/4", then this first arc adjustment has been correctly made.

THE CARBON BURNING RATE is a good indication of general arc behavior and arc amperage; because if the arc current is increased very much above 40 amperes, the burning rate of the positive carbon will increase, so that it will not be possible to project six Society standard double reels with a single positive carbon.

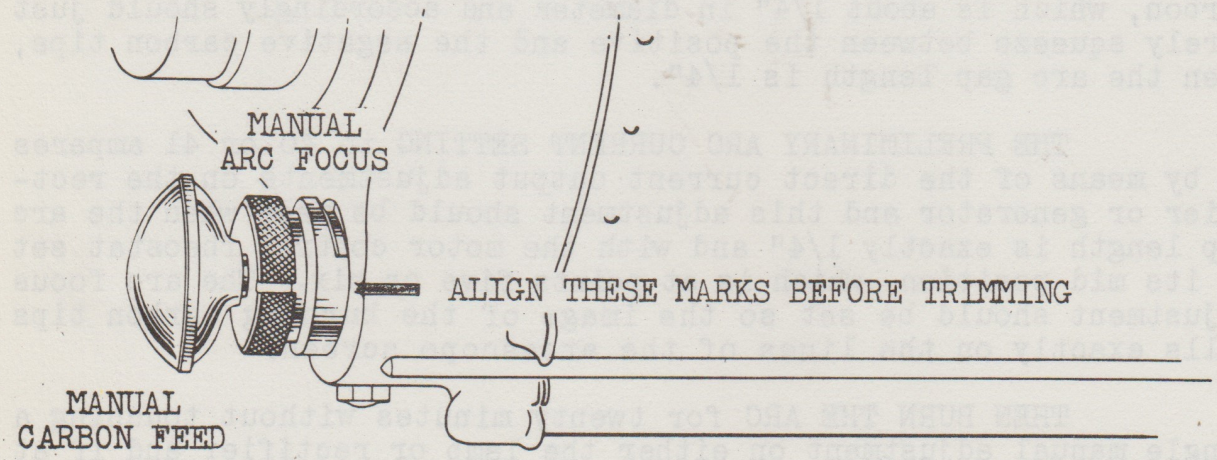
A SUPREX POSITIVE CARBON, 7 m.m. in diameter will consume at 6" per hour when burning at 40 to 41 amperes with 27 to 28 volts across the arc, which is when the arc gap length is set at 1/4". This burning rate of 1/10" per minute requires 2" for each Society new standard reel, which runs about twenty minutes.

ONE 12" POSITIVE CARBON will burn sufficiently long to project five S.M.P.E. new standard large reels of film and allow for the lighting up, or burning in period and still leave a carbon stub of slightly more than an inch.

THE OROTIP 'C' NEGATIVE which is 6 m.m. by 9" burns at the rate of 3 1/2" per hour or slightly less than 1 3/16" per reel. One 9" negative carbon will burn two hours and ten minutes, which is sufficient time to project six reels and leave a 1 1/2" stub.

THE CARBON BURNING SCALE on the lamphouse is a convenient means of checking the burning rates of the carbons and in estimating the burning time of the remaining carbon trim.

FOCUS THE ARC in relation to the reflector by rotating the knurled manual focus collar until a clear colorless field is secured on the projection screen.



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.

ALIGN THE WITNESS MARK on the knurled focus collar with the similar mark on the rear casting of the lamphouse. This will assure the mid setting of the focus adjustment before the lamp is trimmed with a new set of carbons.

THE MANUAL CARBON FEED is by means of the black moulded knob just back of the knurled focus collar. This knob is at the rear end of the carbon feed screw at the back and lower right hand side and outside the lamphouse.

THE ALIGNMENT OF THE POSITIVE CARBON requires no attention on the part of the projectionist, since the positive carbon steadyrest is factory adjusted and the positive carbon clamp is full floating to allow for any crookedness in the carbons.

THE ALIGNMENT OF THE NEGATIVE CARBON tip with the positive must be so that the face of the positive carbon burns perfectly square with the face of the reflector. Both vertical and horizontal alignment of the negative carbon are made by means of the round handles or knobs at the rear and outside the lamphouse.

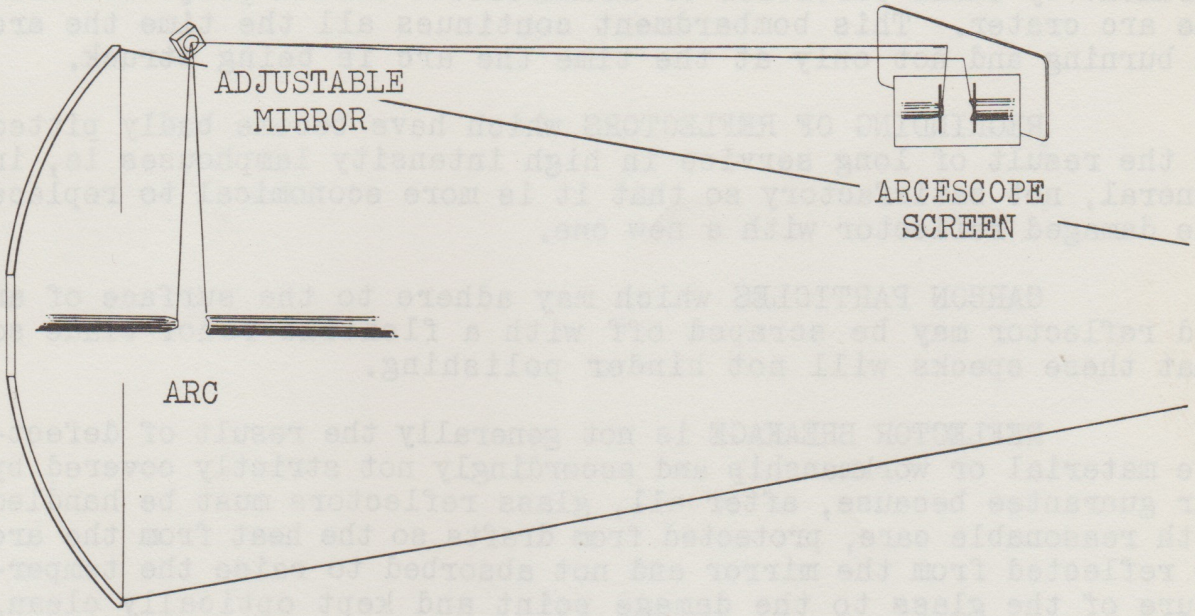
THE STEADYREST or positive carbon guide is manufactured from a special steel alloy, which has a low thermal expansion, is resistant to oxidization at high temperature and meets exacting magnetic requirements; accordingly it must not be replaced by a guide of any other make or of any different alloy.

THE HOPPER which receives the droppings from the arc is removable for cleaning but must not be left out entirely from under the arc, because it supports the supplemental magnets which are essential to the steady burning of the arc.

THE DAMPER in the stack of the lamphouse should be closed sufficiently to prevent excess drafts that might disturb the stable burning of the arc.

THE ARCESCOPE is an auxiliary optical system which projects an image of the burning carbon tips to a small screen atop the lamphouse, so the projectionist may at all times observe the behavior of the arc and make adjustments accordingly.

ADJUSTMENTS OF THE ARCESCOPE should be made only after the arc and reflector adjustments have resulted in a clear brilliant projected picture. Then the adjustable mirror should be tilted to bring the image of the burning carbon tips to the black witness lines on the ground glass arcescope screen.



EXACT ARC FOCUS and proper arc gap length are assured after the arcescope has once been set, by simply maintaining the images of the burning carbon tips at these arcescope lines.

THE ELLIPTICAL REFLECTOR, Part No. 4069, Specification 69, is 11 3/8" in diameter and has a geometric focus of 4" from the arc crater to the center of the reflector and a working distance of 30" from the center of the reflector to the film line. This dimension results in an optical speed of approximately 2.5 to match the speed of most of the modern projection lenses in use today and as required to project the most brilliant picture.

THE REFLECTOR ADJUSTMENTS for vertical and horizontal centering of the spot at the aperture are by means of the two control knobs at top and left; at the back and outside the lamphouse.

CLEANING THE REFLECTOR should become a habit which the projectionist follows religiously but cleaning does not mean simply wiping off the reflector occasionally; it means actually polishing the reflector every day with a soft cloth to maintain the bright optical surface of the glass.

THE WHITE SCUM if allowed to remain on the surface of the reflector soon burns itself into the surface of the glass, then it can only be scoured off by considerable polishing with Bon Ami used on a slightly moistened cloth.

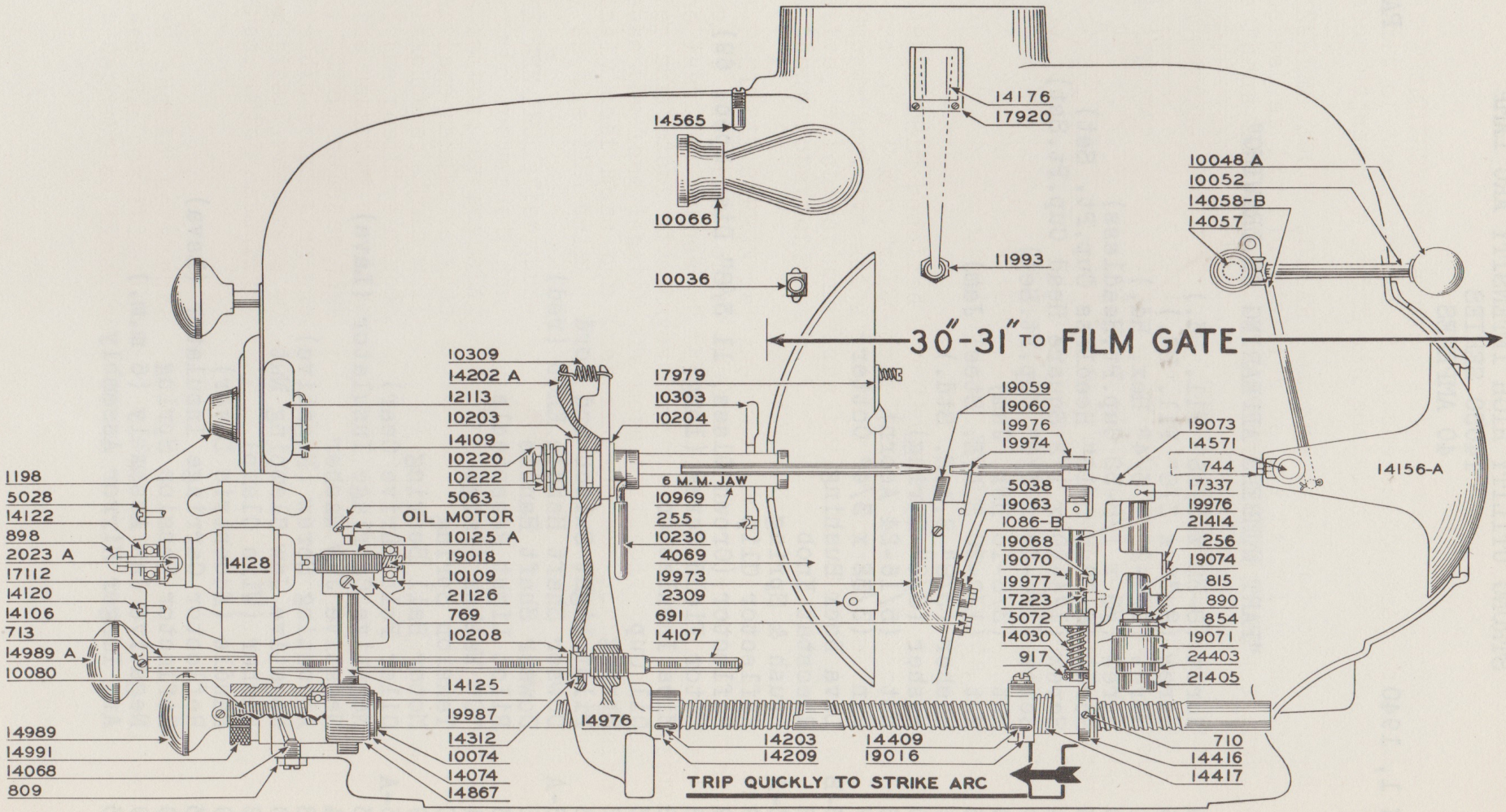
THE PITTING OF REFLECTORS is a difficulty encountered with all high intensity arcs and is the result of a continuous bombardment by small particles of incandescent carbon projected from the arc crater. This bombardment continues all the time the arc is burning and not only at the time the arc is being struck.

REGRINDING OF REFLECTORS which have become badly pitted as the result of long service in high intensity lamphouses is, in general, not satisfactory so that it is more economical to replace the damaged reflector with a new one.

CARBON PARTICLES which may adhere to the surface of an old reflector may be scraped off with a flexible razor blade so that these specks will not hinder polishing.

REFLECTOR BREAKAGE is not generally the result of defective material or workmanship and accordingly not strictly covered by our guarantee because, after all, glass reflectors must be handled with reasonable care, protected from drafts so the heat from the arc is reflected from the mirror and not absorbed to raise the temperature of the glass to the damage point and kept optically clean.

THE OPTICAL TEST of each reflector, before shipment from the factory, is permanently recorded by serial number, to assure compliance with our rigid optical specifications.



14050-1 2-27-40

STRONG UTILITY HIGH INTENSITY ARC LAMP
14050 SERIES
40 AMPERES

MARCH 1, 1940 PARTS LIST

"PART NUMBERS APPEARING ON DRAWING"

		PRICE
255	Screw (8-32 x 5/16" Fil. Hd.)	.05
256	Screw (8-32 x 3/8" Fil. Hd.)	.05
691	Screw (1/4-20 x 3/4" Hex. Hd.)	.10
710	Screw (#8 x 1/8-32 Cup.Pt.Headless)	.15
713	Screw (8-32 x 5/16" Headless Cup.Pt. Set)	.15
744	Screw (1/4-20 x 1/2 Square Head Cup.Pt.Set)	.15
769	Screw (1/4-28 x 3/8" Cup.Pt.Set)	.15
809	Nut (3/8-16 Hex. Jam)	.10
815	Nut (1/2-20 S.A.E. Steel Jam)	.05
854	Washer (3/8" S.A.E. Std.)	.05
890	Washer (3/8" Spring)	.05
898	Nut (5/16-24 Acorn)	.15
917	Pin (3/32 x 3/4" Cotter)	.05
1086-B	Lava Rock Bushing	.10
1198	Rheostat Knob	.40
2023-A	Brush & Spring	.25
2309	Reflector Clip	.10
4069	Reflector (Crown Glass, 11 3/8" Dia. Spec. 69)	18.50
5028	Motor Field Screw (long)	.20
5038	Mica Insulation	.25
5063	Oil Cup	.30
5072	Spring	.25
10036	Pilot Light Switch and Cord	2.00
10048-A	Dowser Shaft Handle Knob (red)	.30
10052	Dowser Shaft Handle	.35
10066	Pilot Light Receptacle	.30
10074	"D" Washer (large)	.10
10080	Tension Spring	.30
10109	Motor Ball Bearing	2.10
10125-A	Oiler Felt (Drive Gear)	.10
10203	Negative Carriage Insulator (Lava)	.50
10204	Negative Jaw Washer	.15
10208	Adjusting Screw (Negative)	.90
10220	Negative Jaw Clamping Nut	.10
10222	Washer (Wire Clamp)	.10
10230	Handle (Eccentric Lever)	.80
10303	Reflector Carriage Insulator (Lava)	1.25
10309	Reflector Tension Spring	.10
10969	Negative Jaw Assembly (6 m.m.)	5.00
11993	Arc Imager Mirror Assembly	1.50

		PRICE
12113	Control Rheostat (120 Ohm .91 Amp.)	5.00
14030	Washer (Positive Jaw & Door Rod Rollers)	.15
14057	Cross Shaft (Dowser)	1.20
14058-B	Dowser Link	.20
14068	Set Screw (Focus Adjusting)	.35
14074	Clutch Washer	.15
14106	Control Knob Sleeve (Long)	.30
14107	Carbon Adjusting Rod (Lower)	.55
14109	Contact Shoe (Control Rheostat)	1.00
14120	Motor Field Screw (Short)	.20
14122	Shim (Fibre - Thick)	.05
14125	Drive Shaft (36 P.)	1.25
14128	Armature	15.00
14156-A	Dowser	5.00
14176	Arc Imager Card	.05
14202-A	Negative Spider	3.00
14203	Driving Wire (Negative Carriage)	.15
14209	Negative Carriage Bushing (6)	1.00
14312	Washer (Reflector Adjusting Screw)(White Fibre)	.10
14409	Driving Wire (Positive Carriage)	.20
14416	Nut (Arc Striker)	.30
14417	Spring (Arc Striker)	.15
14565	Steadying Pin (Reflector)	.20
14867	Lead Screw Gear	2.50
14976	Negative Carriage Unit Assembly	20.00
14989	Control Knob (Black)	.45
14989-A	Control Knob (Red)	.50
14991	Focus Adjusting Screw Assembly	5.00
17112	Motor Brush Holder Cap	.25
17223	Stop Pin	.15
17337	Set Screw	.15
17920	Arc Imager Frame	1.00
17979	Release Trigger Assembly (Reflector)	1.50
19016	Arc Striker Bushing (3 1/2)	2.20
19018	Armature Worm (42 P.)	2.00
19059	Supplemental Magnet - left) Sold in pairs only	
19060	Supplemental Magnet - right) per pair	.40
19063	Positive Steadyrest Bracket	3.50
19068	Positive Jaw Cam Roller	.25
19070	Positive Roller Screw	.20
19071	Positive Carriage	4.50
19073	Positive Jaw Casting (See #19978 for complete jaw)	4.00
19074	Positive Jaw Post	1.10
19973	Ash Receiver and Magnet Assembly	1.35
19974	Positive Steadyrest	1.75
19976	Positive Jaw Clamp Assembly	2.25
19977	Positive Jaw Cam Assembly	1.10

		PRICE
19978	Complete Positive Carbon Jaw Assembly	13.00
19987	Lead Screw and Stud Assembly (6-3 1/2)	8.00
21126	Worm Gear (Bakelite 42 P.)	3.00
21405	Positive Upright Insulator	.45
21414	Positive Jaw Wire Clamp	.30
24403	Insulating Bushing (Large)	.25

"PART NUMBERS NOT APPEARING ON DRAWING"

1195	Wire Clamp	.10
1254	Wire Lug	.05
2003-B	Porcelain Bushing	.20
2019	Wire Lug	.05
2621	Pilot Wire Clip	.10
2621-A	Clip (Reflector Frame)	.10
10047	Dowser Shaft Handle Hub	1.25
10075	"D" Washer (Small)	.10
10105	Dowel Pin	.15
10120	Motor Field Core	2.25
10127	Welsh Plug (Motor Housing)	.10
10145	Screw (1/4-20 x 5/16 Special)(Arc Striker)	.15
10206	Adjusting Screw (Reflector)	.90
10306	Reflector Steadying Spring	.15
11041	Window Glass	.35
11119	Wire Clip (Motor Housing)	.15
11302	Pilot Switch Lock Ring	.05
12031	Glass Retaining Clip (Door Window)	.60
14015-A	Pilot Light Bracket	.40
14029	Screw (Door Latch)(Retaining)	.15
14034	Door Hinge Rod	.80
14037-A	Shield Bell Crank	.75
14042	"D" Washer (Friction - Dowser)	.15
14046-E	Carbon Burn Scale	1.00
14059	Base Pan	3.80
14064	Support Rod (Ash Pan)	.30
14066-A	Guide Rod	1.55
14067-A	Slide Rod	1.65
14077-A	Base Pan Light Shield	.50
14105	Control Knob Sleeve (Short)	.25
14108-A	Negative Adjusting Rod (Upper)	.45
14114	Rheostat Plate	.50
14116-A	Ammeter (Triplett - Model 301 - Gray)	12.00
14117	Shunt (Ammeter)	5.00
14119	Wire Clip (#8 M.P.Cable)	.15
14121	Shim (Fibre - Thin - Doors)	.05

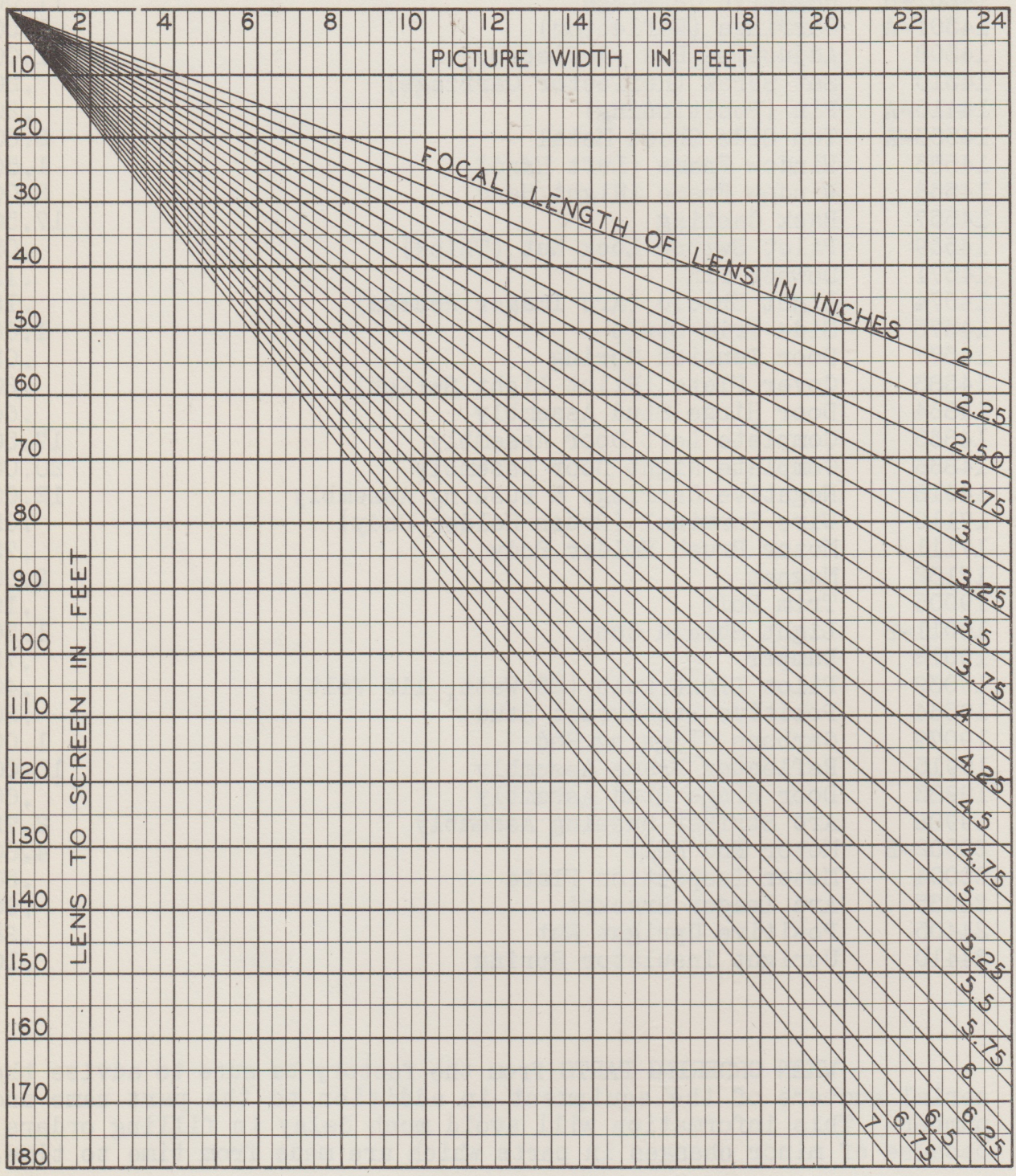
		PRICE
14151	Front Casting	20.00
14152	Top Casting	15.00
14155	Pilot Wire Attachment Plug Cap	.20
14161	Name Plate (High Utility #14050)	1.75
14201-B	Negative Carriage	11.00
14301-A	Carriage (Reflector)	8.50
14308	Adjusting Rod (Reflector)	1.00
14310	Set Screw (Reflector Carriage)	.20
14415-A	Pin (Positioning)	.20
14553-A	Top Side Sheet Metal	2.00
14555	Window Frame (Left Hand)	1.50
14556	Window Frame (Right Hand)	2.00
14557	Back Casting	17.50
14569	Pilot Switch Lock Nut (Thick)	.05
14571	Dowser Pin	.15
14574	Light Shield (Arc Imager Recess)	.15
14575	Side Trim Strip	1.00
14577	Door Tension Spring	.05
14583	Cover Plate (Pilot Light Switch)	.20
14864	Door Hinge Stud Assembly	.60
14865	Complete Left Door Assembly	17.50
14866	Complete Right Door Assembly	20.00
14918	Negative Carriage & Bushing Assembly	12.00
17110	Wire Terminal (Brush Holder Body)	.05
17111	Motor Brush Holder Body	.75
17132	Magnet	2.00
19005	Trim Bolt	.10
19011-B	Light Shield Cone	1.50
19012	Damper	.75
19039	Pilot Light Bulb (25 Watt, 115 Volt)	.40
19064	Positive Steadyrest Stud	.20
19079	Carbons Aligning Rod	1.00
19915	Reflector Frame Assembly	10.00
19983	Door Hinge Stud Assembly	.60
19988	Arc Striker Bushing Assembly	2.75
20002-B	Motor End Bell	4.80
20004	Motor Inspection Plate	.50
24035	Arc Imager Bracket	.90
24405	Positive Upright Nut	.25
24410	Upright Insulator Spring	.10

WHEN ORDERING PARTS from the factory be sure to advise the serial numbers of the equipment in addition to the part name and number. This information will avoid much delay in filling orders, because of minor changes in parts which are made from time to time.

PROJECTION TABLE

4-1-39

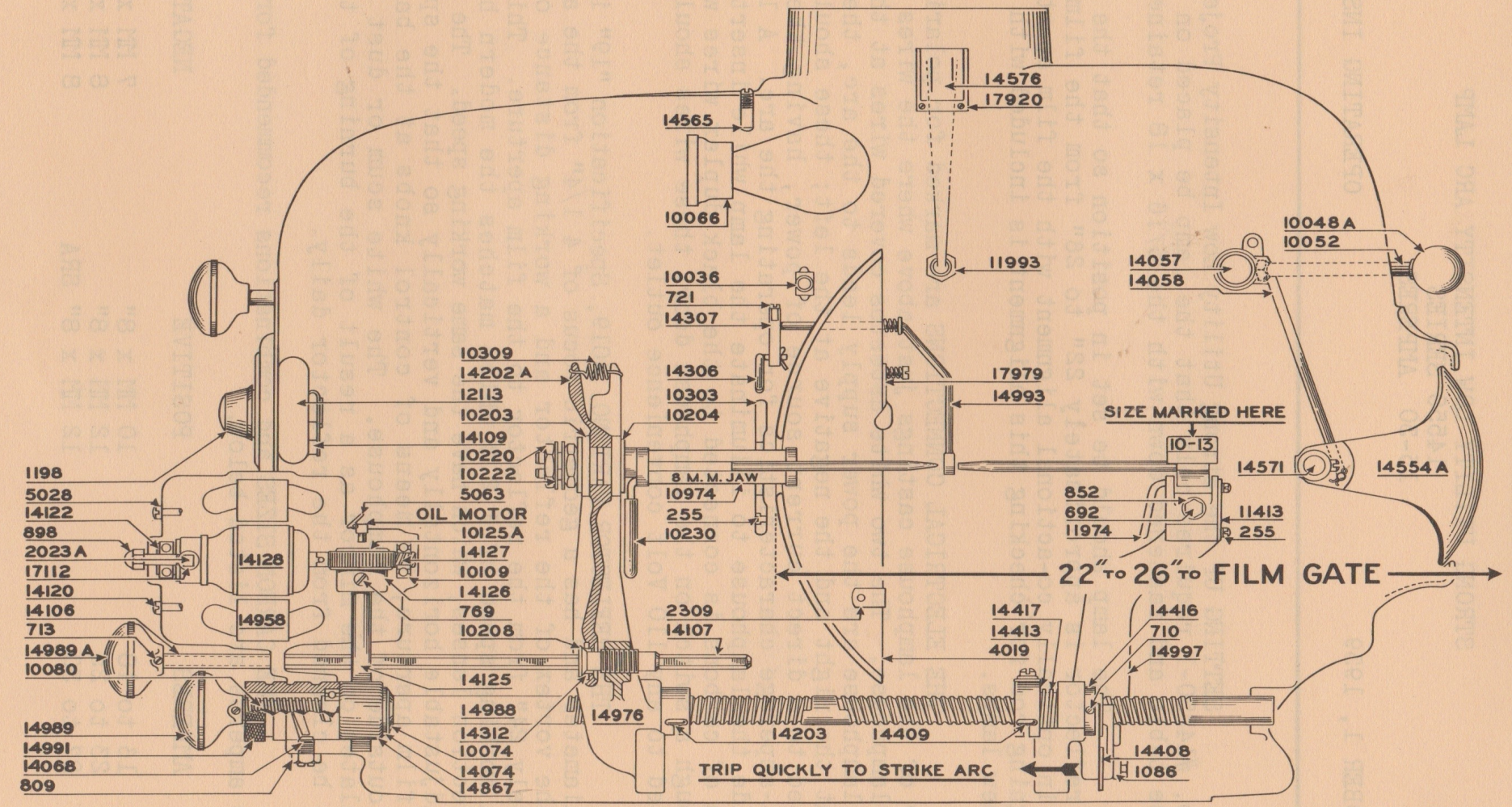
.825 X .600 APERTURE



Strong products are regularly inspected and tested at the Underwriters' Laboratories and each listed product bears an Underwriters' re-examination service marker, an indication of compliance with all of their requirements.

UTILITY 15-30 AMPERE
LOW INTENSITY PROJECTION ARC LAMP
SERIES 14550

DRAWING P. 14550



STRONG UTILITY LOW INTENSITY ARC LAMP
14550 SERIES
15-30 AMPERES

OCTOBER 1, 1939 — OPERATING INSTRUCTIONS

SETTING UP the Strong Utility Low Intensity Projection Arc Lamp, #14550-1 requires only that the lamp be placed on the lamphouse table and fastened down with the 5/16 x 18 retainer screws.

The lamp should be set in position so that the center of the reflector is approximately 22" to 26" from the film aperture and in optically co-actional alignment with the film aperture. One aligning rod for checking this alignment is included with each pair of new lamps.

THE ELECTRICAL CONNECTIONS are marked for polarity on the rear of the lamphouse castings just above where the wires lead from the lamphouse. The two white asbestos covered wires at the rear of the lamphouse are the power supply leads to the arc, the positive is at the right and the negative at the left; these should be connected to a direct current source of power, having the suitable volt-amperage characteristics for operating the arc. A light bulb inside the lamphouse to illuminate the lamp while inserting a new trim of carbons is connected to the black duplex wires which feed through a switch on the lamphouse door, these wires should be connected to any 110 Volt convenience outlet.

THE REFLECTOR PART NO. 4019, Specification "19" is 11 3/8" in diameter and has a geometric focus of 4 1/4" from the arc crater to the vortex of the reflector and a working distance of approximately 24" from the reflector to the film aperture. This results in a working speed of F 2.2 which matches the modern high speed projection lenses, which have the same working speed. The reflector is adjustable horizontally and vertically so that the spot covers the film aperture, by means of control knobs at the back and on the outside of the lamphouse. The white scum or dust which accumulates on the mirror as a result of the burning of the carbon must be cleaned from the reflector daily.

THE CARBON SIZES and combinations recommended for the various amperes are listed below.

AMPERES	POSITIVE	NEGATIVE
16 to 18	10 MM x 8"	7 MM x 8"
23 to 25	12 MM x 8"	8 MM x 8"
27 to 30	12 MM x 8" SRA	8 MM x 8" SRA