Film-Tech

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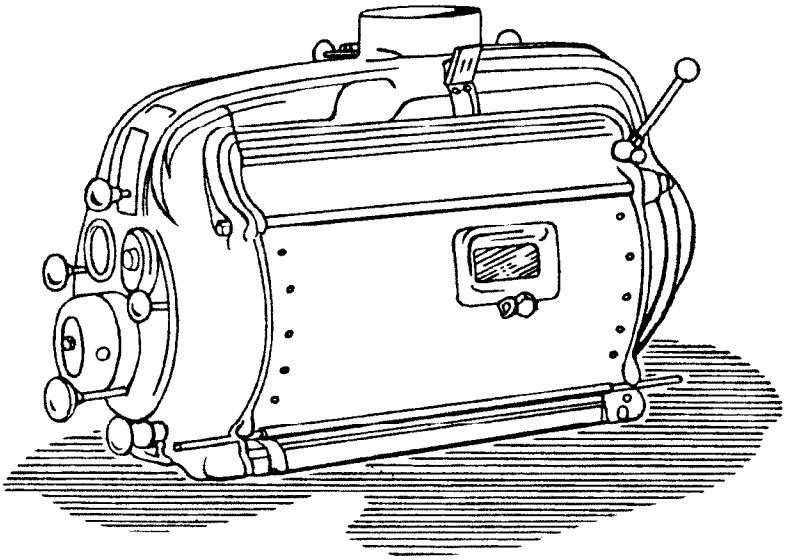
www.film-tech.com

THE STRONG "UTILITY"
PROJECTION ARC LAMP



THE STRONG ELECTRIC CORP.
67 CITY PARK AVE., TOLEDO, OHIO 43697
P.O. Box 1003
(419) 248-3741

PREFACE

THIS STRONG "UTILITY" is a reflector type direct current high intensity projection arc lamp for use on a 35 m.m. projector.

THE ELECTRICAL CAPACITY of this arc lamp is automatically limited to burn between 40 and 43 amperes at 28 to 29 D.C. volts.

THE CARBONS REQUIRED are a 7 m.m. by 14" high intensity cored and copper coated Suprex positive projector carbon with a 6 m.m. by 9" cored and copper coated Orotip "C" negative carbon.

THE DIRECT CURRENT POWER to each lamp must be supplied by separate, single arc 30 volt rectifiers or generators directly connected to each lamp, with no resistor in either arc circuit.

ERRATIC FEEDING OF THE CARBONS with color changes at the screen, may result if the arcs are supplied from a 115 volt D.C. power line or if both lamps are connected to the same generator.

THE SPEED OF THE CONTROL MOTOR is automatically adjusted to maintain a constant D.C. arc current of from 40 to 43 amperes.

THE ARC GAP LENGTH must be exactly 1/4" and to increase the arc distance simply raise the voltage at the rectifiers or at the generator. To shorten the arc gap, turn the rectifier down.

THE MOTOR RHEOSTAT on the back of the lamp controls only the drift of the arc towards or away from the reflector, but this control rheostat is not used to adjust the length of the arc gap.

THE ELLIPTICAL REFLECTOR is 11 3/8 inches in diameter and should be set 4" from the arc and 30" from the film aperture.

THE PROJECTED LIGHT is 4700 lumens as measured with the shutter not running. This is sufficient for moderate size theatres which require about 20 foot candles at a screen 18 feet in width.

IF AT ANY TIME you have a suggestion, or desire aid in securing anticipated results, please feel free to write directly to the personal attention of

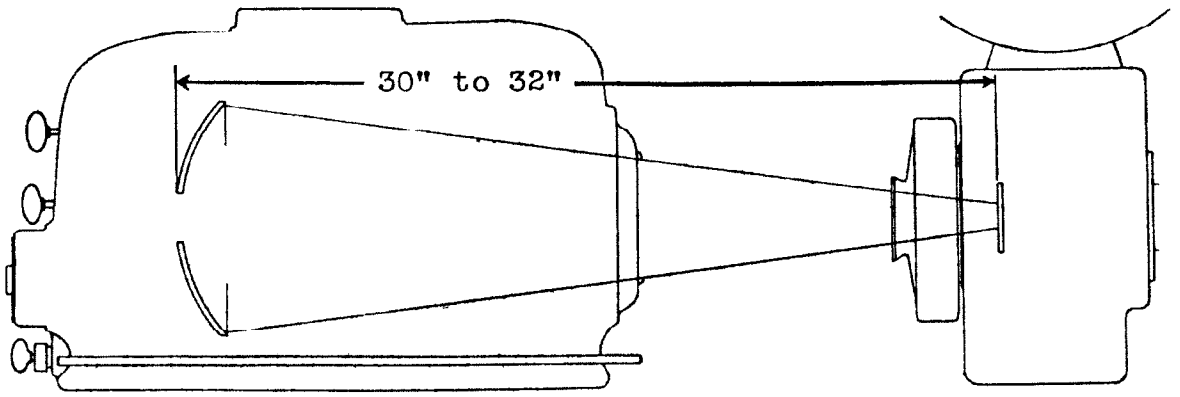
Harry H. Strong

SETTING UP

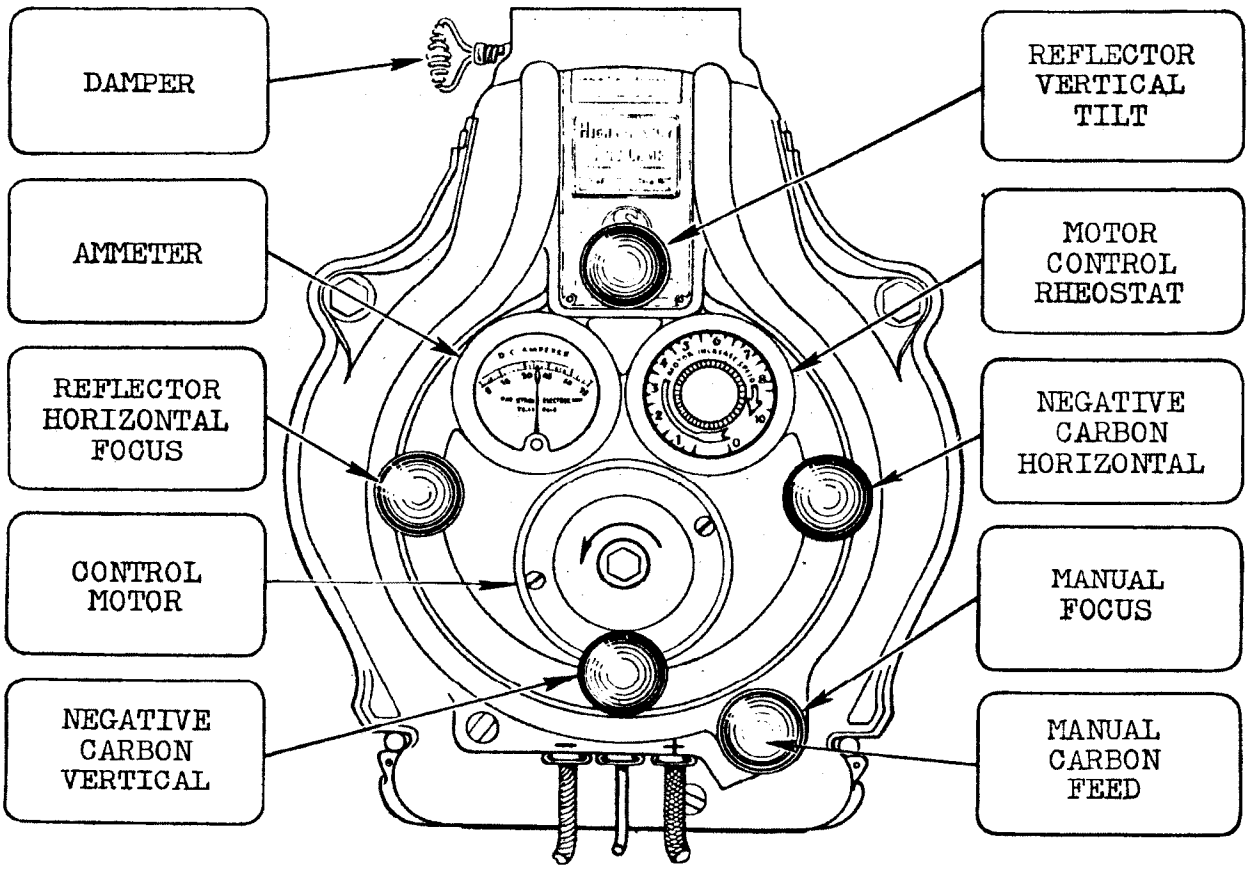
THIS INTERMEDIATE HIGH INTENSITY projection arc and associated electric power conversion equipment has been designed for use on any standard 35 m.m. projector. It operates at 40 amperes with 27 volts across the arc, using a regular 7 m.m. x 12" or 7 m.m. x 14" copper coated high intensity Suprex positive carbon and the new National 6 m.m. x 9" Orotip "C" copper coated negative carbon.

SETTING UP this projection arc lamphouse requires only that the lamp be placed on the lamphouse table and fastened down with 5/16" x 18 retainer screws that are furnished with the lamp. Since the lamphouse overhangs the lamphouse table it is essential that bolts be screwed in the lamphouse front mounting holes to prevent the lamphouse from pointing upward.

THE POSITION OF THE LAMPHOUSE should be such that the center of the reflector is not less than 29" or more than 32" from the film aperture; bearing in mind that the 29" distance results in most light concentration at the center of the screen with a tendency to a fall off or discoloration at the corners. As this distance is increased to 32" the light distribution to the corners will be improved at the expense of center brilliancy. At some definite point, which is approximately 30" from the film aperture, a compromise will be found that affords most ideal screen illumination.



THE OPTICAL ALIGNMENT of the lamphouse with the film aperture should be checked by inserting the aligning rod into the fully separated carbon holders. A rod is supplied with the lamps.



THE ELECTRICAL CONNECTIONS are marked for polarity above where the heavy asbestos arc supply wires lead through the rear lamphouse casting. The positive + arc supply wire is at the right and this wire has a red wire lug. The negative — is at the left.

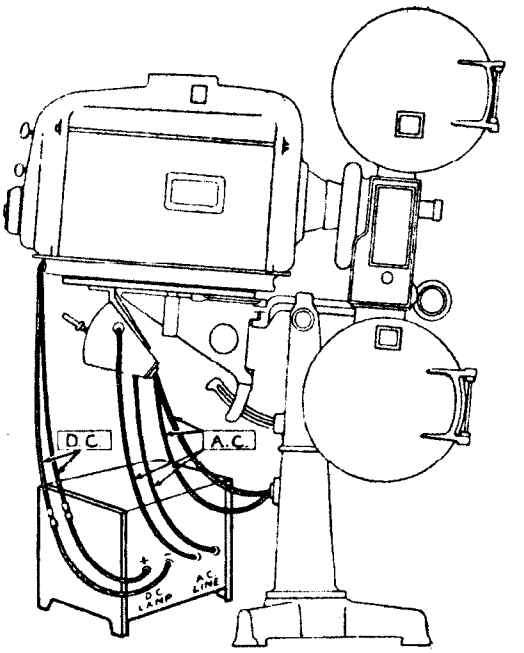
NO SEPARATE CONNECTORS are required for the arc feeding system as this motor is connected permanently to the arc circuit inside the lamphouse, and this lamphouse comes completely factory wired and tested ready to burn.

THE TRIMMING LIGHT inside the lamphouse is automatically lighted when the lamphouse door is opened. Current for this 25 watt bulb is supplied by plugging the black duplex cord, leading from the rear of the lamphouse, into any 115 volt convenience outlet.

FLEXIBLE CONDUIT CONNECTIONS to the pilot light circuit in the lamphouse are made by replacing the porcelain bushing with a 1/2" BX connector which may be screwed directly into this same threaded hole in the rear casting of the lamphouse.

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.

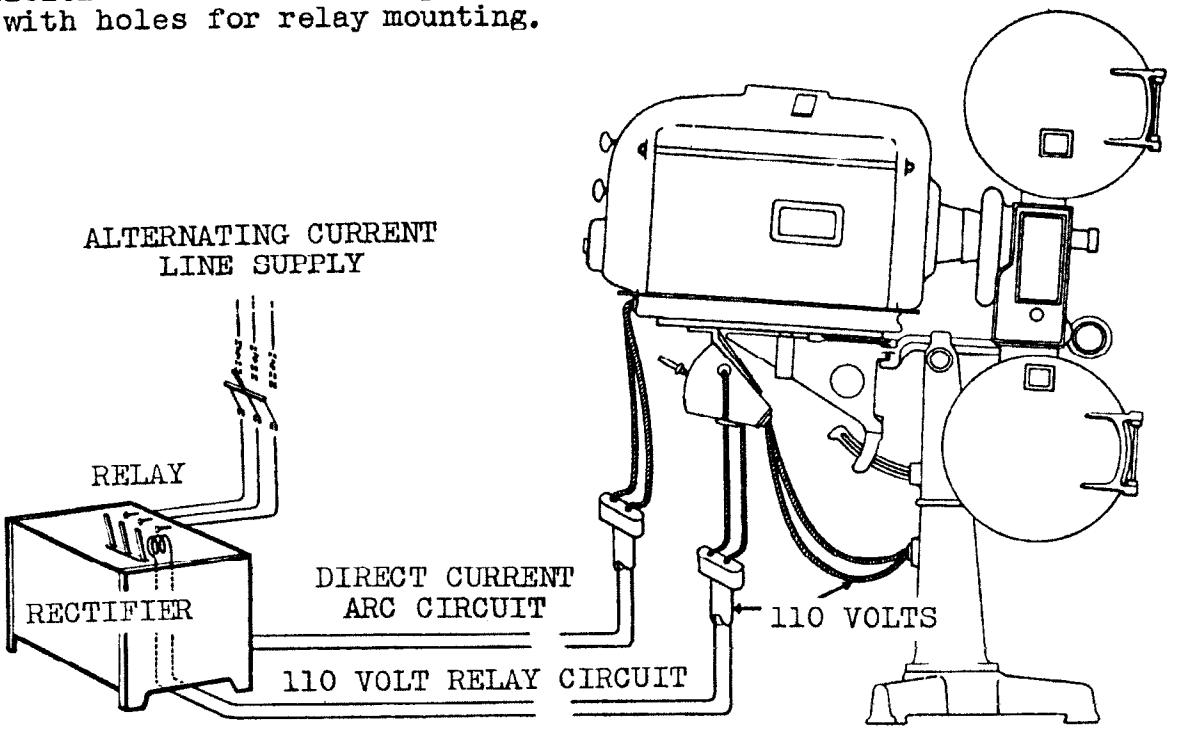
BALLAST RHEOSTATS may be used to cut down the output of a 70 or 80 volt generator or power from an 110 volt direct current central station service, which is connected through a double throw switch to supply only emergency direct current power.

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.



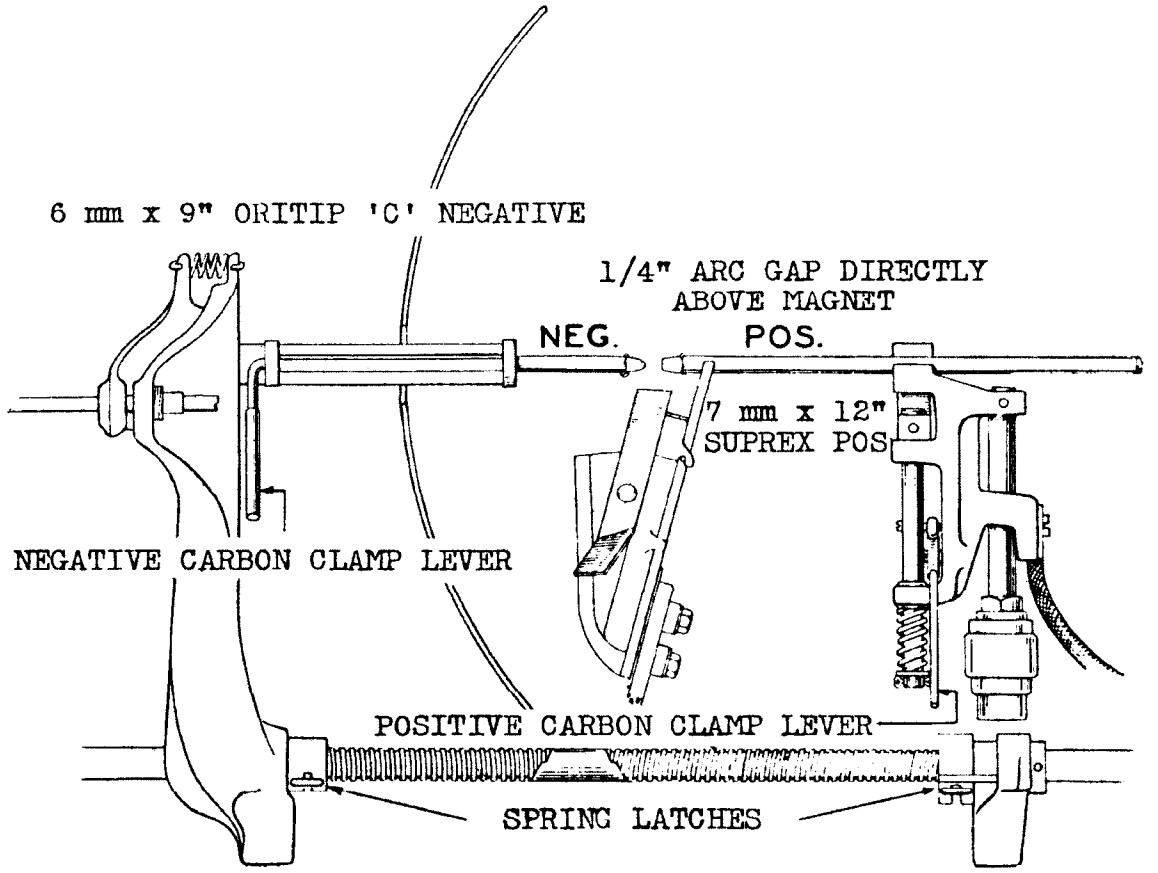
A 30 AMPERE FUSED KNIFE SWITCH should be connected to the alternating supply circuit just ahead of each rectifier so that all of the equipment will be dead when the switches are open.

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

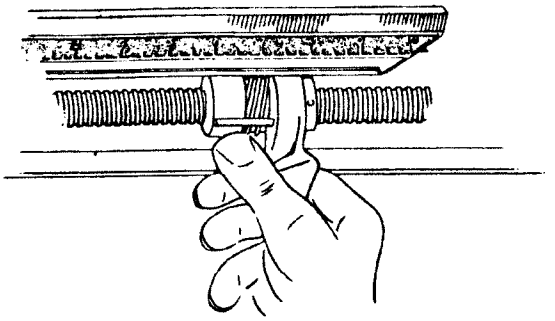
TO MASTER THE TECHNIQUE of high intensity projection requires a thorough knowledge of the lamp and rectifier equipment as well as full understanding of the fundamental principles of the high intensity arc as outlined in the following pages.



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.

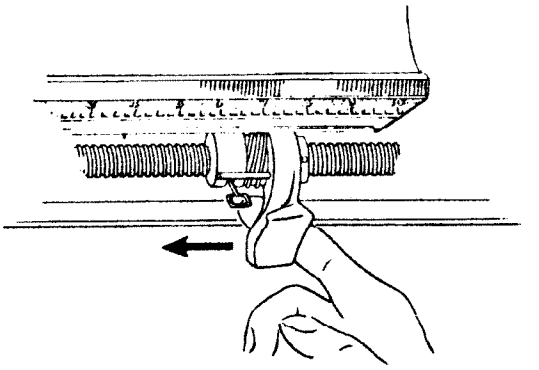


SEPARATE THE CARRIAGES that carry the carbons, to the full limit of their travel, by depressing their spring latches with the thumbs of each hand. This downward pressure will disengage the carriages from the carbon feed screw so that the carriages will slide freely along the carbon feed screw and guide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

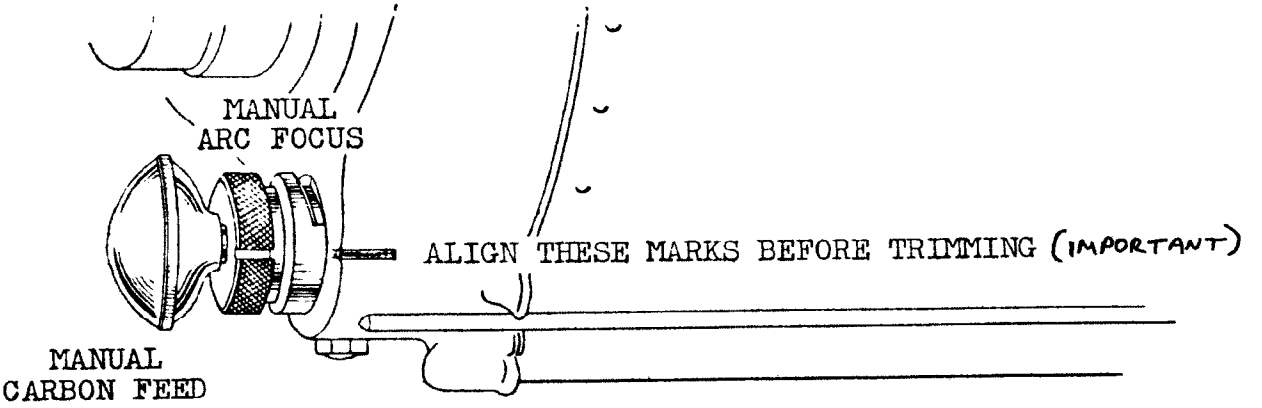
A SUPREX POSITIVE CARBON, 7 m.m. in diameter will consume at 6" per hour when burning at 40 to 41 amperes with 27 to 28 volts across the arc, which is when the arc gap length is set at 1/4". This burning rate of 1/10" per minute requires 2" for each Society new standard reel, which runs about twenty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

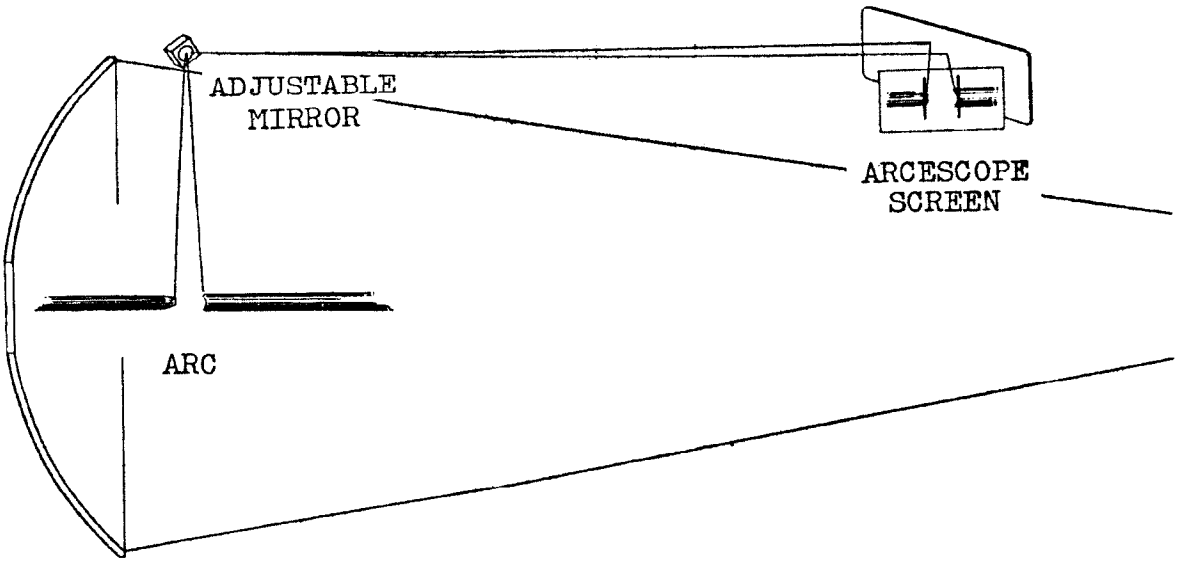
THE STEADYREST or positive carbon guide is manufactured from a special steel alloy, which has a low thermal expansion, is resistant to oxidization at high temperature and meets exacting magnetic requirements; accordingly it must not be replaced by a guide of any other make or of any different alloy.

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.

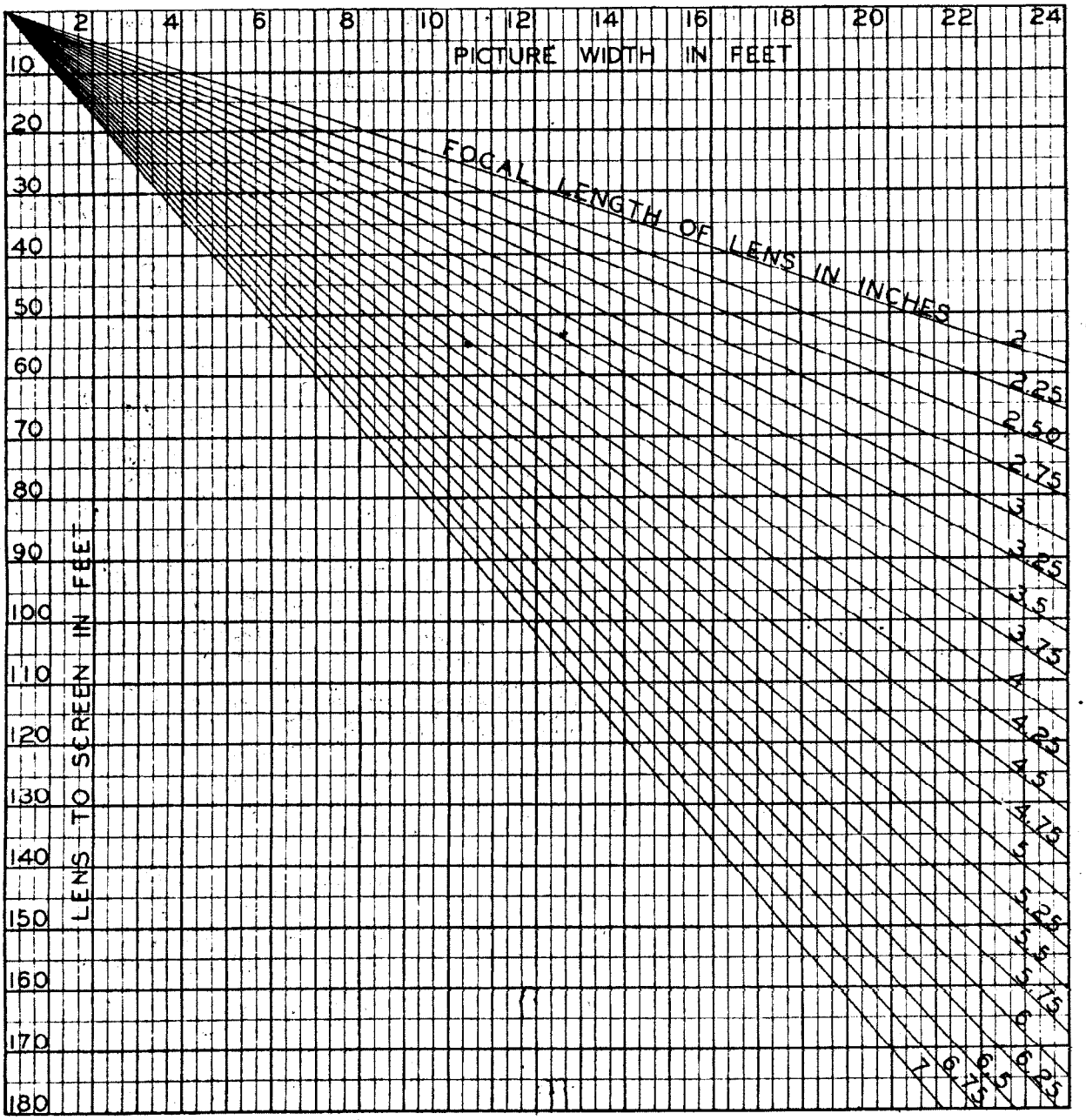
THE OPTICAL TEST of each reflector, before shipment from the factory, is permanently recorded by serial number, to assure compliance with our rigid optical specifications.

DECIMALS OF AN INCH
FOR EACH 64 TH
WITH MILLIMETER EQUIVALENTS

Fraction	1/64ths	Decimal	Millimeters
	1	.015625	0.397
1/32	2	.03125	0.794
	3	.046875	1.191
1/16	4	.0625	1.588
	5	.078125	1.984
3/32	6	.09375	2.381
	7	.109375	2.778
1/8	8	.125	3.175
	9	.140625	3.572
5/32	10	.15625	3.969
	11	.171875	4.366
3/16	12	.1875	4.763
	13	.203125	5.159
7/32	14	.21875	5.556
	15	.234375	5.953
1/4	16	.250	6.350
	17	.265625	6.747
9/32	18	.28125	7.144
	19	.296875	7.541
5/16	20	.3125	7.938
	21	.328125	8.334
11/32	22	.34375	8.731
	23	.359375	9.128
3/8	24	.375	9.525
	25	.390625	9.922
13/32	26	.40625	10.319
	27	.421875	10.716
7/16	28	.4375	11.113
	29	.453125	11.509
15/32	30	.46875	11.906
	31	.484375	12.303
1/2	32	.500	12.700

Fraction	1/64ths	Decimal	Millimeters
	33	.515625	13.097
17/32	34	.53125	13.494
	35	.546875	13.891
9/16	36	.5625	14.288
	37	.578125	14.684
19/32	38	.59375	15.081
	39	.609375	15.478
5/8	40	.625	15.875
	41	.640625	16.272
21/32	42	.65625	16.669
	43	.671875	17.066
11/16	44	.6875	17.463
	45	.703125	17.859
23/32	46	.71875	18.256
	47	.734375	18.653
3/4	48	.750	19.050
	49	.765625	19.447
25/32	50	.78125	19.844
	51	.796875	20.241
13/16	52	.8125	20.638
	53	.828125	21.034
27/32	54	.84375	21.431
	55	.859375	21.828
7/8	56	.875	22.225
	57	.890625	22.622
29/32	58	.90625	23.019
	59	.921875	23.416
15/16	60	.9375	23.813
	61	.953125	24.209
31/32	62	.96875	24.606
	63	.984375	25.003
1	64	1.000	25.400

PROJECTION TABLE
FOR .825 X .600 APERTURE



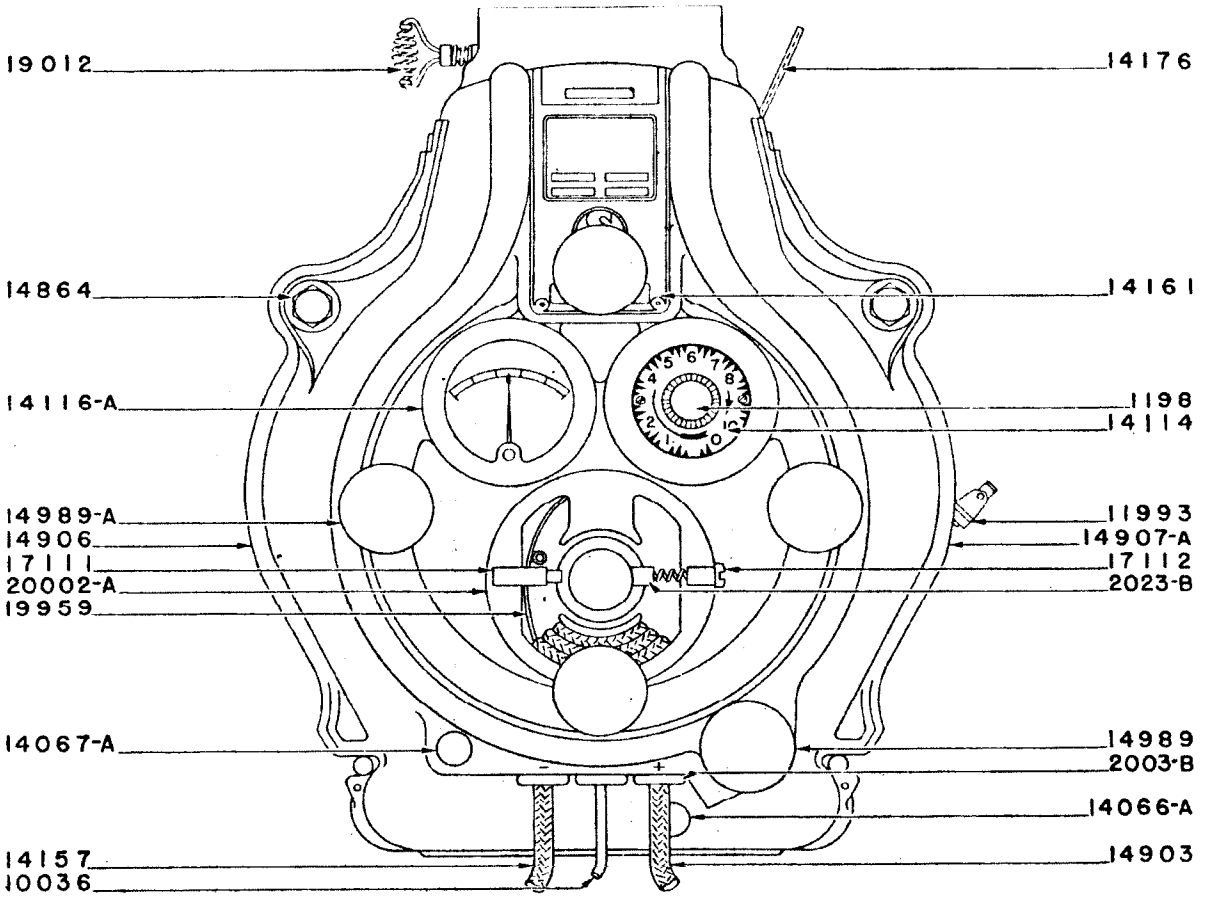
PARTS LIST

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.

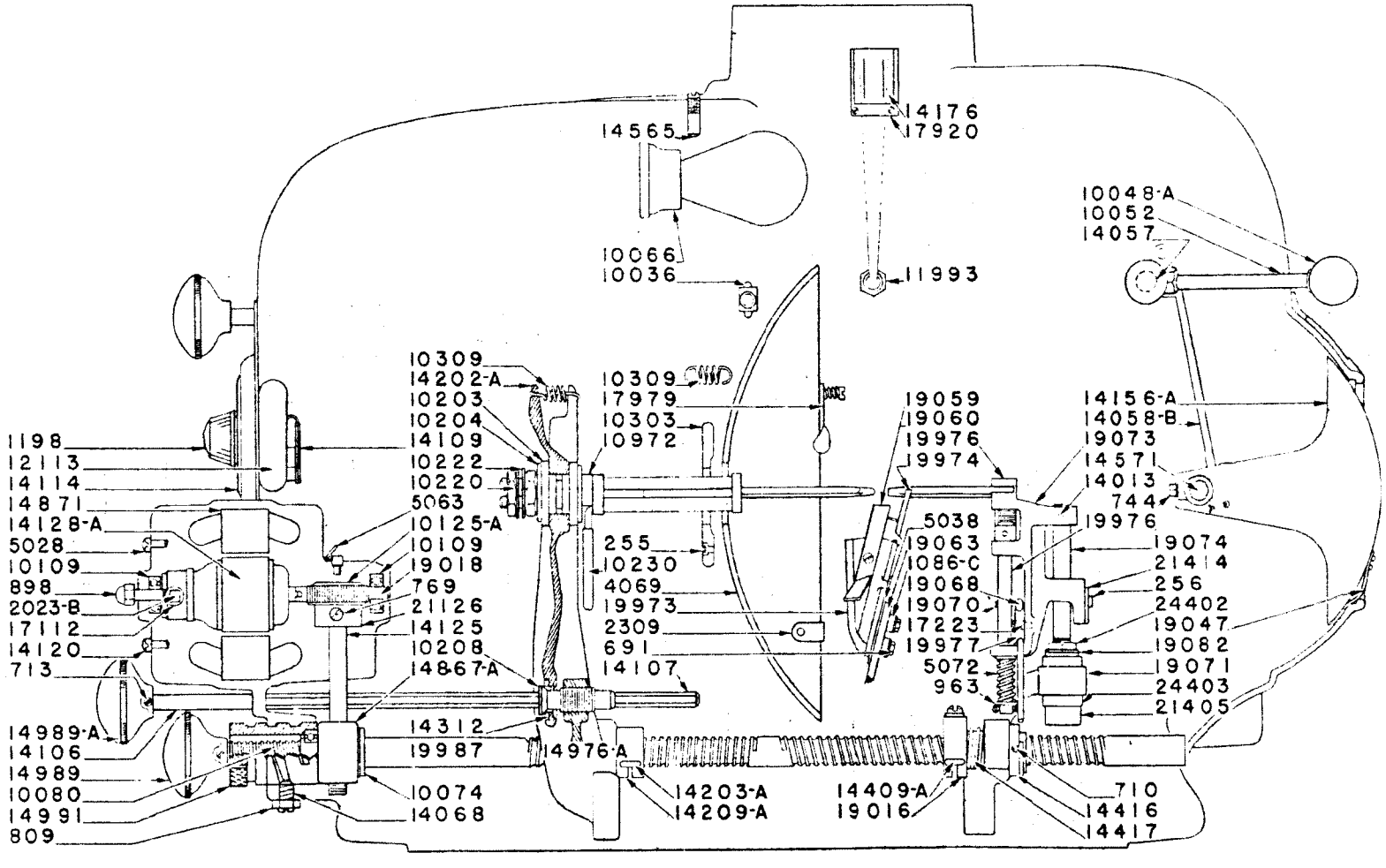
There will be a minimum charge of one dollar on any one invoice and a service charge sufficient to cover the cost of handling on all merchandise returned to us for credit.

STRONG UTILITY
PROJECTION ARC LAMP



THE STRONG ELECTRIC CORP.
Toledo, Ohio

STRONG UTILITY
PROJECTION ARC LAMP



THE STRONG ELECTRIC CORP.
Toledo, Ohio

PLATE 330

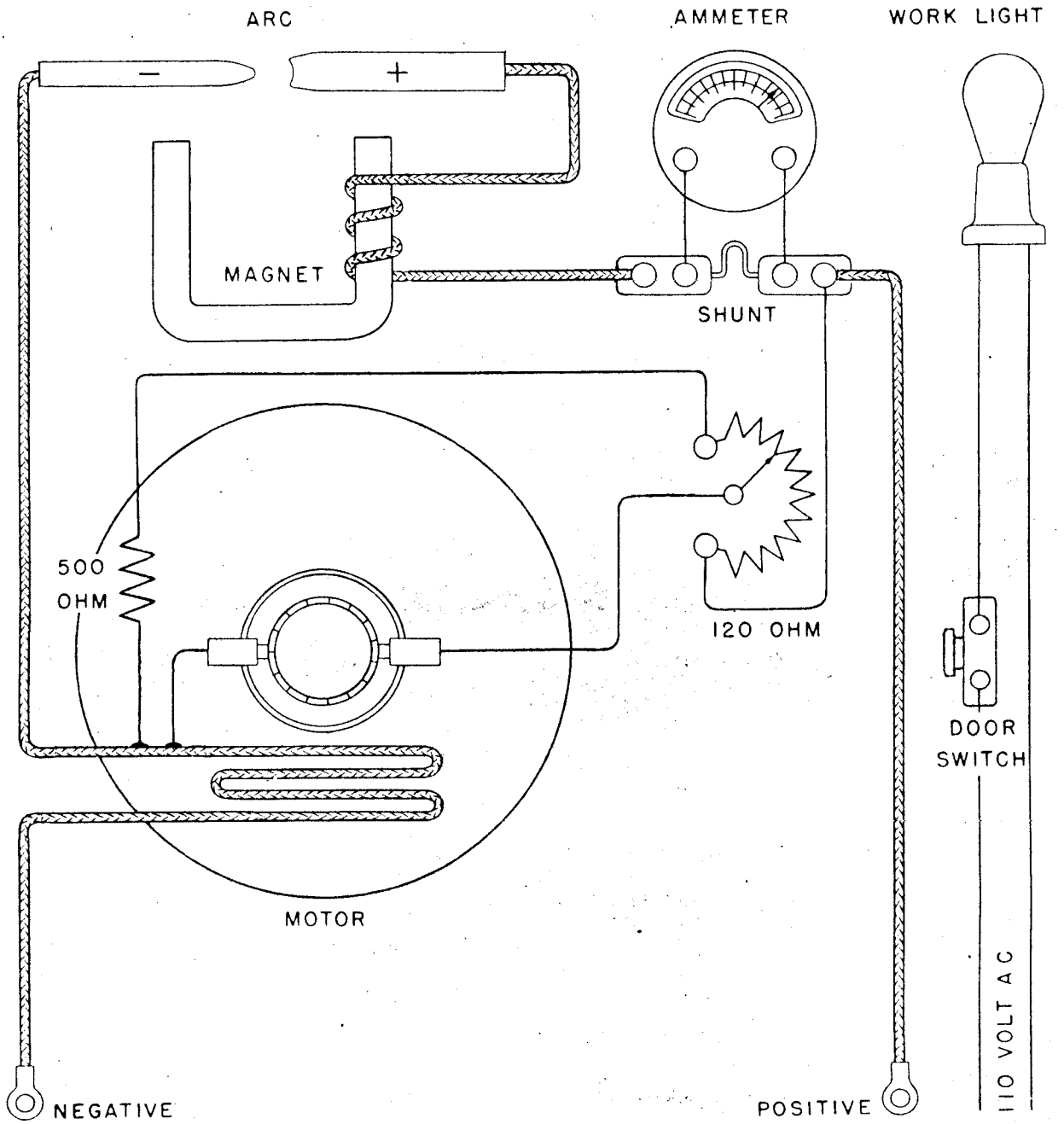
178	Screw (6-32 x 3/16" Fil. Hd.)	.05
181	Screw (6-32 x 3/8" Fil. Hd.)	.05
239	Screw (8-32 x 1/2" Flat Hd.)	.05
253	Screw (8-32 x 3/16" Fil. Hd.)	.05
255	Screw (8-32 x 5/16" Fil. Hd.)	.05
256	Screw (8-32 x 3/8" Fil. Hd.)	.05
258	Screw (8-32 x 1/2" Fil. Hd.)	.05
543	Screw (1/4-20 x 3/8")(Positive Arc Striker)	.10
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" Cup Pt. Headless Set)	.15
744	Screw (1/4-20 x 1/2" Cup Pt. Set - Square Head)	.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. Standard)	.05
890	Washer(3/8" Shakeproof)	.05
898	Nut (5/16"-24 Acorn)	.15
917	Pin (3/32 x 3/4" Cotter)	.05
1086-C	Lava Rock Bushing	.10
1195	Wire Clamp (Double)	.10
1198	Rheostat Knob	.50
1254	Wire Lug	.05
2003-B	Porcelain Bushing	.25
2019	Wire Lug	.05
2023-B	Brush and Spring	.35
2309	Reflector Clip	.15
2621	Pilot Wire Clip	.15
2621-A	Clip (Reflector Frame)	.15
2922	Light Shield (For Motiograph Projector)	.50
2923	Light Cone (For Motiograph Lamp)	.75
4069	Reflector (Crown Glass, 11 3/8" Dia. Spec. 69)	23.00
5028	Motor Field Screw (Long)	.25
5038	Mica Insulation	.35
5063	Oil Cup	.40
5072	Spring (Positive Jaw)	.30
10036	Pilot Light Switch and Cord	2.75
10047	Dowser Shaft Handle Hub	1.70
10048-A	Dowser Shaft Handle Knob (Red)	.40
10052	Dowser Shaft Handle	.50
10059	Pilot Switch Locknut	.15
10066	Pilot Light Receptacle	.40
10074	"D" Washer (Large)	.15
10075	"D" Washer (Small)	.10
10080	Tension Spring	.40
10109	Motor Ball Bearing	2.75
10120-A	Motor Field Core	11.00
10125-A	Oiler Felt (Drive Gear)	.10

10127	Welsh Plug (Motor Housing)	.10
10203	Negative Carriage Insulator (Lava)	.65
10204	Negative Jaw Washer	.20
10206	Adjusting Screw (Reflector)	1.20
10208	Adjusting Screw (Negative)	1.20
10220	Negative Jaw Clamping Nut	.15
10222	Washer (Wire Clamp)	.15
10230	Handle (Eccentric Lever)	.50
10303	Reflector Carriage Insulator (Lava)	1.70
10306	Reflector Steadying Spring	.20
10309	Reflector Tension Spring	.15
10972	Negative Jaw Assembly (6mm)	6.50
11041	Window Glass	.50
11119	Wire Clip (Motor Housing)	.10
11302	Pilot Switch Lock Ring	.15
11993	Arc Imager Mirror Assembly	2.00
12031	Glass Retaining Clip (Door Window)	.75
12113	Control Rheostat (120 Ohm. .91 Amp.)	6.50
14013	Set Screw	.15
14015-A	Pilot Light Bracket	.55
14029	Screw (Door Latch)(Retaining)	.20
14030	Washer (Door Rod Rollers)	.15
14034	Door Hinge Rod	1.10
14037-A	Shield Bell Crank	1.00
14042	"D" Washer (Friction)(Dowser)	.20
14057	Cross Shaft (Dowser)	1.60
14058-B	Dowser Link	.30
14059	Base Pan	5.50
14064	Support Rod (Ash Pan)	.40
14066-A	Guide Rod	2.00
14067-A	Slide Rod	2.15
14068	Set Screw (Focus Adjusting)	.40
14074	Clutch Washer (When Steel Gear is used)	.15
14077-A	Base Pan Light Shield	.65
14105	Control Knob Sleeve (Short)	.40
14106	Control Knob Sleeve (Long)	.45
14107	Carbon Adjusting Rod (Lower)	.70
14108-A	Negative Adjusting Rod (Upper)	.60
14109	Contact Shoe (Rheostat)	1.30
14114	Rheostat Name Plate	.65
14116-A	Ammeter (Triplett Model 301 - Grey)	16.00
14117	Shunt (Ammeter)	6.50
14119	Wire Clip (Motor House)	.15
14119-A	Wire Clip (Positive Carriage)	.15
14120	Motor Field Screw (Short)	.25
14122	Shim (Fibre)	.05
14125	Drive Shaft (36 P.)	1.65
14128-A	Armature	20.00

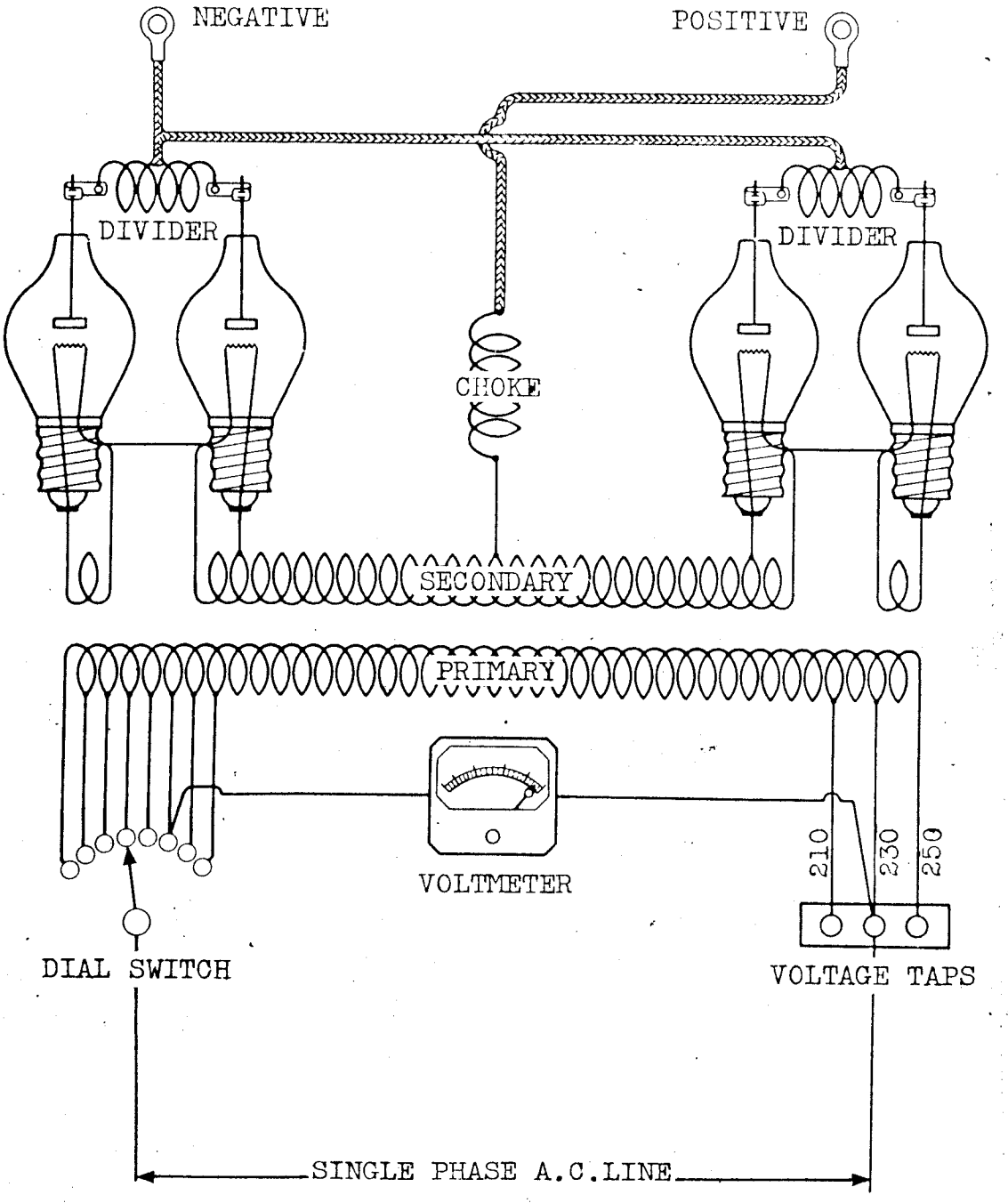
14151	Front Casting	25.00
14152	Top Casting	20.00
14155	Pilot Wire Attachment Plug Cap	.30
14156-A	Dowser	6.50
14157	Negative Feed and Lead Wire	2.50
14161	Name Plate	2.50
14162	Carbon Burn Scale	2.50
14176	Arc Imager Card	.05
14202-A	Negative Spider	4.00
14203-A	Driving Wire (Negative)	.20
14209-A	Negative Carriage Bushing (6)	1.35
14301-A	Carriage (Reflector)	13.00
14308	Adjusting Rod (Reflector)	1.30
14310	Set Screw (Reflector Carriage)	.25
14312	Washer (Reflector Adjusting Screw)(White Fibre)	.10
14409-A	Driving Wire (Positive)	.25
14415-A	Pin (Positioning)	.30
14416	Nut (Arc Striker)	.40
14417	Spring (Arc Striker)	.20
14553	Top Side Sheet Metal	2.70
14555	Window Frame (Left Hand)	1.95
14556	Window Frame (Right Hand)	2.65
14557	Back Casting	25.00
14565	Steadying Pin (Reflector)	.30
14569	Pilot Switch Locknut (Thick)	.05
14571	Dowser Pin	.25
14574	Top Light Shield (Arc Imager Recess)	.15
14575	Side Trim Strip	1.30
14577	Door Tension Spring	.05
14583	Cover Plate (Pilot Light Switch)	.25
14864	Door Hinge Stud Assembly	.80
14867-A	Lead Screw Gear Assembly (Fibre 36 P.)	3.75
14902	Positive Feed Wire Assembly	1.50
14903	Positive Lead Wire Assembly	1.25
14904	Rheostat to Motor Brush Wire Assembly	.25
14906	Complete Left Door Assembly	23.00
14907-A	Complete Right Door Assembly	24.00
14909	Reflector Carriage Assembly	23.00
14976-A	Negative Carriage Unit Assembly	30.00
14989	Control Knob (Black)	.60
14989-A	Control Knob (Red)	.65
14991	Focus Adjusting Screw Assembly	6.50
17014	B.X. Connector	.15
17110	Wire Terminal (Brush Holder Body)	.05
17111	Motor Brush Holder Body	1.00
17112	Motor Brush Holder Cap	.35
17132-A	Magnet	2.65
17223	Stop Pin	.20

17235	Feed Wire Clamp	.10
17367	Bushing (Drive Shaft - Top)	.30
17368	Bushing (Drive Shaft - Bottom)	.30
17920	Arc Imager Frame	1.30
17979	Release Trigger Assembly (Reflector)	2.00
19005	Trim Bolt	.10
19012	Damper	.95
19016	Arc Striker Bushing (3 1/2)	2.95
19018	Armature Worm (42 P.)	2.75
19039	Pilot Light Bulb (25 W, 115 V)	.15
19047	Tension Spring (Front of Dowser)	.75
19059	Supplemental Magnet - Left) Sold in pairs only	.55
19060	Supplemental Magnet - Right) Price per pair	
19063	Positive Steadyrest Bracket	4.60
19064	Positive Steadyrest Stud	.30
19068	Positive Jaw Cam Roller	.35
19070	Positive Jaw Roller Screw	.25
19071	Positive Carriage	6.00
19073	Positive Jaw Casting (See #19978 Complete Jaw)	5.25
19074	Positive Jaw Post	1.45
19078	Steadyrest Aligning Rod	.60
19079	Carbon Aligning Rod	1.20
19915	Reflector Frame Assembly	13.00
19959	Motor Resistor Assembly	3.00
19973	Ash Receiver and Magnet Assembly	1.75
19974	Positive Steadyrest Assembly	2.00
19976	Positive Jaw Clamp Assembly	3.00
19977	Positive Jaw Cam Assembly	1.45
19978	Complete Positive Carbon Jaw Assembly	18.00
19979	Negative Carriage and Bushing Assembly	16.00
19980	Positive Carriage Assembly	11.00
19986	Lead Screw Unit Assembly (6 - 3 1/2)	25.00
19987	Lead Screw and Stud Assembly (6 - 3 1/2)	10.00
19988	Arc Striker Bushing Assembly	3.60
20002-A	Motor End Bell	6.50
20004	Motor Inspection Plate	.65
21126	Worm Gear (42 P.)	3.75
21405	Positive Upright Insulator	.60
21414	Positive Jaw Wire Clamp	.40
22122	Resistor (Motor - 500 Ohm)	1.10
23026	Light Cone (Large)	.75
23027	Light Cone (Small)	.75
23492	Draft Stack Assembly	1.50
24035	Arc Imager Bracket	1.30
24403	Insulating Bushing (Large)	.35
24405	Positive Upright Nut	.35
24410	Upright Insulator Spring	.10
50087	Resistor to Motor Brush Wire	.10

WIRING DIAGRAM
NUMBER 36



THE STRONG UTILITY
INTERMEDIATE HIGH TUBE RECTIFIER
40 AMP. 27 VOLTS
TYPE 16200-8



THE STRONG ELECTRIC CORP.
Toledo, Ohio

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.