The Sperry High Intensity Searchlight.

Instruction Book.

THE SPERRY GYROSCOPE CO., LTD.
15, Victoria Street, London, S.W. 1

The Sperry High Intensity Searchlight.

INSTRUCTION BOOK

FOR THE

Sperry High Intensity Searchlight

INCLUDING

GENERAL DESCRIPTION, INSTRUCTIONS
ON THE CARE, MAINTENANCE, OPERATION
::: AND ADJUSTMENT, :::
INFORMATION NECESSARY FOR CONVERTING
STANDARD PROJECTORS,
AND SPARE PART LIST.

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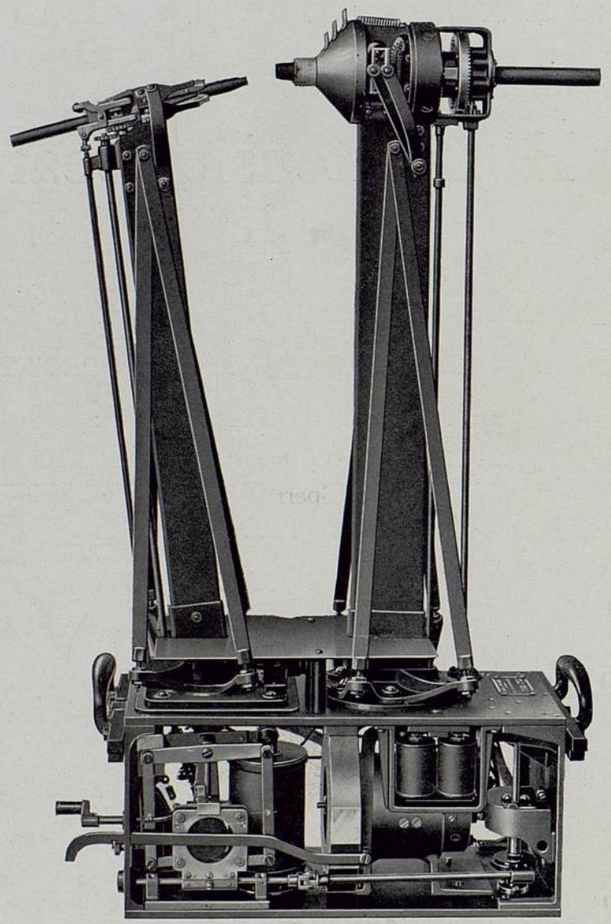

FIG. 1.

INTRODUCTION.

THE object of compiling this pamphlet is to give the instructions necessary for operating the Sperry High Intensity Searchlight, as well as to convey a general understanding of the fundamentals upon which it is based, and which account for the intense light output of which it is capable.

This publication contains no description of the complete projectors made by this Company (this being contained in another publication), for it is realised that, with the advent of a lamp which gives seven to eleven times the light of a standard searchlight, there will be a natural tendency to convert the old type projectors to accommodate the Sperry Lamp, which can be done without difficulty, especially if the necessary projector accessories are supplied by us at the same time as the lamp.

The subject is therefore divided as follows:—

I. The Development of the Sperry High Intensity Arc.

II. General Description of the Sperry Lamp.

III. Instructions for Operation and Maintenance of the Lamp.

IV. Instructions for Adapting Existing Projectors.

V. Spare Part List.

I.—The Development of the Sperry High Intensity Arc.

Searchlights have been applied to naval and military purposes for a number of years, but recently their use in some instances has been a questionable advantage, especially for maritime purposes, as their range has not increased as rapidly as the range of guns and torpedoes.

On account of the necessity for high intensity searchlights, minor improvements have been made in efficiency by more accurate grinding of mirrors and utilising the pure carbon arc to better advantage by reducing the diameter of the carbons, etc., but the advantage derived from these improvements is necessarily limited as the light of a pure carbon arc emanates from the positive crater, and is due to volatilization of the carbon particles.

For some years it has been known that light efficiency can be increased by the introduction of mineral salts into the carbons, and this principle has been widely adopted in lamps used for ordinary lighting purposes. Mineral impregnated carbons have also been tried for searchlight work, but have not hitherto been successful, as the intensity of a searchlight beam depends not only upon the candle-power at the light source but equally upon the extent to which this light is concentrated within the focus of the mirror. In other words the requirement is high intrinsic brilliancy. It will be seen, therefore, that although mineralised carbons give greater light, the volume of the light source is so great that the brilliancy of the beam is less than when comparatively low efficiency pure carbons are used.

The Sperry Lamp depends upon the use of a minerally impregnated carbon, but instead of the flame spreading in the fan-like form which characterises the usual "flame arc," the whole of the arc gases are entrapped within the positive crater by means of the flame from the negative carbon, as shown in Figure 3. The light obtained from the Sperry Lamp is, therefore, the total of that obtained from the incandescent surface of the positive crater added to the light given by the volatilised mineral salts contained within the crater. This results in an intrinsic brilliancy of approximately 500 candle-power per square millimetre being obtained, whereas the intrinsic brilliancy of a pure carbon arc varies between 120 and 160, which is limited by the fact that the light emanates from the surface of carbon raised to its melting point. As carbon has a melting temperature higher than any other known material, it is obvious that the intrinsic brilliancy of this type of lamp must be limited, and, further, that the Sperry Lamp, founded as it is upon new principles, forms a marked advance upon other light-producing agents.

II.—General Description of the Sperry Lamp.

THE LAMP.

As will be seen from the foregoing description, the intense light output of the Sperry Lamp depends upon concentration of the arc gases within the crater of the positive carbon. To maintain the desired crater symmetry the positive carbon is kept constantly rotating, and to prevent oxidation of the mineral core and the volatilization of the positive carbon shell and the negative carbon a blast of air is provided for the purpose of cooling. An essential feature of the lamp is, therefore, the electric blower motor, which runs continuously and drives a centrifugal fan, which forces a current of air up the positive and negative standards for the purpose of cooling the respective heads.

The motor is connected also through suitable gearing to a rod, which carries a pinion for rotating the positive head. The feeding of the positive carbon is effected by means of another rod, which is brought into engagement with the feeding star wheel by means of the thermostat mechanism, or by a lever when under manual control.

The striking of the arc and the feeding of the negative carbon are controlled by a shunt coil which actuates four pawls working upon a double-toothed ratchet. Before the arc is struck, the shunt coil being strongly energized brings two of these pawls into engagement and feeds the carbon forward rapidly until it comes into contact with the positive; the voltage across the shunt coil is then reduced to a minimum, and the other two pawls come into engagement and cause the negative carbon to retrace rapidly and strike the arc. When the arc is burning normally the shunt coil is subjected to only small changes of voltage, and under such circumstances it brings only one of the two pawls into operation and this feeds the carbon forward by very small amounts.

Current is conducted to the positive carbon by four silver brushes placed behind the air-cooled head and to the negative by four copper fingers, both sets of brushes being under spring tension.

Both carbons are gripped between hardened steel rollers geared to their respective feed mechanisms. The entire negative head turns through a small angle to enable the negative carbon to be inserted. This movement of the negative head also releases the pressure from the feeding rollers to facilitate trimming still further.

The Sperry Lamp is made for 75, 115 or 150 amperes, and the distance from the control box to the crater can be made to suit any diameter of projector. The dimensions of the carbons are tabulated hereunder.

SPERRY HIGH INTENSITY LAMP.

Current.	Diameter of Positive Carbon.	Length of Positive Carbon.	Diameter of Negative Carbon.	Length of Negative Carbon.
75 amp.	11 mm.	12 ins.	11 mm.	7 ins.
115 „	13 „	28 „	11 „	10 „
150 „	16 „	36 „	11 „	14 „

It is usual to fit a supporting tube for the positive carbon at the front of the projector; the length of the positive carbon can be increased or decreased as required, and for general information it should be noted that the hours of burning are usually limited by the length of the positive carbon, which is consumed at the rate of 8 to 10 inches per hour.

III.—Instructions for Operating the Sperry Lamp.

BEFORE STARTING.

1. **See that the Reflector, Thermostat Mirror and Front Glass are clean.** It is recognised that the methods of cleaning vary with the type of mirror, that is, whether gold or silver, and therefore this operation should be carried out according to standard procedure.

2. **After putting the Lamp in place, see that the white line on the Lamp is opposite to the white line on the Projector Slides.** When a lamp is first fitted to a projector its correct position should be carefully ascertained and marked. With the Sperry Lamp the necessity for correct focal position is much greater than with an ordinary lamp owing to the small area of the light source, and if the correct focus is maintained by means of a thermostat and the lamp itself is not correctly positioned, it means that the positive carbon is operating too near to the head or projects too much. The former will cause undue heating of mechanical parts and the disintegration of the quartz tube, whilst the latter will cause the positive carbon to taper and result in a corresponding diminution of light.

3. **Carboning the Lamp.**

Negative Carbon.

(*a*). **Examine the Negative Carbon and see if the coppering is quite smooth.** As the negative carbon is fed and regulated by means of rollers, any excrescencies may cause unsatisfactory operation or even prevent the rollers from feeding the carbon through the negative head. If the plating is not smooth it should be rubbed with very fine emery cloth until it acquires a polished surface.

Point both ends of the Carbon. It will be found in practice that the satisfactory operation of the arc depends upon the negative flame impinging on the positive crater gases and maintaining them within the crater. For this reason the carbon should be pointed, as a square-ended carbon causes the negative flame to wander instead of issuing directly from the carbon axis. The other extremity of the carbon should also be pointed so as to facilitate the carboning.

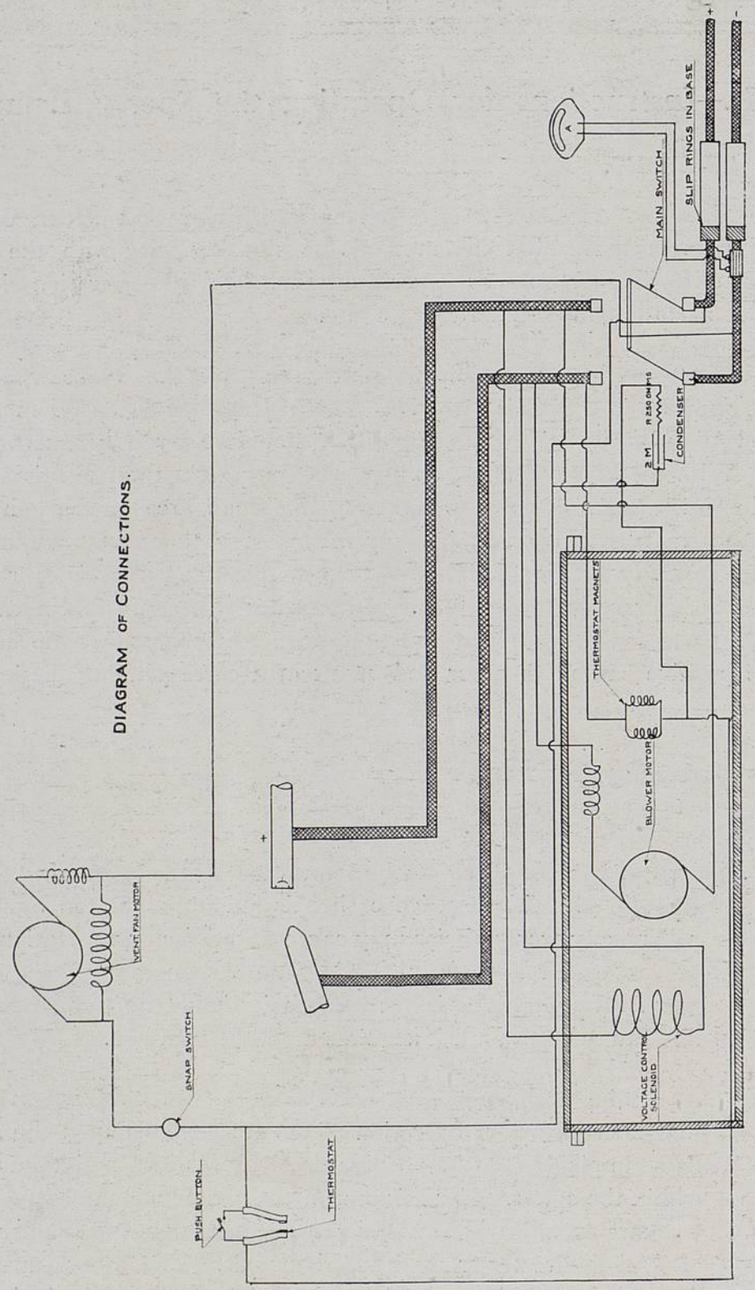

DIAGRAM OF CONNECTIONS.

FIG. 2.

(*b*). **Turn the Negative Standard** by pressure on the bottom casting and insert carbon. The object of turning the negative head is to release the tension of the feeding rollers and enable the carbon to be inserted through the front (that is, nearest the positive head).

(*c*). Be sure that the end of the carbon near to the positive is pointed.

(*a*). Leave about 35 to 40 mm. ($1\frac{1}{2}$ in.) of carbon projecting from the negative head and turn negative standard to its normal position.

Positive Carbon.

(*a*). **Examine Carbon and see that it is straight;** if not it must be set aside, as it will not rotate in the front tube and the operation will consequently be impaired.

(*b*). **Slightly round one end of the Positive Carbon** and push this end through the tube in front of the projector into the positive head until it projects $\frac{5}{8}$ inch (16 mm.) beyond the quartz tube.

(*c*). **Examine Contact Brushes** to see that they are free in their guides by raising them off the carbon and observing that the tension of the spring is sufficient to make good contact on the carbon. **Examine Feed Rollers.** The feed rollers should be examined from time to time to see that the spring is sufficiently strong to cause the rollers to grip the carbons, otherwise the positive carbon may fail to rotate and feed. In such event new springs should be fitted.

4. **Close all Doors of the Projector.**

(*a*). This is important, as the arc is extremely susceptible to draughts.

(*b*). See that the arc switch on the projector is open.

(*c*). Open doors at both inspection holes, the arc observation box and meters.

5. **Switch on Supply** to the lamp from the dynamo, keeping the arc switch open.

6. **Close Ventilating Motor Switch**, and see that the ventilator is running properly. The ventilator is an electrically driven centrifugal fan, and the ordinary care should be given which is due to electrical machinery of this class.

STARTING.

7. **Close the Main Switch on the Projector.**

8. **Immediately the Arc strikes** note the position of the positive and negative carbons on the ground glass screen (see Fig. 3).

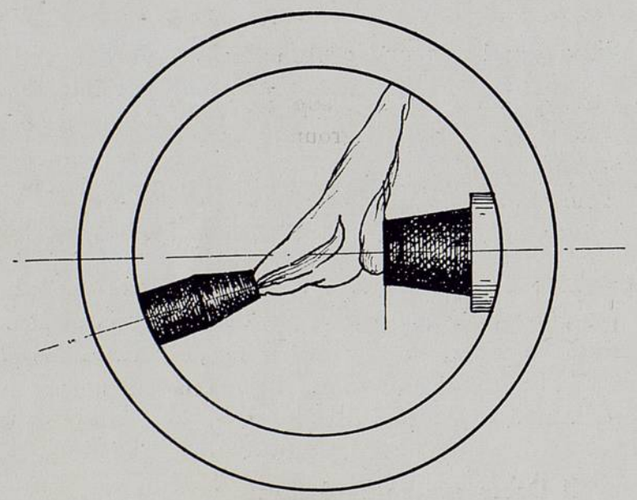

FIG. 3.

(*a*). **The tip of the Positive Carbon should be kept opposite to the line** etched on the ground glass screen. If, after striking the lamp, the end of the positive carbon is in front of the line, it should be allowed to burn back, and if behind the line, it should be fed forwards by pressing the button fitted at the top of the thermostat case.

(*b*). **The length of the Arc should be about 25 mm. (1 in.) for 150 amp. lamps.** This length depends on the voltage and almost immediately after striking it can be regulated by the shunt coil spring adjusting nut, which operates in a slot on the back of the lamp. Lowering this nut increases the length of the arc, and raising it reduces it. If the adjustments have been correctly made the voltammeter should register 72/75 volts and 150 amps. It should be observed, however, that it is more important in this type of lamp to maintain constancy of arc length than accuracy of voltage, and consequently it is advantageous to mark the normal position of the negative carbon as well as the positive on the ground glass screen, as in sketch.

9. **Adjust Thermostat.** The feeding of the positive carbon and the maintaining of the position in relation to the focal point of the mirror is controlled by the thermostat, and in its absence a correct functioning of the lamp can only be accomplished by keeping the positive carbon to the line on the ground glass screen by means of the button on the thermostat box.

(*a*). **Adjusting Thermostat. Keep the Positive Carbon about 1 mm. in front of the line** on the ground glass screen by pressing the thermostat button whenever it is necessary to feed the carbon forward. This should be done by an assistant so as to leave the lamp operator free to make the necessary adjustments to the thermostat mirror.

(*b*). **Whilst the Positive Carbon is being kept in position** the lamp operator should look through the inspection hole on the opposite side of the projector to which the thermostat is situated and see that the beam from the mirror falls in the same horizontal plane as the thermostat. If it requires raising or lowering, this can be done by tilting the mirror by means of a small screwdriver fitted into the slotted adjusting screw accessible from the hole in the thermostat mirror box. **Adjust Mirror by means of the Knurled Focus Adjusting Screw** so as to bring the spot of light on to the opening in the thermostat.

(*c*). **Allow the Positive Carbon to burn back about 2 mm. behind the line.** Then observe the thermostat contacts through the lens and bring them together (by means of the adjustment on the thermostat box) until they make good contact.

(*d*). **If these Adjustments have been correctly made** the thermostat will keep the positive carbon within ½ mm. of the line on the ground glass screen. If this is not the case, however, adjustments can be made to the thermostat mirror. It is also useful to know that the exact position at which the thermostat feeds the positive carbon can be accurately ascertained by watching this position on the ground glass screen and listening for the click of the armature inside the lamp control box when it is energised by the thermostat. This should occur when the positive carbon is ½ mm. behind the line.

(*e*). **If the Contacts do not open** this is due to the mirror not having been correctly focussed and/or the contacts having been forced together too tightly.

(*f*). **If necessary, a further adjustment to the position of the Positive Carbon can be made** by turning the thermostat mirror focussing screw about half a turn in one direction or the other. Turning this screw in a clockwise direction causes the positive carbon to feed further away from the head, and turning it in a counter-clockwise direction causes it to feed further back.

10. **Whilst the Lamp is working, the Arc length should be examined** to see that it is still about 25 mm.

STOPPING.

11. **Switch off the current by the Main Supply Switch or by means of the switch fitted to the Projector.**

12. When the lamp is cool, the reflector, thermostat mirror and front glass should be wiped free of any deposit.

NOTE.—If the arc is extinguished during the run, it is not necessary to make any of the adjustments previously referred to as the positive carbon will take up its normal position under the control of the thermostat and the negative will strike correctly.

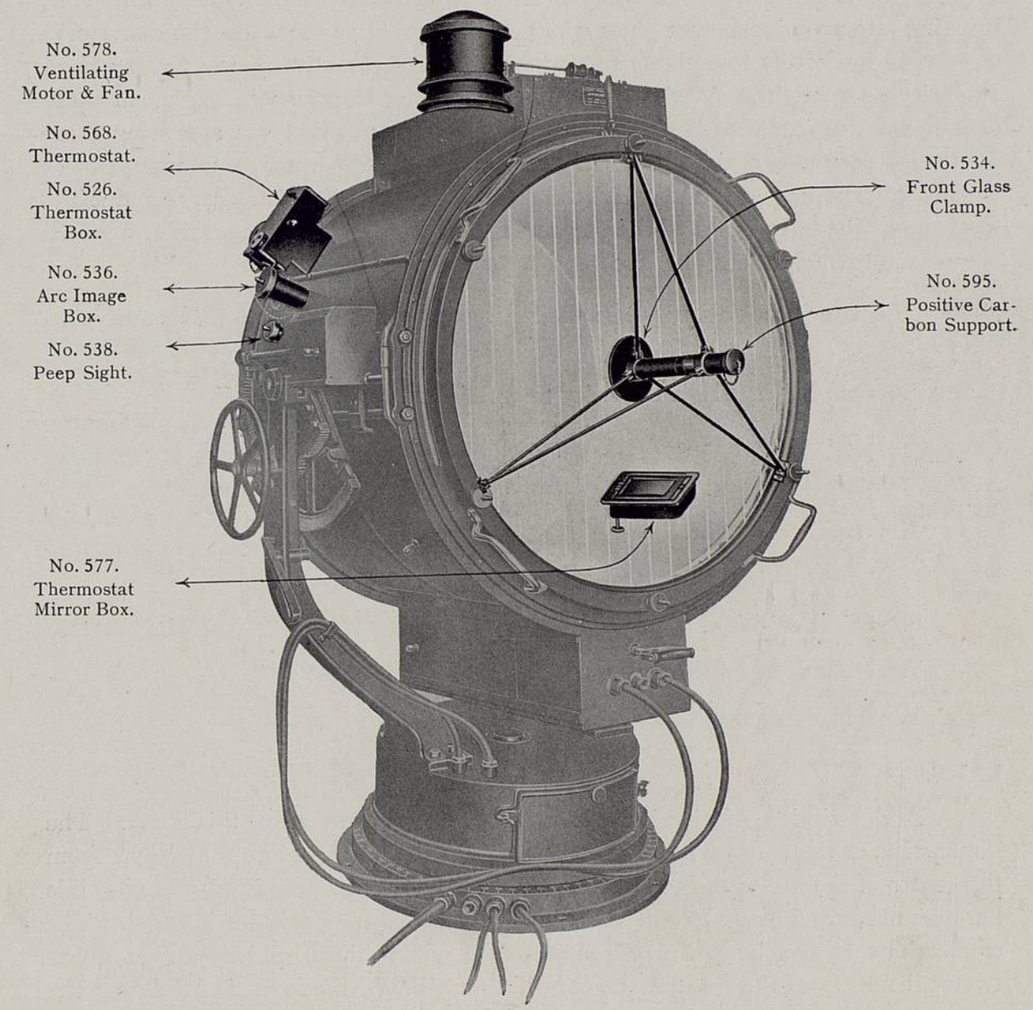

FIG. 4.

IV.—Instructions for Adapting Existing Projectors.

On the preceding page will be seen an illustration of the Sperry Projector, bringing into prominence the parts which are supplied to facilitate the conversion of existing projectors to embody the important characteristics of the Sperry High Intensity Searchlight. A brief description will show the purpose for which these accessories are intended and the most convenient position for mounting them on the projector. In the course of the conversion of several standard types of projectors experience has indicated to us convenient methods of carrying out the work, and, where drawings of the projector to be converted are available, we shall be pleased to suggest suitable accessories for their conversion.

The equipment usually supplied for converting standard projectors is as follows:—

1. One Sperry High Intensity Searchlight Lamp.
2. One Ventilating Equipment.
3. One Thermostat, with Mirror, Condensers and Resistance.
4. One Peep Sight.
5. One Arc Image Box.
6. One Positive Carbon Support Tube and Front Glass Clamping Plate.
7. Quantity of Carbons as required.

We will, therefore, describe these parts seriatim.

LAMP.

A description of the lamp is included in Section 2 of this book. The dimensions of the control box cannot, of course, be altered, but the height from the centre of the arc to the top of this box can be made as required, and the slide bars could also be made to suit the slides with which the projector is fitted. The connections to the lamp are by means of flexible cables, which project about twelve inches from the front of the control box. When the lamp is fitted into the projector the negative end of the control box should be accessible so that the handle for operating the negative carbon, the lever for feeding the positive carbon, and the voltage adjusting nut may readily be operated. Provision is made on the lamp for receiving a focussing screw, but this is rarely necessary provided the correct position is marked when the lamp is installed.

VENTILATING EQUIPMENT.

Owing to the chemical nature of the products of combustion it is absolutely necessary to ventilate the drum by means of a forced draught. It must be remembered, however, that the arc is very susceptible to air currents of any kind; consequently, to prevent flickering the inlets must be near to the top of the drum, and care must be taken to close all other openings through which air might enter. The ventilating equipment usually supplied with a Sperry Lamp consists of an electrically driven centrifugal fan suitably arranged for fixing at the top of the drum, and it has been found that if hooded inlets are provided near to the top all the fumes are drawn off by means of the induced draughts created by the motor.

THERMOSTAT.

The thermostat should be located as close to the mirror casting as possible in order to prevent direct light from the arc disturbing its operation. A slot must be cut through the ventilation duct to allow the reflected beam to reach the lamp, and this slot must be enclosed to prevent escape of air. Considerable latitude may be allowed in the vertical location of the thermostat, any position 30° above or below the horizontal being satisfactory.

THERMOSTAT MIRROR.

The thermostat mirror should be placed at the same horizontal distance from the mirror ring as the thermostat. The mirror should not be diametrically opposite to the thermostat, but should be raised or lowered until a reflected beam clears the mechanism of the lamp. The displacement of the beam can easily be corrected as the mirrors are made adjustable in both planes. A square opening must be cut in the projector drum to receive the mirror, and this opening must be lined to prevent the escape of air. After the lamp has been installed its position can be checked by using a candle or small incandescent lamp held at the focus of the mirror as a source of light.

PEEP SIGHTS.

Those already installed on the projector can probably be used for observing the arc, but we usually supply a special peep sight for adjusting the thermostat, as this operation is somewhat difficult if glass of the correct density is not used.

ARC IMAGE BOX.

The purpose of the arc image box is to project an image of the arc on to a ground glass screen, and by this means the general operation of the lamp and the correct position of the positive crater can be accurately ascertained. This box should be fitted on the same side of the projector as the thermostat and ammeter at any convenient angle above or below the horizontal. It must, however, be mounted so that its axis passes through the centre of the arc.

POSITIVE CARBON SUPPORTING TUBE.

The positive carbon support tube consists of a brass tube with an insulated lining fitted with a tripod for attachment to the front glass ring. This tube is for accommodating that portion of the positive carbon which projects beyond the front of the projector, and the exact length depends upon the distance of the arc

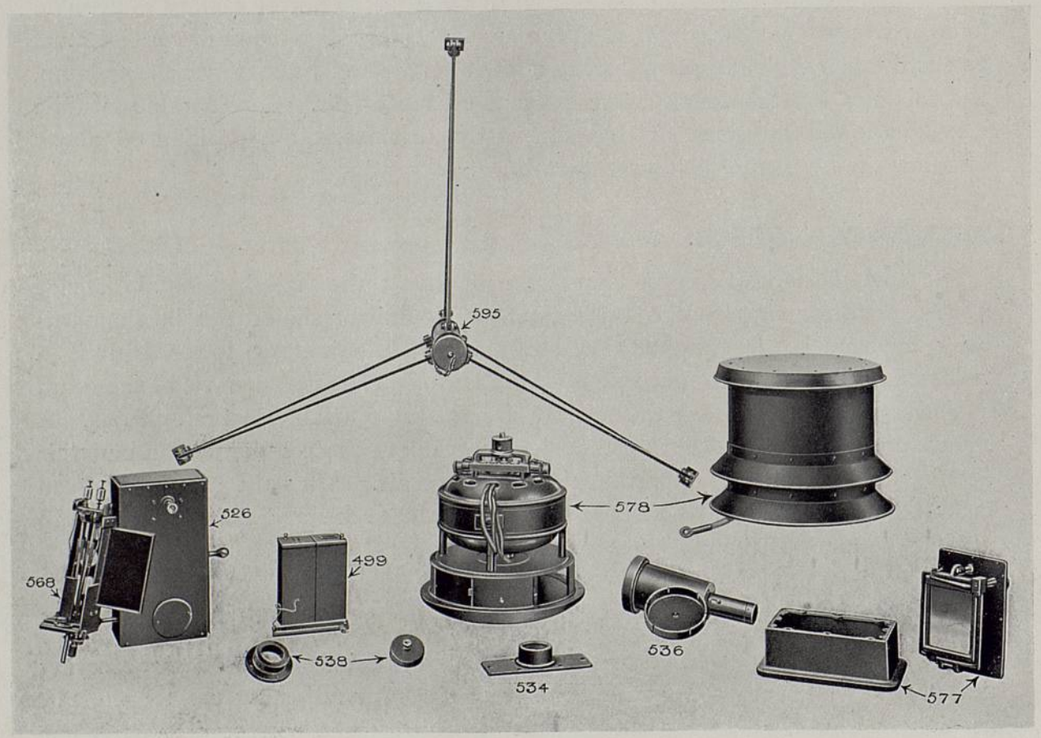

FIG. 5.

from the front glass and upon the length of the carbons used. It is not usual to vary the lengths of these tubes to suit these varying conditions, but they are made long enough for any ordinary requirements, and if they are too long for any particular type of projector they can be shortened as required without difficulty.

FRONT GLASS CLAMP.

The centre glass strip of the projector must be removed and cut in two pieces to fit into the metal centre. This clamp is provided so as to afford a suitable opening for the positive carbon through the front glass.

SHUTTER.

If the lamp has a Venetian blind shutter the centre strip must be cut off to clear the carbon tube. If an iris shutter is used the centre disc must be removed and one installed in its place which permits of the passage of the positive carbon without the possibility of short-circuiting or otherwise injuring the lamp.

V.—Spare Part List.

The following Part List has been compiled to facilitate the ordering of spare parts for Sperry Lamps and Projector Accessories. It includes all the parts of the lamp and is completely illustrated except where shown in the text. Provided the part number is quoted, the various items can usually be supplied without delay. The thermostat and box are also detailed and illustrated, but it has not been considered necessary to detail the components of the projector attachments. As they are illustrated, a brief description will suffice for identifying the part required. When ordering parts, the part numbers should be quoted, also the voltage and current of the lamp for which they are required.

CONTROL BOX.

Part No.	NAME.	No. per Lamp.
545—24	Name plate *Not shown*	1
545—25	„ „ screws „	4
545—97	Control box top and bottom plate screws	15
545—99	„ „ „ plate pedestal screws	2
545—26	„ „ „ „ „ „	2
545—23	„ „ „ „	1
545—95	Thermostat coil frame mounting strip screws	2
545—181	„ „ „ „ clamp	1
545—182	„ „ „ „ strip	1
545—157	Hand control lever—positive feed	1
545—44	Control box air duct screws	12
545—158	Hand control lever axis pin	1
545—19	Thermostat coil securing screws	2
545—179	„ „ „ strip	1
545—43	Control box blower air duct	1
545—45	„ „ „ „ locating piece	1
545—46	„ „ „ „ „ „ screws	2
545—175	Hand control push rod lever	1
545—176	„ „ „ „ spring	1
545—177	„ „ „ „ spindle	1
545—250	„ „ „ „ end collar	1
545—251	„ „ „ „ „ „ set screw	1
545—178	Thermostat coil assembled	2
545—180	„ „ frame casting	1
545—183	„ armature	1
468—153	„ „ spring *Not shown*	1
545—185	„ „ lever	1
545—186	„ „ insulator	2

Part No.	NAME.	No. per Lamp.
545—189	Thermostat armature axis pin	1
545—184	„ „ bush	1
545—187	„ „ insulator screw	1
545—188	„ „ „ washer	1
545—141	„ „ „ nut	1
545—95	Telescope guide screws	4
545—94	„ „	1
545—146	Hand feed clutch	1
545—147	„ „ „ spindle	1
545—153	„ „ „ „ lever	1
545—29	Negative end plate	1
545—163	Control box blower fan blade	3
545—164	„ „ „ „ boss	1
545—104	„ „ „ „ „ screws	6
545—166	„ „ „ retaining nut	1
545—116	Shunt coil core lever frame spring	1
545—160	Control box blower fan cover screws	7
468—87	„ „ „ „ case	1
468—88	„ „ „ „ cover	1
545—53	Worm	1
545—66	„ wheel box cover plate screws	4
545—65	„ „ „ „ „	1
545—64	„ „ „ long and short bearing screws *Not shown* ...	4
545—70	Positive feed rod gear wheel shaft	1
545—69	„ „ „ „ „	1
545—71	„ „ „ „ „ intermediate shaft *Not shown in detail*	1
545—72	„ „ „ „ extension spindle *Not shown* ...	1
545—57	Worm wheel shaft pinion	1
545—55	„ „ spindle	1
545—62	„ „ box short bearing	1
545—54	„ „	1
545—63	„ „ box long bearing	1
545—31	Positive end plate	1
545—33	„ „ „ small bush	2
545—34	„ „ „ large bush	2
545—61	Worm wheel box holding down screws	3
545—91	Reciprocating rod	1
545—92	„ „ head	1
545—90	Eccentric rod head	1
545—86	„ „	1
545—85	„ *Not shown in detail*	1
545—87	„ strap „ „ „ „	1

THE SPERRY HIGH INTENSITY SEARCHLIGHT.

Part No.	NAME.	No. per Lamp.
545—88	Eccentric plate *Not shown in detail*	1
545—89	,, ,, screws ,, ,, ,, ,, ...	2
545—150	Striking bevel wheel packing washer *Not shown* ...	1
545—151	,, rachet ,, ,, ,, ,, ,, ...	1
545—154	Hand feed clutch lever handle ,, ,, ...	1
545—155	,, ,, ,, ,, axis pin ,, ,, ...	1
545—156	,, ,, ,, spacing washer ,, ,, ...	1
545—159	,, control lever stop ,, ,, ...	1
545—160	,, ,, ,, ,, screws ,, ,, ...	1
545—42	Control box handle screws	8
545—41B	Negative end handle	1
545—125	,, feed striking pawl bevel wheel	1
545—124	,, ,, ,, bevel wheel spindle	1
545—152	Vertical bevel wheel spindle collar	1
545—93	Reciprocating rod head axis pin	1
545—67	Worm wheel box cover plate oil hole	1
545—68	,, ,, ,, ,, ,, ,, ,, screw	1
545—59	,, ,, ,, left half	1
545—58	,, ,, ,, right half	1
545—60	,, ,, ,, screws	3
545—76	Negative feed rod coupling top flange	1
545—126	,, ,, ,, bevel wheel	1
545—75	,, ,, ,, coupling top flange	1
545—78	,, and positive feed rod coupling bush	8
545—73	,, ,, ,, ,, ,, ,, insulator	2
545—74	,, ,, ,, ,, ,, ,, bottom flange ...	2
545—77	,, ,, ,, ,, ,, ,, screws	8
545—79	,, ,, ,, ,, ,, ,, washers *Not shown* ...	8
545—80	,, rod coupling shaft	1
545—41B	Control box positive end handle	1
545—35	,, ,, bottom plate	1
545—56	Worm wheel spindle lower bearing	1
545—162	,, ,, ,, ,, ,, screws	3
545—81	Universal joint coupling shaft *Not shown in detail*	1
545—82	,, ,, top and bottom fork negative rod ,, ...	2
545—83	,, ,, ,, ,, ,, ,, ,, ,, ,, ...	1
545—84	,, ,, ,, fork negative head ,, ...	1
468—97	,, ,, pivot block *Not shown in detail* ...	2
545—37	Control box side plate *Not shown*	2
545—38	,, ,, ,, ,, bracket ,, ...	4
545—39	,, ,, ,, ,, ,, rivets ,, ...	8
545—40	,, ,, ,, ,, thumb screws ,, ...	4

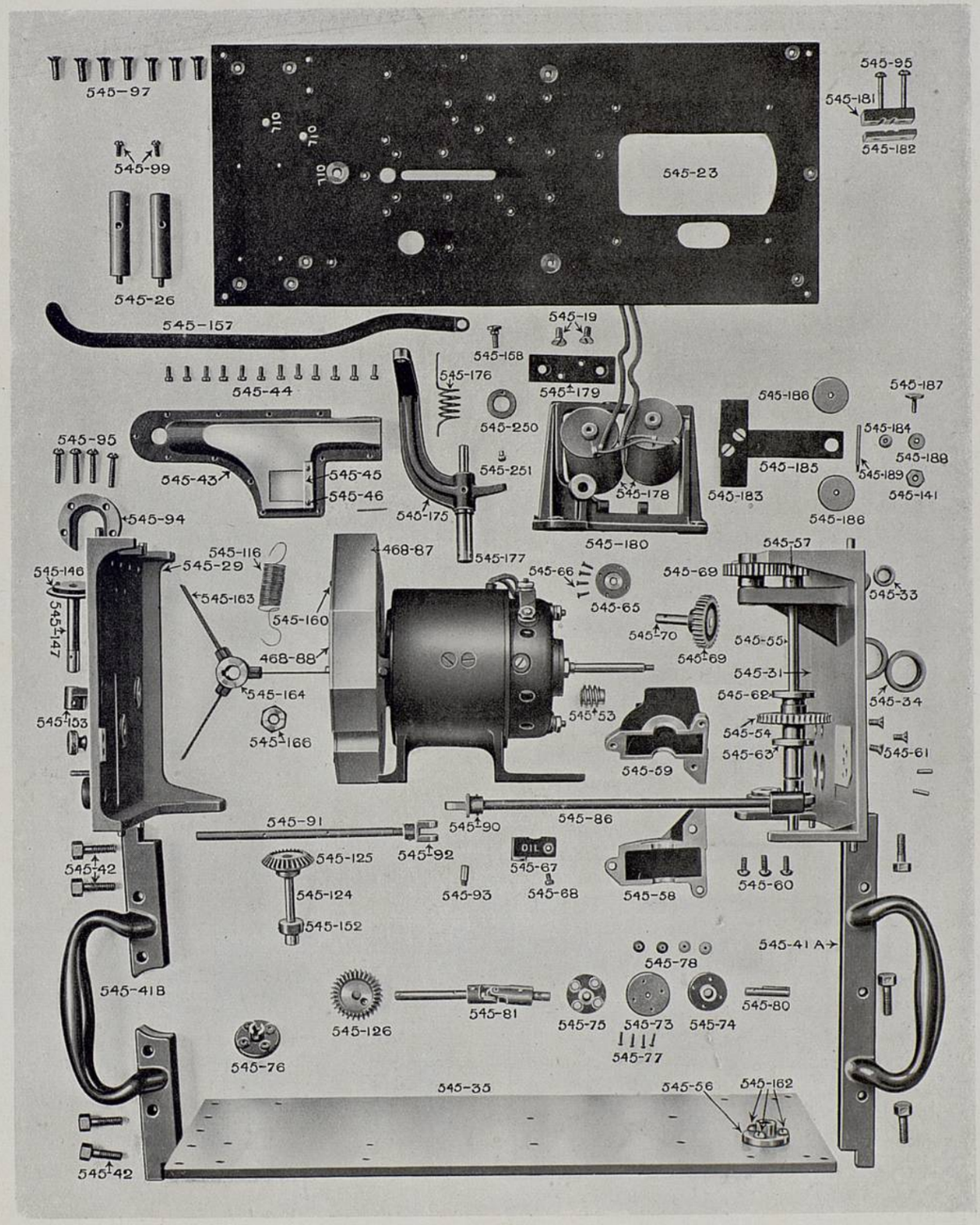

FIG. 6.

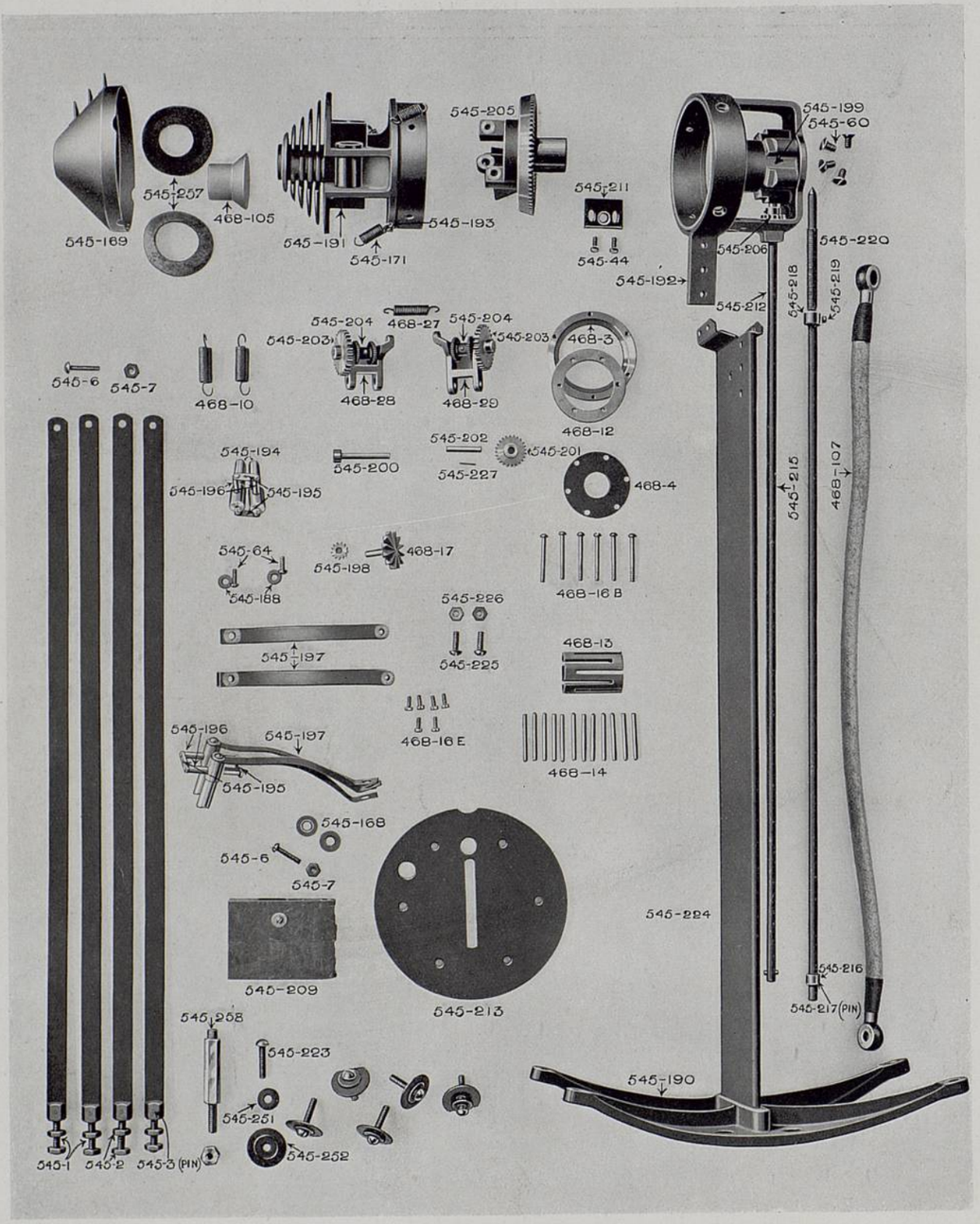

FIG. 7.

POSITIVE HEAD.

PART No.	NAME.	No. PER LAMP.
545—169	Positive head shield	1
468—105	,, ,, quartz tubes	1
545—257	,, ,, ,, ,, packing washers	2
545—191	,, ,, front frame casting	1
545—171	,, ,, shield springs	3
545—193	,, ,, ,, ,, holder	3
545—205	,, ,, gear frame	1
545—211	,, ,, feed rod upper bearing	1
545—44	Positive head feed and upper bearing screws	2
545—192	,, ,, carrier ring	1
545—89	,, ,, ,, ,, screws *Not shown*	2
545—199	,, ,, back frame	1
545—60	,, ,, ,, ,, screws	4
545—6	,, and negative standard tension stay screws ...	2
545—7	,, ,, ,, ,, ,, ,, nuts	2
468—10	,, head brush springs	2
468—28	,, ,, feed roller frame R. H.	1
468—29	,, ,, ,, ,, ,, L. H.	1
468—27	,, ,, ,, ,, ,, spring	1
545—204	,, ,, ,, ,, ...	2
545—203	,, ,, ,, ,, gear wheels	2
468—3	,, ,, thrust ring	1
468—12	,, ,, ,, plate	1
468—4	,, ,, roller bearing retainer	1
545—212	,, ,, feed rod	1
545—206	,, ,, ,, ,, bevel pinion	1
545—215	,, ,, striker rod	1
545—218	,, ,, ,, ,, top collar	1
545—219	,, ,, ,, ,, ,, ,, screw	1
545—220	,, ,, ,, ,, spring	1
468—107	,, and negative heads	2
545—214	,, head standard tension stays	4
545—194	,, ,, brush	4
545—195	,, ,, ,, spring holder	4
545—196	,, ,, ,, holder rod	4
545—200	,, ,, intermediate pinion	1
545—201	,, ,, ,, gear wheel	1
545—227	,, ,, feed roller taper pin	2
545—202	,, ,, ,, ,, spindle	2
545—170	,, ,, shield cover plate *Not shown*	1

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Part No.	NAME.	No. per Lamp.
545—104	Positive head shield cover plate screw *Not shown*	1
545—141	„ „ „ „ „ nut „	1
468—34	„ „ standard insulating bush „	6
545—258	Positive and negative terminal posts	2
545—64	Positive head brush contact strip screw	4
545—188	„ „ „ „ „ washer	4
545—198	„ „ striker wheel pinion	1
468—17	„ „ „ „	1
468—16	„ „ roller retainer screw	6
545—197	„ „ brush contact strip	8
545—226	Positive head carrier ring air duct nuts	3
545—225	„ „ „ „ „ „ screws	3
468—13	„ „ roller bearing cage	1
468—14	„ „ bearing rollers	12
468—16E	„ „ thrust ring screws	6
545—6	„ standard air duct insulating wrapper screws ...	1
545—7	„ „ „ „ „ „ nut ...	1
545—168	„ „ „ „ „ „ washer ...	2
545—209	„ „ „ „ „ „	1
545—213	„ „ insulating plate	1
545—223	„ „ screws	6
545—251	„ „ brass washers	6
545—252	„ „ mica „	6
545—224	„ „ air duct	1
545—216	„ head striker rod-bottom collar	1
545—217	„ „ „ „ „ pin	1
545—190	„ „ standard bracket	1
545—1	„ and negative standard tension screws	8
545—2	„ „ „ „ „ nuts	16
545—3	„ „ „ „ „ pin	8

NEGATIVE HEAD.

545—100	Negative head contact finger—tapped for pin	2
545—238	„ „ „ „ spring top	2
545—239	„ „ „ „ „ bottom	2
545—113	„ „ „	2
545—30	„ „ main casting	1
545—234	„ feed rod gear wheel	1
545—52	„ head connecting strip—short	2
545—237	„ „ contact finger screws	4

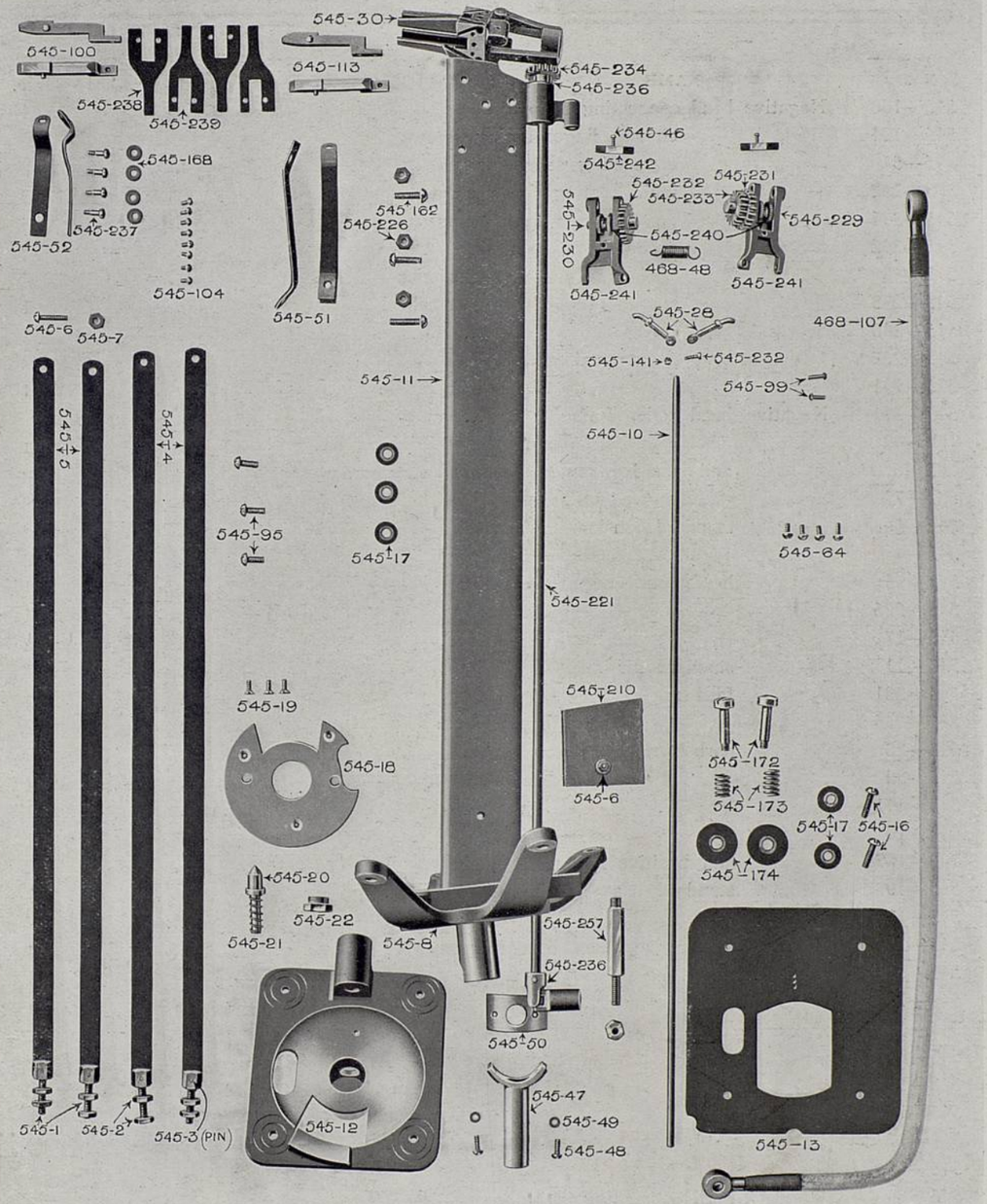

Fig. 8.

Part No.	NAME.	No. per Lamp.
545—168	Negative head connecting strip washers	4
545—104	„ „ contact finger spring screws	4
545—51	„ „ connecting strip—long	2
545—162	„ „ main casting fixing screws	3
545—226	„ „ „ „ „ nuts	3
545—242	„ „ roller frame axis pin	2
545—46	„ „ „ „ „ „ screws	2
545—233	„ „ „ intermediate gear wheel	1
545—240	„ „ „	2
545—232	„ „ „ gear wheel	2
545—231	„ „ „ „ „ long spindle	1
545—241	Negative head roller frame	2
468—48	„ „ „ „ spring	1
545—6	„ and positive standard tension stay screw ...	2
545—7	„ „ „ „ „ „ nut ...	2
545—5	„ standard tension stay, short	2
545—4	„ „ „ „ long	2
545—95	„ head connecting strip screw	1
545—226	„ „ „ „ nut	1
545—17	„ „ „ „ washer	2
545—11	„ standard air duct	1
545—221	„ feed rod	1
545—236	„ „ „ top and bottom pins	2
545—28	„ carbon release arms	2
545 -32	„ „ „ „ screw	1
545—141	„ „ „ „ nut	1
545—10	„ „ „ rod	1
468—107	„ and positive heads	2
545—19	„ standard base packing plate screws	3
545—18	„ „ „ „ „	5
545—210	„ „ air duct insulating wrapper	1
545—6	„ „ „ „ „ „ screw ...	1
545—7	„ „ „ „ „ „ nut ...	1
545—168	„ „ „ „ „ „ washer ...	2
545—172	„ „ bracket clamp screw	2
545—173	„ „ „ „ „ spring	2
545—174	„ „ „ „ „ washer	2
545—17	„ „ base securing screw washer	4
545—16	„ „ „ „ „	4
545—64	„ head connecting strip screws	4
545—99	„ „ roller frame stop screws	2
545—229	„ „ „ spindle, long	1

Part No.	NAME.	No. per Lamp.
545—230	Negative head roller spindle, short	1
545—217	„ „ „ „ pin	2
545—20	„ standard base detent plunger	1
545—21	„ „ „ „ „ spring	1
545—22	„ „ „ „ „ „ retainer ...	1
545—8	„ „ bracket	1
545—12	„ „ base	1
545—50	Control box blower air duct insulator	1
545—47	„ „ „ „ „ connector	1
545—49	„ „ „ „ „ insulating bush	2
545—48	„ „ „ „ „ connector screw	2
545—13	Negative standard base insulating plate	1
545—9	„ „ bracket bush *Not shown*	1
545—14	„ „ base insulating washer	4
545—15	„ „ „ „ bush	4

SHUNT COIL.

545—243	Shunt coil core spring *Not shown*	1
545—142	„ „ „ adjusting screw „	1
545—143	„ „ „ „ „ nut „	1
545—246	Shunt coil assembled	1
545—222	Control box top plate protector plate	1
547—27	„ „ „ „ „ „ bush *Not shown* ...	1
545—139	Shunt coil core lever frame pivot screw	2
545—107	„ „ „ „ „	1
545—112	„ „ „ suspension pin lever screw	2
545—111	„ „ „ „ „ „	1
545—120	Lever striking ratchet guide plate strip	1
545—121	„ „ „ „ „ „ screws	2
545—117	Guide for ratchet plates	1
545—118	„ „ „ „ screws	2
545—247	Shunt coil base	1
545—248	„ „ „ securing screws	4
545—108	„ „ core	1
545—114	„ „ „ rod	1
545—109	„ „ „ suspension pin	1
545—110	„ „ „ „ „ washer *Not shown* ...	2
545—148	Hand feed clutch spindle screw	1
545—245	Shunt core coil spring support	1
545—244	„ „ „ „ clamp plate	1

THE SPERRY HIGH INTENSITY SEARCHLIGHT.

Part No.	NAME.	No per Lamp.
545—104	Shunt core coil spring clamp plate screws	2
545—115	„ „ „ rod screw	1
545—137	Ratchet link screw	4
545—138	„ „ „ collar	4
545—141	Pawl link screw nut	2
545—131	Upper pawl L.H.	1
545—133	Pawl spindle	4
545—135	„ carriage front plate	1
545—129	„ „ distance piece	2
545—99	„ „ „ „ screws	2
545—130	Upper pawl R.H.	1
545—136	Ratchet link	2
545—132	Lower ratchet pawls	2
545—134	Pawl carriage	1
595—144	Hand feed clutch plate	1
545—145	„ „ „ „ spindle	1
545—105	Lever striking ratchet locking arm spring	1
545—140	„ „ „ axis pin	1
545—104	„ „ „ locking arm screw	1
545—103	„ „ „ „ „ plate	1
545—102	„ „ „ „ „ pin	1
545—101	„ „ „ „ „	1
545—106	„ „ „ „ „ hook	1
545—98	Bracket support striking lever	1
545—99	„ „ „ „ screws	4
545—149	Hand feed bevel wheel	1
545—96	Negative feed gear standard	1
545—97	„ „ „ „ screws *Not shown* ...	4
545—122	Lever striking ratchet wheels	2
545—123	„ „ „ „ bush...	4
545—119	„ „ „ „ spacing washer	1
	„ „ „ „ retaining screws	2
545—127	Eccentric pin carrier—upper pawls	2
545—128	„ „ „ pin „ „	2
545—161	Striking motion ratchet link bush *Not shown*	4
545—249	Shunt coil terminals „	2

THERMOSTAT BOX.

526—27	Thermostat box lens cover	1
526—28	„ „ „ „ handle	1
526—29	„ „ „ „ pin	1

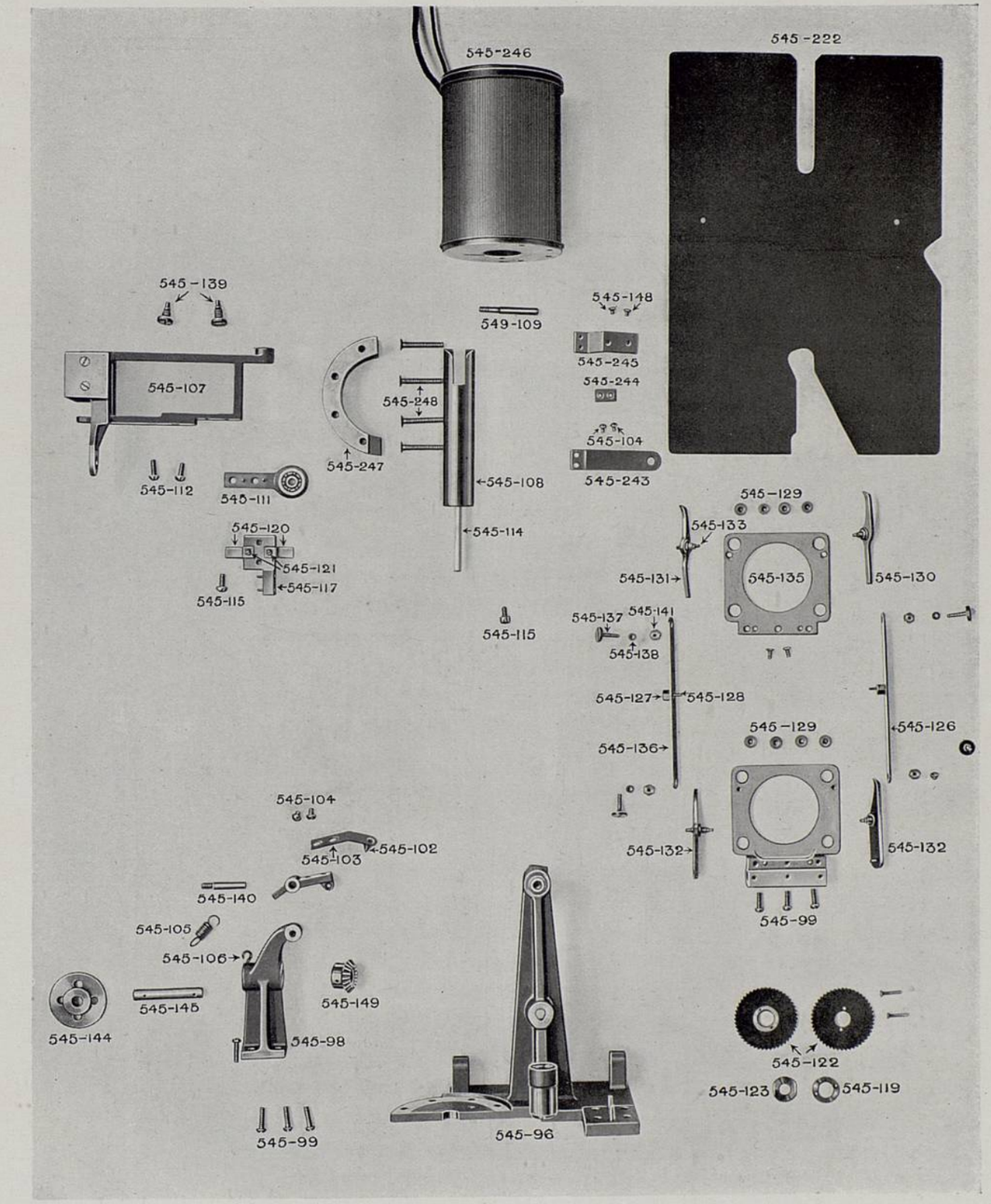

Fig. 9.

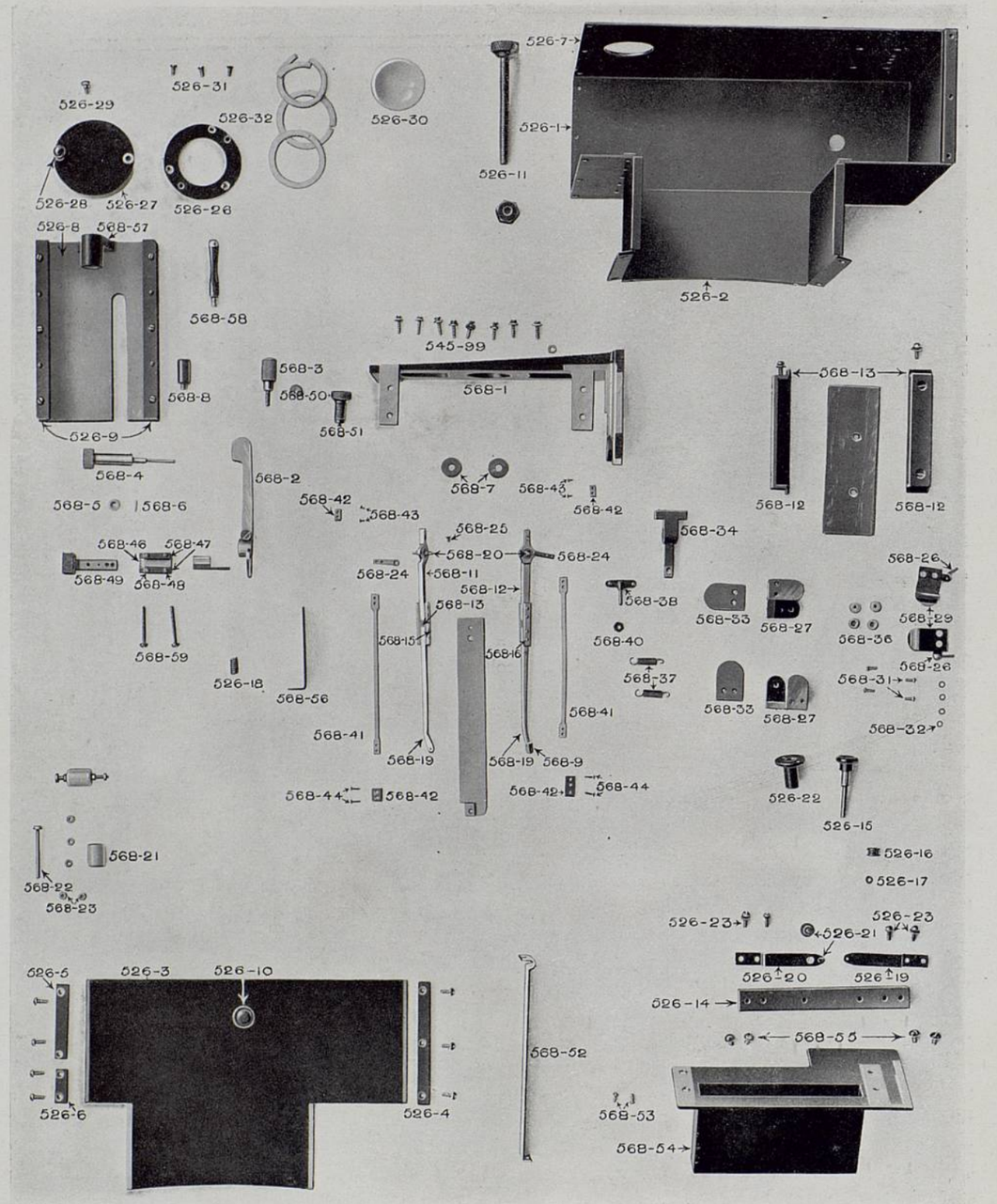

FIG. 10.

THE SPERRY HIGH INTENSITY SEARCHLIGHT.

PART No.	NAME.	No. PER LAMP.
526—26	Thermostat box lens holder	1
526—31	,, ,, ,, ,, screws	3
526—32	,, ,, ,, ,, packing rings	3
526—30	,, ,, ,, ...	1
526—11	,, adjusting screw	1
526—7	,, box—top plate	1
526—1	,, ,, ...	1
568—57	,, adjusting screw pedestal	1
526—8	,, box slide	1
526—9	,, guides	2
568—58	,, handle	1
568—8	Adjusting lever clamp screw	1
568—3	,, ,, locking screw	1
568—51	,, locking screw insulator	1
568—50	,, ,, ,, ...	1
545—99	Contact lever bearing and central support screws	8
568—1	Thermostat main frame	1
526—12	,, box contact bar holders	2
526—13	,, ,, ,, ,, ...	2
568—4	,, adjusting lever spindle	1
568—5	,, ,, ,, ,, collar	1
568—6	,, ,, ,, ,, ,, pin	1
568—2	,, ,, ,, ...	1
568—49	Zinc strip fixing block	1
568—46	,, ,, adjusting block guide	1
568—47	,, ,, ,, ,, ,, plates	2
568—48	,, ,, ,, ,, ,, ,, screws	4
568—45	,, ,, ,, ,, ...	1
568—42	,, ,, stiffening piece	2
568—43	,, ,, screws (lever end)	4
568—7	Adjusting lever spindle spring washer	2
568—10	Contact guard	1
568—59	Zinc strip adjusting block guide screws	2
526—18	Thermostat box cut-out spring	1
568—56	,, contact cover plate	1
568—41	Zinc strips	2
568—19	Contact levers	2
568—11	,, ,, extension—top	1
568—12	,, ,, ,, —bottom	1
568—20	,, ,, bearing spindles	2
568—13	,, ,, insulator	2
568—15	,, ,, connector	2

Part No.	NAME.	No. per Lamp.
568—16	Contact levers connector pins	8
568—9	„	2
568—44	Zinc strip screws contact end	4
568—24	Contact lever zinc attachment piece	2
568—25	„ „ „ „ „ screws	4
568—26	„ „ leads	2
568—34	„ „ central support	1
568—38	„ „ „ „ spring holder	1
568—40	„ „ „ „ „ „ nut	1
568—37	„ „ „ „ „ „	2
568—33	Spring contact insulators	2
568—27	Contact lever bearing support ; 1 R.H., 1 L.H.	2
568—30	Spring contact insulator bushes	4
568—31	„ „ screws	4
568—29	„ „ on bearing support ; 1 R.H., 1 L.H. ...	2
568—32	„ „ screw washers	4
568—22	Contact lever weight screw	2
568—21	„ „ „	2
568—23	„ „ „ „ nuts	6
568—14	„ „ insulator tubes *Not shown*	8
568—17	„ „ terminal screws „	2
568—18	„ „ „ „ washers „	2
568—28	„ „ bearing support bush „	2
526—22	Thermostat box cut-out sleeve	1
526—15	„ „ „ plunger	1
526—16	„ „ „ „ collar (large)	1
526—17	„ „ „ „ „ (small)	1
526—5	„ „ cover guides (medium)	1
526—6	„ „ „ „ (small)	1
526—3	„ „ „	1
526—10	„ „ „ handle	1
526—4	„ „ „ guide (large)	1
526—60	„ „ „ „ screws	7
568—52	Distance piece for zinc strips	1
568—53	„ „ screws	2
526—20	Thermostat box cut-out contact strip (long)	1
526—19	„ „ „ „ „ (short)	1
526—21	„ „ „ „	1
526—14	„ „ „ bar	1
526—23	„ „ „ contact strip screws	4
568—54	„ protection cover	1
568—55	„ „ „ screws	4