

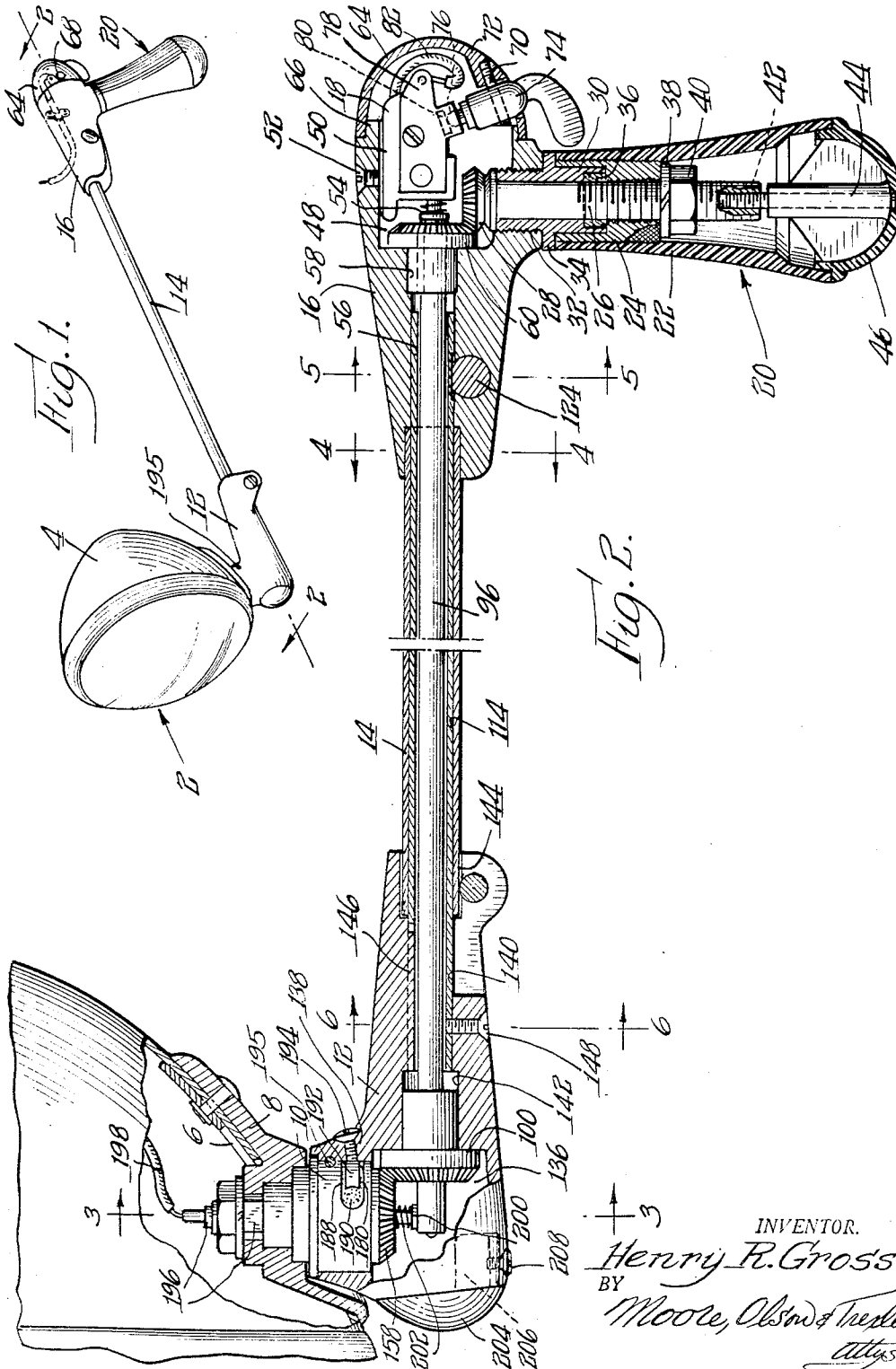
Feb. 6, 1951

H. R. GROSS
DIRIGIBLE SPOT LAMP

2,540,257

Filed Dec. 3, 1947

3 Sheets-Sheet 1



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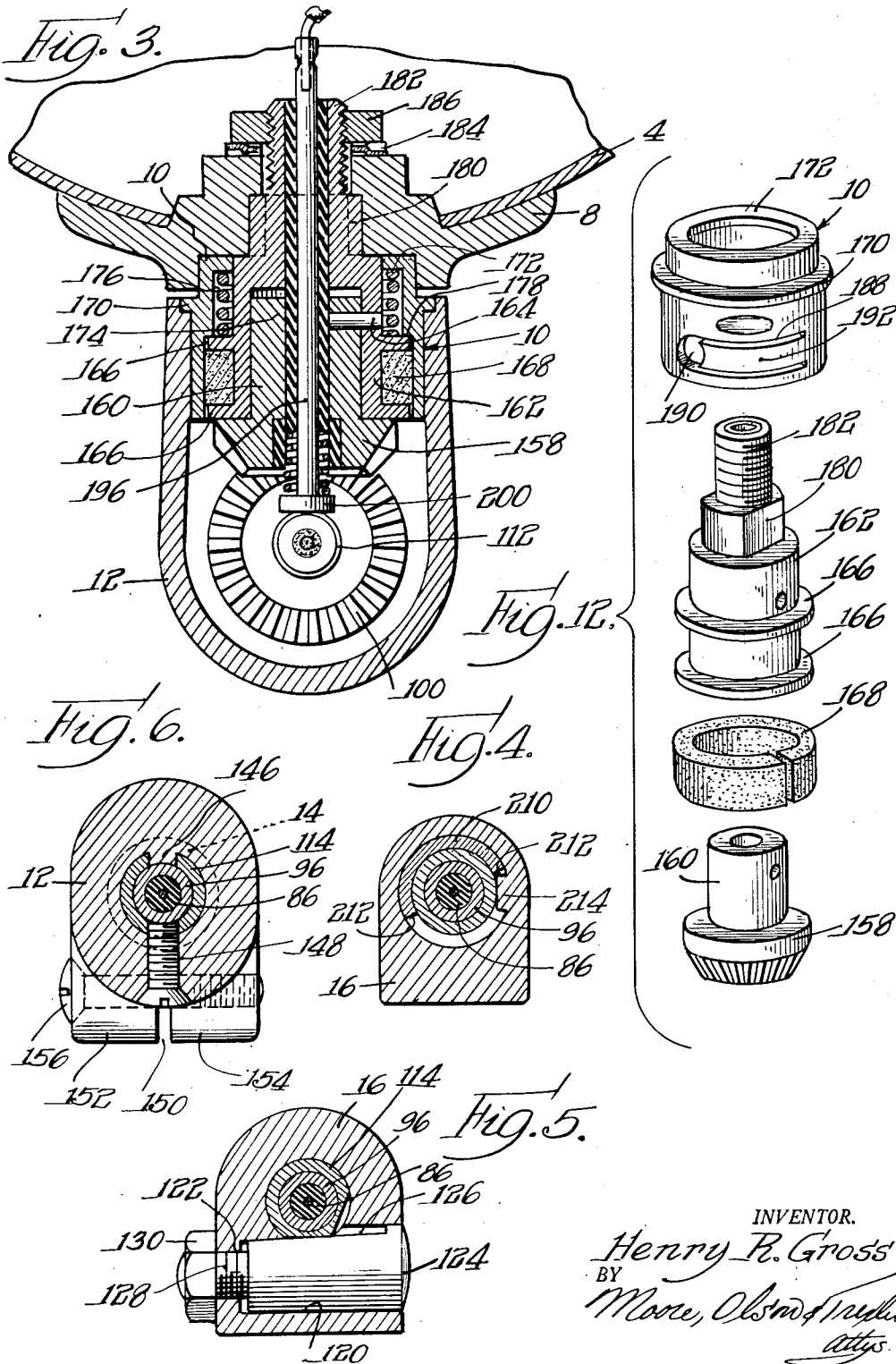
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Filed Dec. 3, 1947

3 Sheets-Sheet 2



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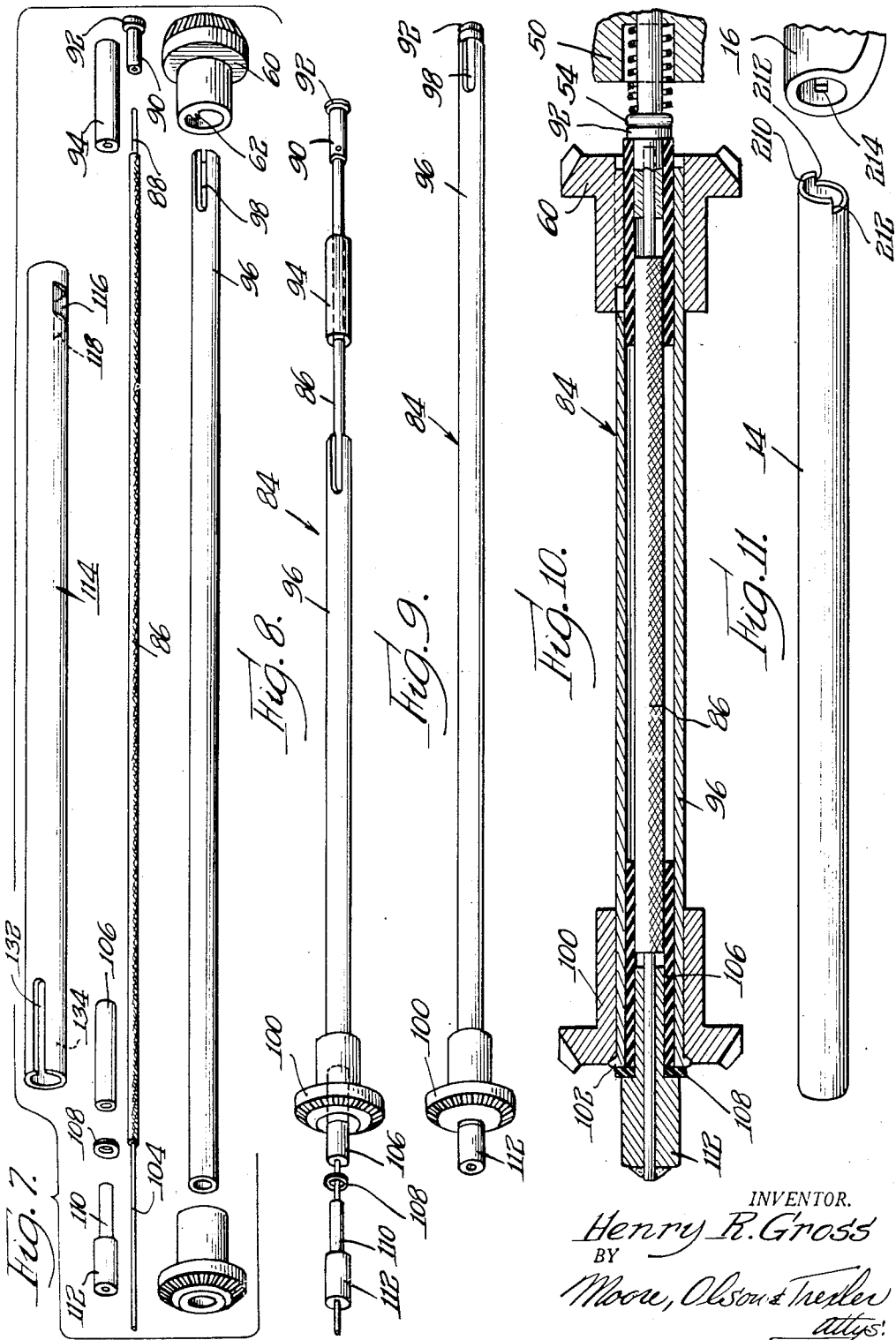
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UNITED STATES PATENT OFFICE

2,540,257

DIRIGIBLE SPOT LAMP

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Application December 3, 1947, Serial No. 789,362

2 Claims. (Cl. 240—61.13)

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This invention relates to a dirigible spot lamp, and more particularly to a spot lamp for mounting on an automobile.

It is a principal object of the invention to simplify the construction of a dirigible spot light and to provide a construction which is more readily susceptible to mass production thereby to reduce the cost thereof, while at the same time providing a more efficient and rugged structure.

Other objects of the invention are to provide a more efficient and less expensive means for holding the spot light at any angle to which it may be adjusted or manipulated; to provide a more rugged and less expensive means for carrying the electric current to the spot light; and to provide a dirigible spot light which is to be mounted on either the right or left side of the automobile at will.

Other and further objects and advantages of the invention will be apparent from the following description when taken in connection with the following drawings wherein:

Fig. 1 is a view in perspective of a dirigible spot lamp embodying the invention;

Fig. 2 is an enlarged, fragmentary view in vertical section taken substantially along line 2—2 of Fig. 1;

Fig. 3 is a fragmentary view in vertical section taken along the line 3—3 of Fig. 2;

Fig. 4 is a view in vertical section taken along the line 4—4 of Fig. 2;

Fig. 5 is a view in vertical section taken along the line 5—5 of Fig. 2;

Fig. 6 is a view in vertical section taken along the line 6—6 of Fig. 2;

Fig. 7 is an exploded view in perspective of certain parts of the spot lamp prior to their assembly in manufacture;

Figs. 8 and 9 are views in perspective showing the manner of assembling the rotary conductor and rotation impelling unit of the lamp;

Fig. 10 is a view in vertical section showing the assembly of the lamp revolving unit with the rotary conductor and rotation impelling end;

Fig. 11 is a view in perspective of the combined support and journal of the lamp unit, and

Fig. 12 is an exploded view in perspective of the friction bearing mount for the lamp on the head housing.

As shown in the drawings, a preferred embodiment of the invention comprises a lamp unit 2 of any suitable construction including a housing or shell 4 having an opening 6 in its bottom part to receive part of a bracket 8 rotatably supported on a thrust bearing 10 mounted in a rotatable

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support or head housing 12 journaled on a combined mounting tube and journal 14 adapted to pass through a suitable opening in the framing post of an automobile. The combined mounting tube and journal 14 has rotatably journaled on its inner end a handle housing 16, in which is mounted a control switch 18 for turning the lamp on and off, and on which is rotatably mounted a handle 20 causing rotation of the lamp unit when it is rotated relative to the housing 16 and causing revolution of the lamp unit when it rotates the housing 16.

The combined mounted tube and journal 14 may be fixed or secured in any desired or suitable known manner, not shown, to the frame post of the automobile in such manner as to secure it against rotation. The handle 20 preferably consists of a plastic tube 22 flaring outwardly at its lower end and molded about an internally threaded externally knurled metal sleeve 24. The sleeve 24 is threaded on the shank of an actuating shaft or rod 26 having a beveled gear 28 formed integrally therewith at the upper end thereof. The sleeve 24 is formed in its upper portion with an enlarged bore. A sleeve bushing 30 forms an internal journal for the handle 20 and an external bushing for the rod or shaft 26. The upper portion 32 of the sleeve bushing 30 is externally threaded for threading into an aperture in the bottom wall of the housing 16. The sleeve bushing is also formed with the enlarged portion of the collar 34 which overlies the upper end of the handle to enclose the same and form a thrust bearing for the handle. The lower end of the sleeve 30 is provided with an enlarged bore in which is received a lubricant impregnated ring 36 to supply lubrication for the external and internal bearing surfaces of that bushing. The handle is secured against rotation on the threaded rod 26 and with the proper bearing pressure against the ring 34, by means of a lock washer 38 and a lock nut 40. The lower end of the rod 26 is provided with an internally threaded axial opening 42 to receive a screw 44 by means of which a plastic cap 46 is secured to and closes the lower end of the plastic tube 20. It should be noted that the opening in the bottom wall of the housing 16 into which the upper threaded portion 32 of the sleeve 30 is received is greater in diameter than the beveled gear 28 so that the combined gear and rod may be assembled with the housing by the simple introduction of the geared end of the rod through the opening in the bottom wall of the housing. The housing 16 is preferably a die casting open at its outer end

and provided with a mounting chamber 48 in which is mounted a combined switch and connector 50 secured to the upper wall of the chamber as by a screw 52 threaded into the mounting block of the switch. The switch is so mounted that its outwardly spring urged connective pin 54 is positioned on the axis of the longitudinal bore 56 of the housing. The bore 56 is provided with an enlarged inner end portion 58 in which is journaled the hub of a centrally apertured bevel gear 60. The gear 60 intermeshes with the gear 28 and is provided with a longitudinal key or spline 62.

The open end of the housing 16, and the chamber 48 thereof, are closed by a die cast cap 64 placed over the reduced annular flange portion 66 of the inner end of the housing and secured thereto as by one or more screws 68, Fig. 1, threaded into openings in the flange 66. The cap 64 pivotally supports by means of a pin 70 threaded into a boss 72 formed in the cap a switch operating member 74 having a spring mounted plunger 76 which connects and disconnects one switch lug or plate, as for example the plate 78 of the switch, to a transverse switch lug or plate 80 which is connected electrically in any suitable manner to the spring urged connective pin 54, the switch plate 78 being connected to the lead-in wire 82.

The gear 60 receives the inner end of a combined rotation impeller and electric connector 84, Figs. 9 and 10. This unit is made and assembled as follows: An insulated wire 86, Fig. 7, is stripped at its opposite ends and the bared end 88 of the wire is inserted in a metallic sleeve which is crimped, soldered or otherwise affixed to the wire. The sleeve 90 is formed with an enlarged head or connector disk 92. An insulating sleeve 94 is telescoped on the wire 86 before the end 88 is inserted in the sleeve 90 and the sleeve 94 is of an external diameter to snugly fit within rotation impeller tube 96. The internal diameter of the sleeve 94 is such as to fit snugly over the sleeve 90. The insulating sleeve 94, and the metal sleeve 90 having been assembled on the bared end 88 of the wire 86, the tube 96 is telescoped over the wire. The tube 96 is formed at one end with a longitudinal slot 98 which forms a keyway for receiving the key or spline 62 of the gear 60. A centrally apertured bevel gear 100 is press fitted on the other end of the tube 96 and that end of the tube is peened over as at 102, Fig. 10, to prevent the gear from moving off the end of the tube. This gear 100 of course is assembled with the tube 96 prior to the insertion of the wire 86 therethrough. The wire 86 having been inserted in the tube 96 is opposite bared end 104 projecting from the end of the gear and on that end of the wire is telescoped an insulating sleeve 106, an insulating washer 108, and a connector sleeve 110. The sleeve 106 is of an external diameter adapted to snugly fit within the tube 96 and an internal diameter to fit over the sleeve 110 which is provided with an enlarged portion 112 forming a rotary electric connector drum.

After the various sleeves have been assembled on the end 88 of the wire, the wire is inserted through the tube 96 and the various sleeves and washers are placed on the other end 104 of the wire. The whole is then placed in a fixture which holds the tube 96 stationary and presses upon the outer faces of the drum part 112 of the connector 110 and the disk 92 of the sleeve 90 so as to press the insulating sleeves into the ends of the tube 96 into tight fitting relation therein until

the washer 108 is strongly clamped between the drum part 112 of the connector 110 and the end of the tube 96. The sleeve 90 being crimped to the other end of the wire its position with respect to the gear 60 is automatically determined by the location of the washer 108 abutting the other end of the tube.

The press fitting of the insulating sleeves 94 and 106 in the ends of the tube 96 assure rotation of the wire and the end connectors with the rotation of the tube.

The rotation impelling and connecting unit 84 is loosely journaled in a connector tube 114 which connects the interior, handle bearing housing 16 to the external, lamp supporting and revolving housing 12. The tube 114 is formed at its inner end with milled flat key surfaces 116 and 118 which, as it will presently appear, permit the housing 16 to be oriented in either one of two angular positions relative to the axis of the tube while keying the tube to the housing.

The housing 16 is formed with a transverse aperture 120, Fig. 5, having a reduced portion 122. Aperture 120 receives a keying pin 124 having a milled flat key surface 126 adapted to cooperate with a selected key surface 116 and 118 to secure the tube 114 and housing 16 against relative rotation. The key pin 124 is formed with a reduced threaded end 128 which passes through the reduced portion 122 of the transverse aperture and projects therebeyond to receive the mounting nut 130. It should be noted that the relatively, angularly disposed key surfaces 116 and 118 permit relative angular orientation of the housing 16 and tube 114 as necessary for mounting on the right or the left hand side of an automobile.

The tube 114 is formed at its other, outer end with a key slot 132 and opposite to the key slot a threaded opening 134. The external lamp supporting housing 12 is preferably a die casting having an open chamber 136 at its outer end, a hollow boss 138 upstanding from the housing 12 and an axial opening 140 communicating with the chamber 136 and extending transversely to the axis of the hollow boss 138. The opening 140 is formed with enlarged portions 142 and 144 on opposite ends thereof. The portion 144 of the opening is of a diameter to provide a journal for the beveled gear 100 while the portion 142 is of a size to receive the mounting and supporting tube 14 so that that tube forms a journal for the housing 12. The central portion of the opening 140 is formed with an integral axially extending key or spline 146 to receive the key slot 132 in the tube 114. A locking screw 148 passes through a suitable opening in the housing 12 and is threaded into the opening 134 of the tube 114 to secure the tube against longitudinal movement relative to the housing 12.

The housing 12 at its inner end is split by a slot 150, Fig. 6, to form clamping sections 152 and 154, the sections having aligned openings transverse to the housing to receive a clamping screw 156 and the section 154 being internally threaded so that on tightening of the clamping screw the sections 152 and 154 will be brought together to set up the desired rotational friction between the stationary mounting tube 14 and the housing 12 so that the bracket 12 and the lamp 2 will remain in any angular position to which it may be set.

The gear 100 meshes with like beveled gear 158 having a hub 160 received in a stud 162 to which it is keyed as by the pin 164. The stud 162 is formed with spaced annular flanges 166 receiving

between them a split ring 168 of friction material. The thrust bearing 10 consists of a sleeve having a peripheral flange 170 seated in a complementary groove in the upper end of the boss 138 of the housing 12. The bearing sleeve is also formed with an internal flange 172 at its upper end to form a retaining ring 4 of a helical spring 174 interposed between the flange 172 and the upper peripheral flange 166 of the stud 162. The external surface of the sleeve above the flange 170 forms a bushing or journal for the rotation of the bracket 8, the outer portion of which is formed with an annular recess to receive the upper portion of the sleeve.

The sleeve is also provided internally with an upper portion 176 which is of less diameter than the lower portion thereof to form an internal shoulder 178 which is adapted to engage the upper peripheral flange 166 of the stud 162 to serve as a limit stop. The bearing sleeve 10 is assembled with the stud 162, with which the gear 158 has already been assembled, by a pressing operation which forces the bearing sleeve over the friction ring 168, the external diameter of which is slightly greater uncompressed than the internal diameter of the bearing sleeve.

The stud is formed above the bearing sleeve 10 with a key portion formed by opposite flat sides 180 fitting in a hole of like conformation in the bracket 8 so that the bracket is keyed to the stud for rotation therewith. Above the key portion 180 the stud is formed with a threaded end 182 on which is mounted a lock washer 184 and a locking or clamping nut 186.

The bearing sleeve 10 is formed with a pair of chordal cuts 188 communicating with a common opening 190 so as to form a resilient clutch finger 192 adapted to bear on the friction ring 168. A set screw 194 threaded in the boss 138 bears at its inner end against the resilient, arcuate finger 192 adjustably to determine the "clutch" pressure between the finger and the frictional ring 168 so that the friction clutch formed by this arcuate finger and the friction ring holds the lamp unit against free or inadvertent rotation while allowing the stud to rotate relative to the thrust bearing on intentional rotation of the gear 158. The sleeve 10 is keyed to the housing 12 as by cross pin 195. The gear 158 and the stud 162 are provided with an axial opening extending completely therethrough and an insulated conductor 196 passes therethrough from a wire 198 of a lamp unit to a connector pin 200 resiliently maintained in engagement with the drum portion 112 of the connector 110 by a coil spring 202 interposed between the gear 158 and the enlarged head of the connector pin. The chamber 136 of the housing 12 is closed by cap 204 having a part circular flange 206 received in the chamber and secured to the housing 12 by a screw 208 passing through an opening in the lower wall of the housing and received in a threaded opening in the part circular wall 206 of the end cap.

The mounting and supporting tube 14 passes in the usual manner through an appropriate opening in the corner post between the windshield and side window of an automobile and is fixedly secured thereto in any convenient manner, as by the usual bracket having a split ring portion which is tightened to rigidly clamp or lock the mounting tube 14 against rotation. The tube 14 at its inner end is formed with a part circular portion 210, Fig. 11, the opposite longitudinal edges 212 of which form buttons or stops en-

gageable with the opposite edges of a lug and key 214 formed on the internal wall of the longitudinal opening 56 of the housing 16 so that the revolution of the housing 16, and the consequent revolution of the lamp unit about the common axes of the several tubes to raise or lower the lamp unit, is held within the limits prescribed by the laws of the various states.

The spot lamp constructed in accordance with the present invention may be assembled as follows:

The rotation impelling and conductor unit 84 is inserted in the housing 12 prior to the location of the cap 204 so that the unit extends from the inner end of the housing and the gear bears against the inner wall of the chamber 136. The rotation drive unit including the gear 158, the stud 162 and the assembled thrust bearing 10 is preliminarily assembled with the bracket 8 and the bracket riveted to the housing shell 4 of the lamp unit. The lamp is now assembled with the housing 12 by inserting the thrust bearing sleeve 10 into the opening of the boss 138 of the housing and the gear 158 brought into meshing relation with the gear 100 and the connector pin 200 bears upon the drum 112 of the connector sleeve 110. The housing cap 204 is then placed in position and secured by the screw 208. The tube 114 is now inserted into the housing 12 from the inner end thereof by aligning the key slot 132 with the internal key 146 and pushing the tube inwardly until the opening 134 is aligned with the complementary opening in the bottom of the housing 12, at which time the set screw 148 is threaded into the opening 134 to secure the tube 114. The mounting and supporting tube 14 is then inserted in the housing 12 and the screw 156 tightened frictionally to clamp the housing to the tube 14.

The housing 16 having been assembled with the handle unit 20, the gear 60 and the switch unit 18 and the closing gap 64, the assembled unit 84, tube 114 and tube 14 are inserted in the housing 16, the whole being rotated until the key slot 98 of the tube 96 registers with the internal key 62 of the gear 60, and the whole is then pressed inwardly until the tube 14 bottoms against the internal shoulder formed by the outer enlarged portion of the central opening 56 of the housing. The housing 16 is then rotated on the tube 114 until one of the key surfaces 116 and 118 is aligned with the opening 120 in the housing. The pin 124 is then inserted with its flat surface 126 engaged with the selected key surface of the tube 114 and a nut 130 applied to secure the pin to the housing and thereby key the housing to the tube 114. The assembly of the spot lamp is thus completed. On installation of the spot lamp in an automobile the entire inner control unit is removed by detachment of the pin 124. The external unit is then inserted through the prepared opening in the frame post of the automobile and the bracket mounted on the frame post to receive it is then clamped to the tube 14. The installation is completed by replacing the interior control unit which is swung on the tubes 14 and 114 to clear adjacent parts of the automobile and to position the handle in the proper position when the lamp unit is in vertical position and the pin 124 is then replaced and locked by the nut 130.

The flat key surfaces 116 and 118 of the tube 114 are so placed in angular relation to the key slot 132 at the opposite end of the tube that when the lamp is installed on the lefthand side of the automobile the key surface 116 will, when

the lamp unit is in vertical position, be aligned with the opening 120 whereas when the entire unit is mounted on the righthand side of an automobile, with the lamp unit in vertical position, the key surface 118 will be aligned with the opening 120.

It will be apparent from the foregoing description that applicant has provided an invention to simplify the construction of a dirigible spot light, and a construction which is more readily susceptible to mass production to reduce the cost thereof, while at the same time providing a more efficient and rugged structure. Applicant has also provided a more efficient and less expensive means for holding the spot light at any angle to which it may be adjusted or manipulated, a more rugged and less expensive means for carrying the electric current to the spot light, and a dirigible spot light which is to be mounted on either the right or left side of the automobile at will.

It will be obvious that changes may be made in the form, construction and arrangement of the parts without departing from the spirit of the invention or sacrificing any of its advantages, and the right is hereby reserved to make all such changes as fairly fall within the scope of the following claims.

What I claim is:

1. In a dirigible spot lamp having longitudinally separated head and handle housings, a spot lamp mounted on said head housing for rotation thereto and for revolution therewith, gears in said head and handle housings for causing rotation of the lamp relative to the head housing and telescoped shafts connecting the head and handle housings and the gears therein to cause revolution of the lamp on revolution of the handle housing and rotation of the lamp on rotation of the gear in the handle housing, a handle unit comprising a stud having a gear formed integrally therewith at one end to engage the gear in the handle housing, said housing having an opening therein of greater diameter than said gear to permit insertion of the gear into the housing through said opening, a sleeve having an inner portion extending into said opening to close the same and secured to said housing and having an outer portion extending from said opening, said stud being journaled in the inner and outer

portions of said sleeve, said stud being externally threaded at its lower end, a hollow handle having an internally threaded portion threaded on the lower portion of said stud and an internal bore portion of greater diameter than said threaded portion and above said threaded portion to receive the lower portion of the sleeve and journal the handle to said sleeve, and a nut within said bore portion of greater diameter to lock said stud and said handle in non-rotatable relation.

2. In a dirigible spot lamp having a handle housing and a drive gear in said housing, a handle unit comprising a stud having a gear formed integrally therewith at one end to engage the gear in the handle housing, said housing having an opening therein of greater diameter than said gear to permit insertion of the gear into the housing through said opening, a sleeve having an inner portion extending into said opening to close the same and secured to said housing and having an outer portion extending from said opening, said stud being journaled in the inner and outer portions of said sleeve, said stud being externally threaded at its lower end, a hollow handle having an internally threaded portion threaded on the lower portion of said stud and an internal bore portion of greater diameter than said threaded portion and above said threaded portion to receive the lower portion of the sleeve and journal the handle to said sleeve, an annular internal shoulder between the portions of different diameter of said bore, the lower portion of the sleeve terminating short of the annular internal shoulder in said handle and a lubricating ring surrounding said stud and confined between the lower end of the sleeve in said internal shoulder of the handle.

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