Sept. 12, 1950 H. R. GROSS 2,521,971

SWITCH CONNECTOR FOR SPOTLIGHTS

Filed Dec. 3, 1947

Fig. 1.

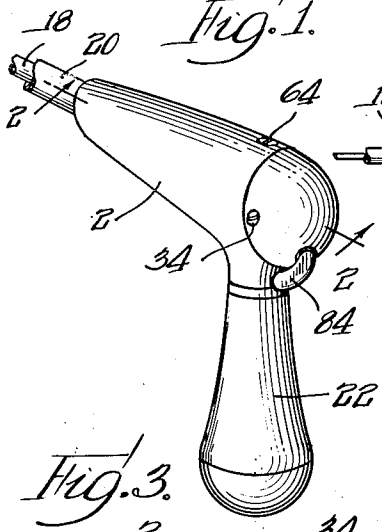


Fig. 2.

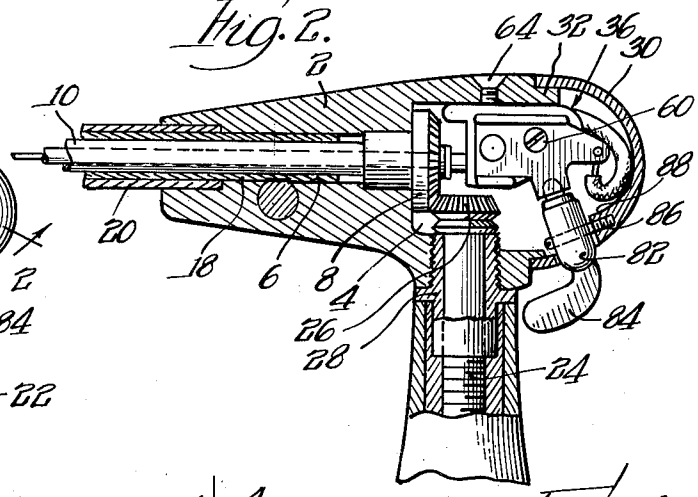


Fig. 3.

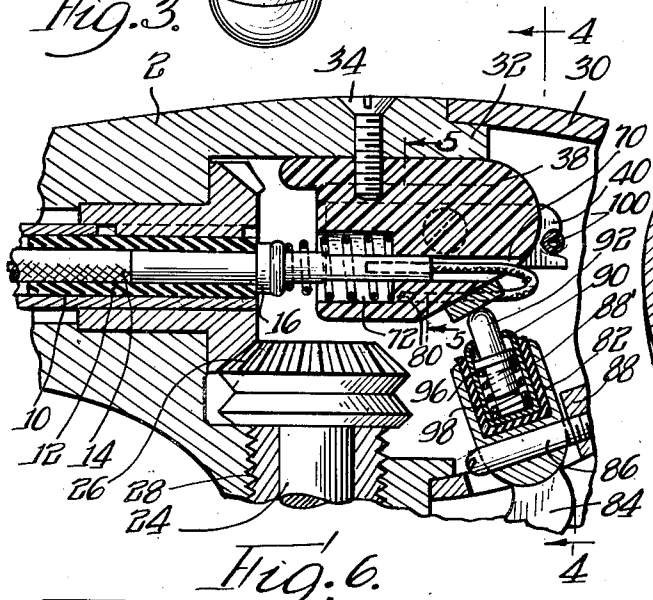


Fig. 4.

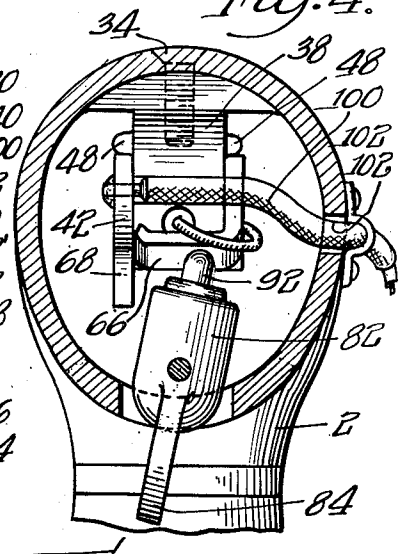


Fig. 6.

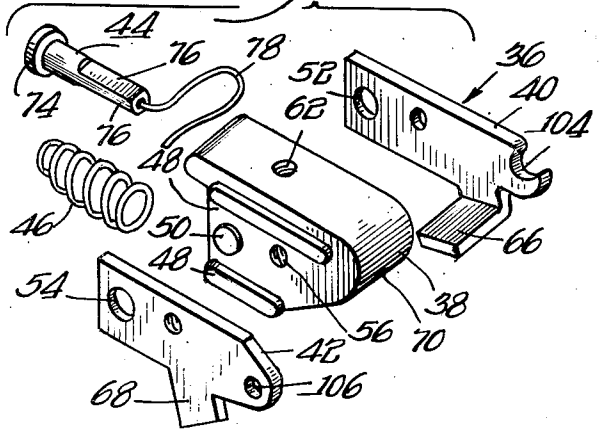
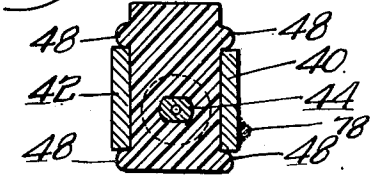


Fig. 5.



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SWITCH CONNECTOR FOR SPOTLIGHTS

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1 Claim. (Cl. 200—51)

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This invention relates to a switch connector for a rotary conductor, and more particularly to a switch connector for the rotary conductor of a dirigible spot light.

In dirigible spot lights, it is most convenient to provide a rotatable conductor having rotary contact terminals at its opposite ends to connect a control unit mounted in a position inside an automobile to a lamp unit mounted outside the automobile. Difficulty has been encountered in providing a satisfactory connection between a stationary switch mounted in the control unit and the rotary contact terminal of the rotatable conductor. This difficulty has been occasioned by the fact that tolerances allowed in the cutting and forming of the many parts which mechanically and electrically connect the control unit to the lamp unit are cumulative and cause a wide variation in the positioning of the rotary contact terminal of the rotatable conductor in the control housing. Some form of shiftable connector to wipe the rotary contact of the rotatable conductor must therefore be provided and its connector must be secured to a stationary part in the control housing effectively to secure it against rotation while bearing upon the rotary contact irrespective of the position which it may occupy in the control housing due to the accumulated tolerances. This connector must be connected to a control switch, mounted in the control housing, and this control switch must be fixed in position to cooperate with a switch operator extending from the housing to a predeterminedly located opening closely fitting the switch operator. It is essential that the control unit be as small as possible in order that it may infringe as little as possible upon the driver's vision and with his manipulations of the various controls necessary to handle the modern automobile. It is also essential to the economical manufacture of the spot light that the maximum number of parts be formed by die castings, stampings and other mass production methods which require that provision be made for mounting each of the various parts in fixed position.

It is accordingly an object of this invention to provide a control unit meeting the above specifications, and more particularly to provide a combined switch and connector assembly for the control unit, which assembly shall occupy the minimum of space and permit a movement of the connector part a sufficient distance to take up all of the cumulative tolerances and yet bear against the rotary contact terminal with sufficient force to insure a good electrical connection under all conditions.

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A further object of the invention is to provide a connector switch for such use which is comprised of a minimum number of parts which can be readily assembled by assembly line methods of mass production.

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

Fig. 1 is a view in perspective of a control unit embodying the present invention;

Fig. 2 is a fragmentary view in vertical section taken along the lines 2—2 of Fig. 1;

Fig. 3 is an enlarged fragmentary view on a portion of Fig. 1 with additional parts being shown in section;

Fig. 4 is a view in vertical section taken along the line 4—4 of Fig. 3;

Fig. 5 is a view in vertical section taken along the line 5—5 of Fig. 3; and

Fig. 6 is an exploded view in perspective of the parts of the connector switch which is constructed in accordance with the present invention.

As shown in Fig. 1, a control unit embodying the invention comprises a die casting 2 having an open rear control chamber 4 and a longitudinal bore 6 extending from the chamber 4 to one end of the housing casting 2. The bore 6 is provided with an inner enlarged portion to receive the hub of a beveled gear 8 keyed to a tube 10 in which there is mounted for rotation with the tube an insulating sleeve 12 and a conductor 14 carrying at its inner end a rotary contact terminal 16. The conductor 14, sleeve 12 and tube 10 are journaled in a sleeve 18 to rotate the dirigible spot light about a vertical axis, as is well known. The tube 18 is secured in any convenient manner to control unit housing 2 to rotate about its axis on revolution of the control unit thereby to cause revolution of the spot lamp about the horizontal axis, as is well known. The housing 2 is mounted on and supported by stationary tube 20, as is conventional. The control handle 22 is secured to a stud 24 formed with a beveled gear 26 and journaled in a bushing 28 threaded in an opening in the housing. The control chamber 4 of the housing is closed at its rear end by die cast cap 30 fitting at its forward end over a reduced annular flange 32 of the housing and the cap is detachably secured to the housing as by a screw 34 received by a suitable opening in the rim of the cap 30 and threaded into a suit-

able opening, not shown, in the flange 32. A connector switch 36 is mounted in this control chamber 4 and a space provided by the streamlined cap 30. This connector switch comprises a molded mounting block 38 of Bakelite or other insulating plastic, switch blades 40 and 42, connector sleeve 44 and spring 46. The mounting block 38 is formed with spaced projecting surfaces 48 on each side to receive and form a seat for the switch blades 40 and 42 and with a button 50 on each side to be received in an opening 52 in the blade 40 and a like opening 54 in the blade 42 to locate the blades in proper position for cooperation with a switch operator. The mounting block is also provided with threaded openings 56 to receive an attaching screw 58 or 60 to fasten the switch blades thereto. A threaded opening 62 in the top of the block 38 receives a mounting screw 64 by means of which the switch is mounted in the housing 2, as illustrated in Fig. 2. The switch blade 40 is formed with a lateral lug 66 and the switch blade 42 with a dependent lug 68, the lug 66 extending beneath the block 38 and terminating as illustrated in Fig. 4 just short of the lug 68 of the blade 42. The mounting block 38 is also formed with an opening 70 having opposite flat sides and extending from the rear of the mounting block longitudinally thereof to an enlarged circular opening 72 extending longitudinally to the forward face of the block. The connector sleeve 44 has an enlarged head 74 which forms a contact terminal or brush to engage the rotary contact terminal 16 and the inner portion of the sleeve is flattened at opposite sides as at 76 to crimp the sleeve to a bared wire 78 and to hold the sleeve against rotation when it is inserted in the opening 70 of the mounting block. It should be noted that the opening 72 in the block 38 is of greater diameter than the head 74 of the connector sleeve and also of greater diameter than the rotary contact terminal 16. The coil spring 46 is received in the opening 72 and bears at one end against the internal shoulder formed by the opening and at the other end against the head 74 of the connector sleeve. The spring urges the connector sleeve outwardly into resilient engagement with the rotary contact terminal 16 and allows the sleeve to be extended from the block 38 or if necessary to be retracted into the block to accommodate the cumulative tolerances which cause the rotary contact terminal 16 to assume different positions or spacings from the switch block 38.

The bared wire 78 passes through the opening 79 in the block 38 and is looped over along the switch blade 40 to which it is soldered at its free end as at 80. The wire 78 is sufficiently flexible and made sufficiently long to permit the required extension and retraction of the connector sleeve.

The switch operator comprises a die cast cup 82 having a finger piece 84 secured as by a pin 86 to a boss 88 of the cap 30 so that the operator extends out of the control housing through a suitable opening in the cap 30. An insulating cup 88' is press fitted into the cup 82 and a metal cup shell 90 is press fitted into the insulating cup 88. The cup 90 receives switch pin 92 and is peened over to retain the pin. The pin is provided with a peripheral flange 96 against which a spring 98 bears at one end, the spring bearing at its other end against the bottom of the metal cup 90. The spring 98 resiliently urges the pin in contacting engagement with the lug 66 of the switch blade 40. When the switch operator is swung in a counter-clockwise direction, as seen in Fig. 4, the switch pin 92 bridges the gap between the switch lug 66 and the switch lug 68.

A hot wire lead-in 100 extends into the control chamber 4 to a suitable opening 102 in the side wall of the housing 2. The conductor is supported in a notch 104 of the outer end of the switch blade 40 and its bared end is received in an aperture 106 in the end of the switch blade 42 and is soldered to that end.

In assembly of the parts with the control housing 2 the gear 8 is first mounted in the chamber 4, the gear 26 attached to the handle stud 24 and the sleeve 28 is introduced into the chamber 4 and the sleeve 28 tightened to hold the parts in such relation. The switch block 38, with its associated parts mounted thereon, is mounted in chamber 4 by screw 64 and the cap 30 with the switch operator assembled therewith is attached to the housing by the screw 34. The assembly of the mounting tubes 20, 18 and 10, the sleeve 12, and the conductor 14 are inserted in the housing 2. The rotary contact terminal 16 at the end of the conductor assumes a position in the chamber 4 which varies with the accumulated tolerances so that its spacing relative to the forward edge of the block 38 may vary considerably. Whatever position it assumes it engages the head 74 of the connector sleeve 44 and depresses it toward or into the block 38 so that firm electrical contact is established between the stationary head 74 of the connector sleeve and the rotary contact terminal 16.

It will be apparent from the foregoing description that applicant has provided a rotatable conductor having rotary contact terminals at its opposite end to connect a control unit mounted in a position inside an automobile to a lamp unit mounted outside the automobile, and more particularly a combined switch and connector assembly for the control unit which shall occupy the minimum of space and permit a movement of the connector part a sufficient distance to take up all of the cumulative tolerances and yet bear against the rotary contact terminal with sufficient force to insure a good electrical connection under all conditions. Applicant has also provided a connector switch for such use which is comprised of a minimum number of parts which can be readily assembled by assembly line methods of mass production.

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 claim.

What I claim is:

A connector switch for a rotary conductor comprising a stationary mounting block of insulation, said block having longitudinally extending grooves in its opposite sides, switch blades mounted in said grooves and extending rearwardly beyond said block, one of said blades having a portion extending transversely of the block and terminating just short of the switch blade on the opposite side of the block, a switch operator having a shiftably mounted member in engagement with said portion of the blade extending across the block and shiftable therealong to bridge the gap between the blades, said block having a longitudinally extending open-

ing therein, said opening having flat sides and opening to the rear side of the block and communicating with a larger opening opening into the forward face of the block, a connector pin having a portion with flat sides slidably and non-rotatably received in the first-mentioned opening in the block and an enlarged head smaller than said second-mentioned opening so that the pin may move into the block, and spring means mounted in said block and bearing at one end against the block and at the other end against the enlarged head of the connector pin to extend the pin from the block and permit its retraction to the block in accordance with the spacing of the rotary conductor from the forward face of the block.

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