Dec. 4, 1934. L. O. PARKER 1,983,095

CONTACT ASSEMBLY

Filed Sept. 20, 1929

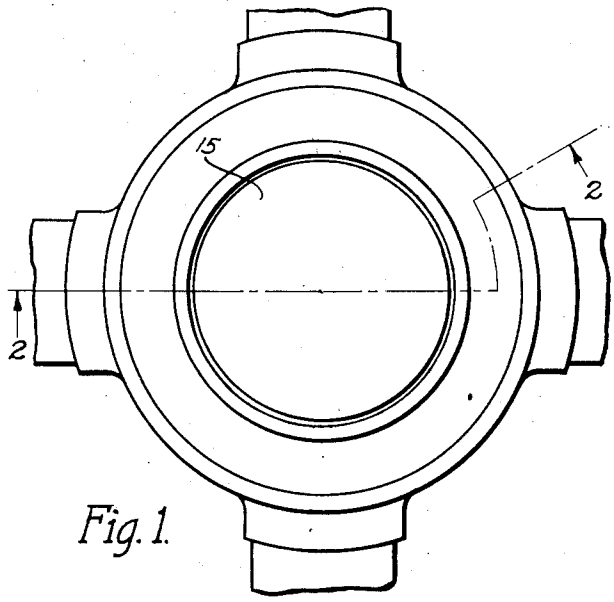


Fig. 1.

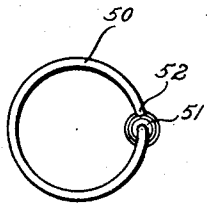


Fig. 4.

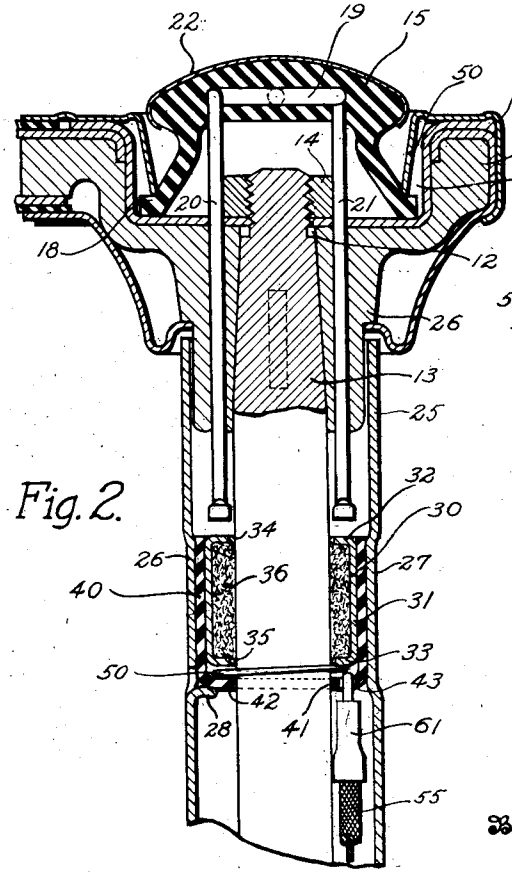


Fig. 2.

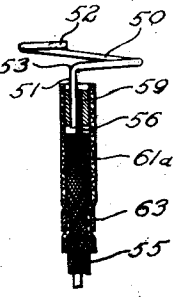


Fig. 5.

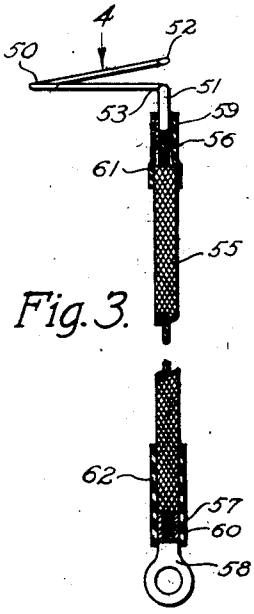


Fig. 3.

Inventor
Leslie O. Parker

By Spencer, Hardman & Fehr
His Attorneys

Patented Dec. 4, 1934

1,983,095

UNITED STATES PATENT OFFICE

1,983,095

CONTACT ASSEMBLY

Leslie O. Parker, Anderson, Ind., assignor, by mesne assignments, to General Motors Corporation, Detroit, Mich., a corporation of Delaware

Application September 20, 1929, Serial No. 393,891

7 Claims. (Cl. 200—59)

This invention relates to a circuit controlling device, and it is intended to be used in connection with a horn button assembly similar to that shown in the patent to A. R. Lewellen, No. 1,651,397 patented December 6, 1927.

The particular feature to which this invention relates is a relative fixed contact within the steering column which cooperates with a movable contact member reciprocating through and guided by the steering hub, yet rotatable therewith.

It is an object of the instant invention to provide within the steering column a part including the fixed contact so constructed as to permit the wire leading to the fixed contact to be carried within the steering column.

A further object of this invention is to provide a switch structure of the class described which permits a wide variation of the juxtaposed parts and yet insures engagement between the cooperating contact members, that is not provided by the structure referred to.

A further object of this invention is to provide a switch contact and terminal assembly for use in steering post switches, which may be produced as a complete sub-assembly and produced as an article of manufacture for the trade at large.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawing wherein a preferred embodiment of one form of the present invention is clearly shown.

In the drawing:

Fig. 1 is a top plan view in fragmentary showing of the steering post embodying this invention.

Fig. 2 is a longitudinal section of a steering column embodying the instant invention substantially as indicated by the line and arrows 2—2 in Fig. 1.

Fig. 3 is an elevational view of the switch contact and terminal connector contributing to the instant invention.

Fig. 4 is an end view thereof substantially as indicated by the arrow 4 of Fig. 3.

Fig. 5 is a view of a modified form in section.

With particular reference to the drawing in which the reference characters refer to similar parts throughout the several views, 10 designates a hub casting which has an open top central recess 11 and a central bore 12 adapted to fit upon the upper tapered end of a steering shaft 13. The hub casting 10 is secured to said post or shaft by a nut 14 disposed within the recess 11 and that tends to force the casting 10 upon the tapered portion of said shaft, being restrained from rotation thereabout by a key as indicated in Fig. 2 and well known to those skilled in the art. The recess 11 forms a housing for a soft rubber horn button 15 which is retained therein by means of a depending annular flange 50 of the cover plate 51 secured about the hub 10 so that said flange engages the bottom flange 18 of the button 15. The button 15 is secured about a hairpin member 19, the legs 20 and 21 of which are disposed in passages of the hub 10 along the aperture 12 and diametrically disposed thereabout. The button 15 is further provided with a cover 22 of rigid material as pyralin, celluloid or similar substance so that the button may be depressed without deformation thereof beyond a certain point. The hair pin 19 is thus reciprocally movable along the axis of the hub 10 and is resiliently urged to the retracted position by means of the inherent resiliency of the button 15.

The steering column supporting the shaft 13 includes a tubular mast 25 encircling the said shaft and telescopically engaging a portion of the hub casting 10 as at 26. Disposed within the mast and slightly below the hub casting 10 there is provided an anti-rattle bushing 30 which is frictionally retained within a constriction of the mast 25 formed by depressing the walls of the tube inwardly as at 26 and 27. A lug 28 is struck inwardly at the bottom of or near the lower end of this constriction so as to provide a stop radially directed toward the shaft 13 and prevent the bushing 30 from sliding to the bottom of the column.

In the present instance, the anti-rattle bushing 30 consists of a metal ring 31 of cylindrical formation the peripheral edges of which are inwardly flanged at 32 and 33 substantially as indicated in Fig. 2. This provides a longitudinal bore through the bushing that terminates in restricted portions 34 and 35 that are only slightly larger than the diameter of the shaft 13 and forms an annular receptacle within which is packed a quantity of corded fiber material 36. In practice it is found that this fiber packing may be formed into a washer like member, the central opening of which is considerably smaller than the diameter of the shaft 13 so that when forced thereover the fibers of the packing will be firmly compressed and will tend to rigidly engage the shaft restraining it from coming in contact with the inwardly directed flanges 32

and 33 of the said metal casing. At the time of assembly the packing 36 is saturated with a suitable lubricant which also contributes to elimination of rattle and noise in the assembly.

The anti-rattle bushing 30 is rigidly supported within the mast 25 by an insulating sleeve or cup-like member 40, the bottom wall 42 of which is apertured at 41 to nicely fit about the shaft 13 and permit rotation of the shaft therein. The sleeve 40 is of such dimension as to just receive the bushing 30 and fill the annular space between it or the ring 31 and the constricted portion of the mast 25. The bottom edge 42 of the cup resting upon the stop lug 28 struck inwardly at the bottom of the constriction, and this edge 42 of the cup is apertured at 43 at one side of the central opening 41 for the passage of an electrical conductor which has connection with the metal casing 31 as will presently appear. It will be noted from the illustration that the bushing 30 with the non-conducting cup 40 which insulates the ring 31 from the mast 25 is positioned just below the free end of the hairpin 19 of the horn button structure hereinbefore described, and is within the range of depression attributed to said button so that when the button 15 is depressed that one or the other or both of the legs 20 and 21 will engage the ring 31 for purposes later to be described.

The switch contact and terminal assembly forming the subject matter of this invention is fully illustrated in Figs. 3 and 4, and its relative association with other parts of the structure is clearly illustrated in Fig. 2. The assembly comprises a single turn or loop 50 simulating an open spring ring, one end of which terminates in the extension 51 angularly disposed relative to the ring portion and in substantial parallel alignment with the axis of the helix from which the ring might be composed. By forming this ring from a single turn of a helix as illustrated in Fig. 3, there is then provided the free end 52 disposed out of the plane of the juncture 53 with the extension 51 that provides for considerable flexing of the spring without exerting the same beyond its elastic limit, since this flexing is distributed throughout the entire length of the member 50 between its free end 52 and the extension 51. When disposed in the bottom of the cup 40, as illustrated in Fig. 2 with the extension 51 disposed within the side aperture 43, and the ring 50 encircling the shaft 13, a spring seat will be provided for the bushing 30 which reduces the degree of accuracy with which the parts have to be assembled. It is obvious from this structure when completely assembled as in Fig. 2, that depression of the button 15 in moving the hairpin 19 to engage the ring 31, that electrical contact will be made between the grounded structure of the button 15 and the extension 51 by way of the legs 20 and 21 of the hairpin engaging the ring 31 and thence through the free end 52 of the ring 50. When the hairpin 19 engages the ring 31 the ring 50 is electrically connected therewith by reason of the interposed ring 31 and traversed by the current conducted thereto through the attached lead.

The terminal assembly in its completed form includes a non-conducting lead 55, each end of which is bared as at 56 and 57 so as to provide an electrical contact with the extension 51 and a terminal member 58 respectively. In the instance of connection of the bared end 56 with the extension 51, the elements 51 and 56 are lapped over one another as illustrated in Fig. 5, and a metal clip 59 is then compressed about them to frictionally secure the elements together. The terminal connector 58 is secured to the bared end 57 in the usual way known to the art, in that a clamping portion 60 is compressed about the bared end 57. The metallically connected portions of the conductor 55 with the extension 51 and the terminal connector 58 are then properly fluxed and subsequently soldered as is the usual process.

Rubber or other non-conducting flexible or pliable sleeves 61 and 62 which have previously been slipped over the ends of the conductor 55, are then rolled or worked up over the said connections as illustrated in Figs. 3 and 5, so that the sleeve 61 completely covers and insulates the metallic and soldered connection between the conductor 55 and the extension 51, while the sleeve 62 similarly covers and insulates the connection of the conductor 55 with the terminal 58. In one form of the invention, the sleeves 61 and 62 are formed of short lengths of band tubing or relatively pure gum of a dimension that must be stretched slightly in order to pass over the insulated conductor 55. When these sleeves are subsequently worked over their respective connections, they will then be under tension and will so firmly engage the parts as not to be readily moved therefrom without extraneous effort.

In another form of the invention, the sleeves 61 and 62 are formed of woven corded or fabricated material impregnated with shellac, varnish, or the like, as indicated at 61*a* in Fig. 5. When the lead 55 is attached to the terminal members 50 and 58 as above described these sleeves 61 and 62 are then moved over the soldered connection where they are secured by a clamp ring or band 63 which compresses the sleeves into the body of insulation as shown in Fig. 5.

The conductor assembly thus formed may be readily disposed in the cup 40 so that the lead 55 will extend along the mast 25 between it and the shaft 13, presenting the terminal 58 at the bottom end and outside thereof for proper connection with the sound signal which it is designed to control. All parts of the conductor assembly will thereby be properly insulated from all of the elements of the steering column structure, and the terminal ring 50 as it is seated within the cup 40 will be in electrical engagement with the metal ring 31 which is selectively engaged by the grounded structure of the hairpin 19, operating to close the circuit through the sound signal and energy source.

While the form of embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. In an electric contact device for steering columns, a fixed tubular column, an inner rotatable steering post, an annular insulating sleeve between said column and post, said sleeve providing an inwardly directed flange engaging said post, a resilient annular contact member supported on said flange and encircling said post, a grounded reciprocating contact member guided to contact with said annular sleeve, means carried by said sleeve for bridging the connection between the contact members, and a button for reciprocating the contact member.

2. In an electric contact device for steering

columns, a fixed tubular column, an inner rotatable steering post, an annular insulating sleeve between said column and post, said sleeve supporting a relatively fixed resilient contact member encircling said post, an oil receptacle carried by said sleeve and disposed against said spring contact and means movable along the post for electrically connecting said spring contact member.

3. As an article of manufacture, a switch contact and connector, comprising in combination, a resilient annular ring providing an axially directed stem, an insulated conductor having a terminal connector provided with a bared end, a metallic clip compressed about said stem and bared end, and a pliable insulating sleeve encompassing said metallic clip whereby a weather proof connection is made between the stem and conductor.

4. In a switch contact and connector, the combination comprising, a resilient annular ring providing an axially directed stem, an insulated conductor having a terminal connector provided with a bared end, said stem and bared end overlapping, a resilient clip compressed about the overlapping stem and conductor end to electrically connect the same, and an insulating sleeve of pliable material encompassing said connection.

5. In a switch contact and connector, the combination comprising, a length of insulated conductor having a bared portion at each end thereof, a terminal member electrically secured to each bared end by overlapping a portion thereof, one of said terminal members comprising substantially a single turn of a helical spring terminating in a stem parallel with the axis of said helix for connection with one of said bared ends, a clip compressing portions of said terminal members and bared ends into engagement, and a non-conducting pliable sleeve frictionally encompassing portions of said terminal members to cover said clip and adjacent conductor.

6. A contact assembly for steering column switches, comprising in combination, a single turn of a helical spring terminating in a member parallel with the axis of said helix, an insulated conductor secured thereto, and a non-conducting pliable sleeve enveloping said connection, said assembly adapted to be mounted in a steering column so as to have its spring ring portion encircling the steering post for engagement with a bridging conductor, and its insulated conductor extending along the column between it and the post.

7. An article of manufacture comprising in combination, a length of insulated conductor having bared end portions, an open spring ring switch contact, a terminal member, means clinching the switch contact and terminal member to the bared ends of said conductor, and gum rubber sleeves stretched over the connections thus made to cover said clinched portions.

LESLIE O. PARKER.