Aug. 27, 1929. R. B. BENJAMIN 1,726,335

ELECTRICAL CONTACT MAKING DEVICE AND ASSEMBLING THE SAME

Filed Dec. 22, 1927

Fig. 1.

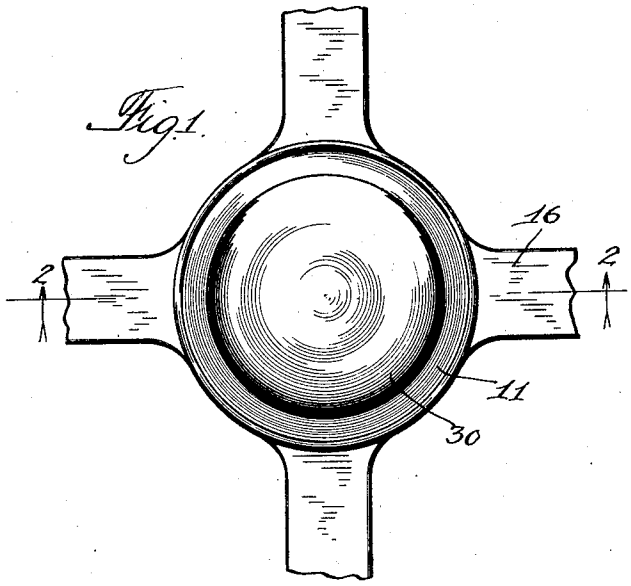


Fig. 2

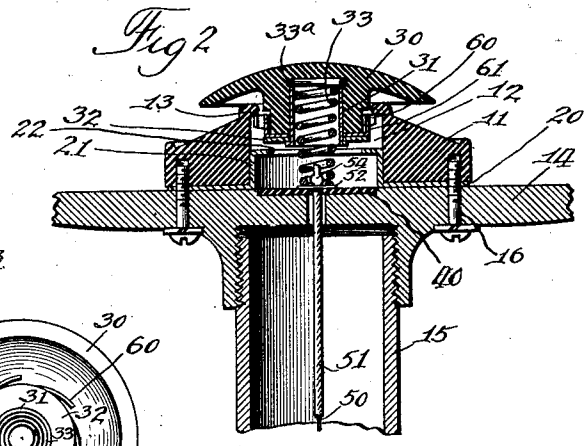


Fig. 3.

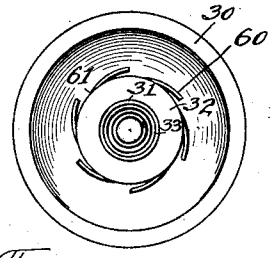


Fig. 4

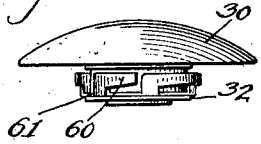


Fig. 6.

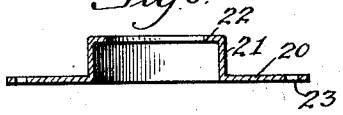
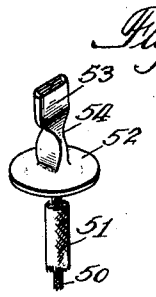


Fig. 5.



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Patented Aug. 27, 1929. 1,726,335

UNITED STATES PATENT OFFICE.

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ELECTRICAL CONTACT-MAKING DEVICE AND ASSEMBLING THE SAME.

Application filed December 22, 1927. Serial No. 241,851.

My invention relates to an improved form of contact-making device of especial utility in circuits comprising electrical signalling apparatus that is to be operated for short intervals only, as for example, a signal bell, motor-car horn, siren or the like.

One of the objects of my invention is to provide a contact-making device comprising a push-button of improved construction that readily lends itself to rapid and simple assembly.

A further object of my invention is to provide a push-button, of the type generally in use on motor-cars for operating the warning signal, in which the movable part of the button may be instantly attached and detached from the balance of the contact-making device without the use of any tools whatsoever.

A further object of my invention is to provide a push-button of the type which may be operated either by a straight downward pressure on the button or a tilting movement thereof in which the button part may be readily connected and disconnected with respect to the base part.

Other objects will appear in connection with the description and drawings that form a part of the present specification. In the said drawings:

Figure 1 is a top plan view of my improved push-button contact-making device as it appears when applied to the center of a steering-wheel of a motor-car;

Fig. 2 is a sectional elevation of the device showing its interior construction;

Fig. 3 is a bottom plan view of the push-button proper showing the means employed for retaining the same in assembly with the main housing of the contact-making elements;

Fig. 4 is a side elevational view of the push-button shown in bottom plan view of Fig. 3;

Fig. 5 is a detailed elevational view of the manner in which the single wire leading to the device is provided with a contacting tip or end; and

Fig. 6 is a detail of a metallic disc that serves as one of the electrical contacts in the device.

Referring for the moment to Fig. 2, it will be seen that my improved contact-making device comprises a shell of molded insulating material 11 having an open interior space 12. The interior walls of this space are substantially vertical, but the space is somewhat constricted at the top thereof by the crimped or projecting edges 13. The general shape of this shell is not material, and it may consist of a molded phenol resin material, or of porcelain or other substance that does not conduct electric current. The edge 13 forms a fulcrum against which the edge of the button operates when pushed otherwise than centrally.

The shell 11 is attached to a supporting surface, such as a wall, table, or, as shown in Fig. 2, to the metallic spider 14 of a steering-wheel of a motor-car. This metallic spider 14 is attached to the metallic steering-post 15 of the motor-car. The latter is, by reason of the fact that in most modern motor-cars that are provided with a storage battery the negative side of said battery is connected with the metallic frame of the car, in metallic conducting relationship with the negative pole of the said storage battery.

The shell 11 is secured to the spider 14 by means of the screws 16 or their equivalent.

Between the insulating shell 11 and the metallic spider 14 there is inserted a metallic disc 20. This is in the form of a flat disc provided at its center with an opening having an upwardly extending flange 21, turned over at its upper edge 22 as seen in Fig. 6. This disc is provided with a number of holes 23 through which the screws 16 pass; although it may merely be notched to accommodate these screws. The object attained is to place this disc 20 into direct metallic contact with the spider 16, and hence with the negative side of the battery on the motor-car. The upper edge 22 of the disc 20, therefore, serves as the negative side of the contact-making device.

The upper, movable part of my improved contact-making device comprises a molded insulating push-button 30. This button has inserted and molded into it, during fabrication, a hollow metallic bushing 31. An annular flat metallic member 32, whose opening closely corresponds with an outside diameter of the bushing 31, is slipped over the end of the latter, whereupon the bushing 31 is rolled or crimped over the flat member 32, thus keeping the same tightly in place, while also securing good metallic conducting contact with the same.

A resilient metallic, preferably bronze or brass, spring 33 is placed into the interior of

the bushing 31, being retained therein by its tapering form and especially by the last turn 33^a of the spring which is made slightly larger than the other turns, so that it will, when pushed into the bushing 31, expand into the enlarged end of the same and be retained thereby. The spring 33 is sufficiently long so that it will extend, when but slightly compressed, to about the level of the lower surface of the metallic disc 20, but as the said disc is hollow, will, of course, not contact with the same.

Placed on the metallic spider 16, or in a recess in the center of the same, there is a disc 40 of a non-conducting material, preferably vulcanized fiber, hard rubber, laminated phenol-resin or the like. This disc has a central perforation through which extends the end of a wire cable 50. This wire cable is connected with the positive side of the storage battery already referred to.

The cable 50, provided with a protective covering 51 to prevent short circuits, is attached to a special form of terminal contact, as shown on an enlarged scale in Fig. 5. This terminal has a disc-like portion 52 and an upwardly extending tubular portion 53. In assembling the cable 50 to the terminal the end of the cable is pushed through the tubular portion 53 of the staple, whereupon the latter is twice crimped as at the points 53 and 54, thus firmly attaching the staple to the wire, and placing the former in good metallic contact with the wire. The planes of the crimpings preferably cross each other at right angles.

When assembled in the completed contact-making device, as shown in Fig. 2, the smaller end of the spring 33 will abut against the disc like portion 52 of the staple, the tubular portion of the staple extending upwardly within the convolutions of the spring 33. When thus assembled, therefore, it will be seen that the positive side of the battery will be connected with the spring 33 and the disc 32.

If now the push-button 30 is depressed, the disc 32 will contact with the disc 20, completing the electrical circuit and operating the signal device that is associated with it. By reason of the disc-like shape of the contacting members 20 and 32, this contact will be established even though the button 30 be pushed from one side, so that positive and certain operation of the contact-making device is secured. In the latter case the button operates like a telegraph key, forming the equivalent of a lever of the second class with the fulcrum at the projection 13. The actual point at which the fulcrum forms will be diametrically opposite the point where the button is pushed. The button is prevented from being pushed out of the shell 11 by being provided with a plurality of outwardly extending tangentially disposed resilient members 60, which are part of a sleeve 61, which surrounds the narrow part of the button 30, as shown in Figs. 2, 3, and 4. This sleeve may form either a part of the disc 32 or may be separated therefrom and placed between the disc 32 and the body of the button 30.

The spring members 60, in their normal positions, extend under the crimped edge 13 of the shell 11 and are held against this edge by reason of the resilience of the spring 33, which tends to push the button 30 out of the shell 11. As will be noticed in Figs. 3 and 4, the spring members 60 extend tangentially from the sleeve 61, all pointing in the same direction. Assume now for the moment, that the button 30 with its spring 33 and sleeve 61 and projecting spring members 60, as shown in Fig. 4, be placed in the opening 12 of the shell 11 and then rotated in a clockwise direction (counterclockwise as shown in the bottom view of Fig. 3), the projecting spring members 60 will tend to be compressed and will lie flat against the sleeve 61 so that the button 30, and the assembled parts thereon, can be pushed downwardly past the crimped edge 13 into the space 12. As soon as this takes place, the spring members 60 will again assume their original tangential positions and will therefore prevent the button 30 from being pushed out of the space 12 by the spring 33.

However, when it is desired to remove the button for purposes of repair or inspection, it suffices to pull upon the same while rotating it in a clockwise direction, when the action just described will repeat itself, the spring members 60 will be again compressed, and the removal of the button thereby made possible. It will thus be noted that the assembly and disassembly of the button 30 and the sleeve 61 with the appurtenances thereto attached can be accomplished without the use of any tools whatsoever, in an extremely simple and efficient manner.

Preferably, the outside dimension of the cylindrical portion of the button 30 is made just slightly smaller than the internal diameter of the crimped fulcrum flange 13, so that there will be a fairly close fit without however binding upon the button. There should be enough clearance, however, to insure that the button will not stick in contact, but will return to the position shown in Fig. 2 as soon as the pressure upon its upper surface is removed.

Where the wire cable 50 passes through the center of the steering column 15, it is provided with a covering of loom 51 so as to prevent short circuits and the undesirable operation of the signal device controlled by the contact-making device.

While for the sake of simplicity it has been stated that the wire 50 and the spring 33 and the disc 32 are in contact with the positive side of the battery, it is to be understood that the signalling device which is to be operated

will be cut into this part of the circuit as the disc 20 corresponds to the "ground" side of the circuit and, therefore, the operating device must be placed somewhere along the line of the cable 50.

Obvious modifications in the shape and method of assembly of my improved contact-making device and such as would constitute equivalents therefor are to be considered within the scope and intent of my present invention, for which I claim:—

1. An electrical contact-making device which comprises a push-button made of insulating material and comprising a top portion and a shank portion and resilient wing members on the shank of said button, the latter being foldable against said shank.

2. An electrical contact-making device which comprises a push-button made of insulating material, yieldable means for supporting said push-button, and resilient wing members on the shank of said button, the latter being foldable against said shank.

3. An electrical contact-making device which comprises a push-button of insulating material having a top portion and a shank portion, resilient tangentially extending wing members on the shank of said button, and a housing of insulating material; said wing members being foldable against said shank and insertable together with said shank into said housing.

4. An electrical contact-making device which comprises a push-button of insulating material having a top portion and a shank portion, resilient tangentially extending wing members on the shank of said button, a housing of insulating material; said wing members being foldable against said shank and insertable together with said shank into said housing, and resilient means urging said push-button out of said housing.

5. An electrical contact-making device comprising a casing member, circuit-controlling elements enclosed thereby, a top or cover for said casing member having a universal tilting movement to operate said controlling elements, resilient means tending to keep said cover and casing member apart, and resilient tangentially extending wing-members on the under side of said cover whereby said cover is retained on said casing.

6. A push-button switch construction comprising a stationary contact, an insulating housing therefor having an opening and having an inwardly extending annular flange surrounding said opening, a push-button comprising a top portion and a shank, a second contact carried by said push-button for cooperation with said first contact, and a plurality of tangentially extending leaf springs spaced about said shank portion and secured thereto, the free ends of said leaf springs being movable toward and from said shank and being compressible sufficiently to permit the shank carrying the springs to be inserted through said opening, and being expansible sufficiently to engage underneath said flange when inserted whereby said button may be assembled with respect to said casing by placing the shank in registration with the opening and pushing the shank and the spring carried thereby into the casing while rotating the button.

In witness whereof, I have hereunto subscribed my name.

REUBEN B. BENJAMIN.