Jan. 18, 1927. 1,614,887

H. E. HILL

PUSH BUTTON

Filed March 6, 1926

Fig. 1.

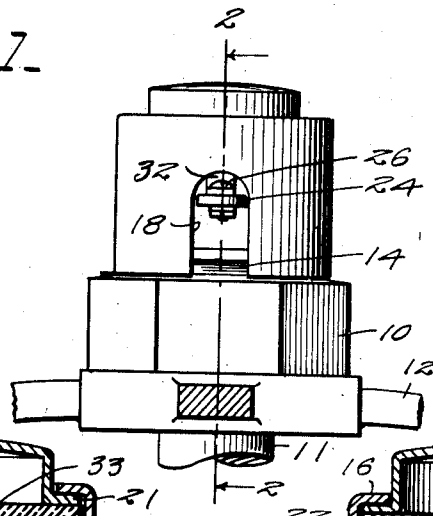


Fig. 2.

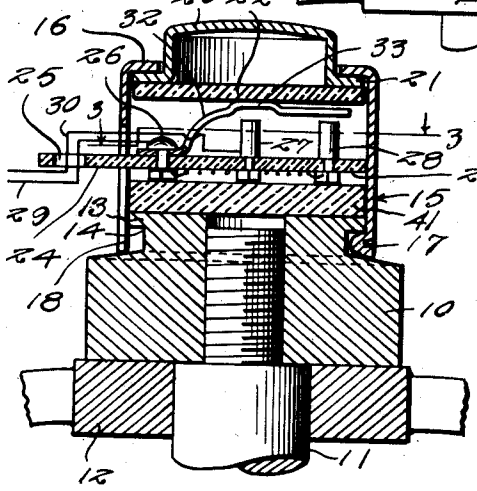


Fig. 4.

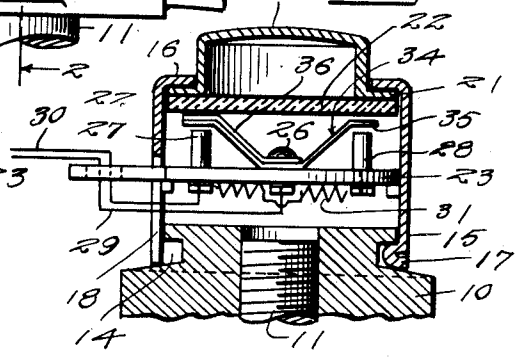


Fig. 5.

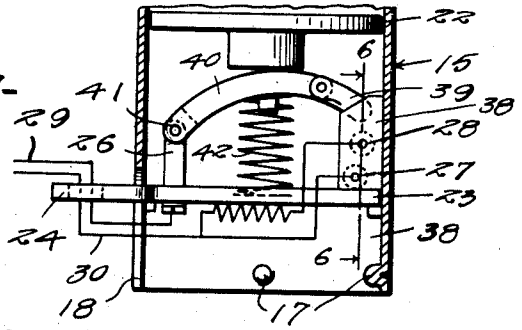


Fig. 3.

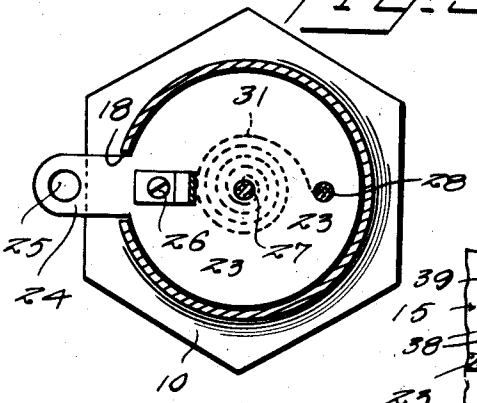
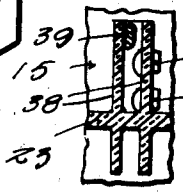


Fig. 6.



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UNITED STATES PATENT OFFICE.

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PUSH BUTTON.

Application filed March 6, 1926. Serial No. 92,850.

This invention relates to push buttons and more particularly to a push button for use in controlling the horn of a motor vehicle.

An important object of the invention is to produce a push button by means of which the current delivered to the horn may be controlled so that the sound emitted from the horn may be controlled.

A further and more specific object of the invention is to provide a push button which, when engaged with light pressure, completes the circuit to the horn and includes in this circuit a resistance and when engaged with greater force cuts out the resistance so that the full strength of the current is supplied to the horn.

A still further object of the invention is to provide a structure such that the resistance contact elements and other necessary parts of the button may be included in a horn button structure of substantially the same size as the horn button structures now employed.

These and other objects I attain by the construction shown in the accompanying drawings, wherein for the purpose of illustration is shown a preferred embodiment of my invention and wherein:—

Figure 1 is a side elevation of a push button switch constructed in accordance with my invention;

Figure 2 is a section on the line 2—2 of Figure 1;

Figure 3 is a section on the line 3—3 of Figure 2;

Figure 4 is a section similar to that shown in Figure 2 taken through a modified form of the device;

Figure 5 is a similar view of a further modification;

Figure 6 is a section on the line 6—6 of Figure 5.

Referring now more particularly to the drawings, the numeral 10 generally designates a support for the horn button, at present disclosed as a nut adapted for engagement with the upper end of the steering shaft 11 of a motor vehicle to retain the steering wheel 12 in position thereon. The upper end of this nut has an axial boss 13, the side wall of which immediately adjacent the upper surface of the nut is formed with a peripheral channel 14. A cylindrical casing 15 is provided, this casing having an internal diameter equal to the diameter of the boss 13 and having at its upper end an inturned flange 16. The side wall of the casing 15 adjacent its lower end is provided with a plurality of small inwardly extending lugs 17 preferably produced by punching the metal, these lugs reducing the effective interior diameter of the casing at a point where it is less than the external diameter of the boss. The side wall of the casing is provided with a longitudinally extending notch 18 of considerable depth, this notch permitting spreading of the lower portion of the wall so that the lug 17 may pass over the upper end of the boss 13 and engage in the groove 14 to rotatably mount the casing upon the boss. A pressed metal button element is provided comprising a cylinder 19 having an external diameter slightly less than the internal diameter of the casing 15 at the flange 16 thereof. The upper end of the cylinder 19 is closed, as at 20, while at its lower end, it has an out-turned flange 21 of substantially the same diameter as the internal diameter of the cylindrical casing 15. Abutting the under surface of the flange 21 is a stiff insulating disk 22 which prevents electrical contact between the switch elements and the metal button element. The switch elements are carried by an insulating disk 23 which, in each of the structures hereinafter referred to, has at one side a radially projecting arm 24 of the same width as the notch 18 and having at its outer end an opening 25, the purpose of which will presently appear.

In each form of the invention, the disk 23 bears three contacts 26, 27 and 28. In each instance, a current feed lead 29 is connected to the contact 26 and an output lead 30 to the contact 27. Each of the contacts 27 and 28 project through the under surface of the disk 23 and at this under surface are connected by a resistance element 31 which is flatly disposed against the under surface of the disk 23, being preferably helically coiled against the under surface of the disk, as more clearly shown in Figure 3.

In the form of the invention more particularly shown in Figure 2, the contacts 26 and 28 are arranged at opposite sides of

the disk 23 and the contact 27 is arranged at the center of the disk and intermediate the contacts 26 and 28. To the contact 26 is secured an upwardly bowed spring blade 32, the central portion of which is slightly offset, as indicated at 33, and the end of which overlies the contact 28. The bow provided is sufficient to permit the free end of the blade to engage the contact 28 while the blade is still separated from the contact 27 with the result that if the horn button 19 is given a slight push, the contacts 28 and 26 are connected and current flows to the output lead through the resistance 31. If more force is exerted upon the button, the offset 33 comes into contact with the contact 27 and the resistance 31 is short circuited.

In the form shown in Figure 4, the contact 26 is located at the center of the disk and upon the same diameter with the contacts 27 and 28 which are arranged adjacent opposite sides of the disk. A V-shaped blade 34 has its bight secured to the contact 26 and the ends 35 of the arms thereof extended over the contacts 27 and 28. The arm which extends over the contact 27 is reinforced by an additional spring element 36 so that upon a given pressure upon the horn button, the arm coacting with the contact 28 engages its contact while the other arm is withheld from engagement with its contact. When greater pressure is applied, however, the arm coacting with the contact 27 is forced downwardly against the action of the reinforcing spring 36 to short circuit the resistance.

In the form shown in Figure 5, the contact 26 is supported from one side of the disk while at the opposite side of the disk, a pair of insulating flanges 37 and 38 have flat faces which oppose one another. One of these elements forms a mounting for the contacts 27 and 28, the contact 28 being arranged uppermost. The other element forms a guide for a spring brush 39 carried by the end of a conductor arm 40 pivoted to the contact 26, as at 41. The central portion of this conductor arm is abutted by a spring 42, the lower end of which abuts the surface of the disk 23. As the arm 40 is moved downwardly, the spring brush engages consecutively the contacts 28 and 27 with the results hereinbefore set forth. In each of the constructions above noted, between the lower surface of the insulating disk and the upper surface of the boss 13, an insulating disk 41 is arranged to prevent any possible short-circuiting of the switch elements upon this boss.

It will, of course, be obvious that the construction hereinbefore set forth is obviously capable of a certain range of change and modification without materially departing from the spirit of the invention and I accordingly do not limit myself to such specific structure except as hereinafter claimed.

I claim:—

1. In a push button switch, a base having a circular boss, the boss adjacent the base having a groove, a cylindrical casing having the same diameter as the boss and having at its upper end an inturned flange, the lower end of the casing having inwardly projecting portions the inner ends of which are arranged upon a diameter smaller than the diameter of the boss, the side wall of the casing having a slot opening through said lower end, a push button slidable through the upper end of the casing and held against removal therefrom by said flange, an insulating disk arranged within the casing and having at one side a projecting arm extending through said slot, contacts carried by said disk, a blade carried by one of said contacts and having its free end overlying a second contact to engage therewith when moved under the influence of the push button and lead wires for said contacts extending through the slot of the casing and through an opening in the outer end of the arm of said insulating disk.

2. In a push button switch, a base having a circular boss, the boss adjacent the base having a groove, a cylindrical casing having the same diameter as the boss and having at its upper end an inturned flange, the lower end of the casing having inwardly projecting portions the inner ends of which are arranged upon a diameter smaller than the diameter of the boss, the side wall of the casing having a slot opening through said lower end, a push button slidable through the upper end of the casing and held against removal therefrom by said flange, an insulating disk arranged within the casing and having at one side a projecting arm extending through said slot, three contacts carried by said disk. a flatly coiled resistance element upon the under surface of the disk and connecting two of said contacts, a blade carried by the third contact and having portions overlying the two contacts and selectively engageable therewith upon application of differing pressures to the push button and lead wires connected to the last named contact and to the contact with which the blade engages upon the application of greatest pressure to the push button extended through the slot and through an opening in the outer end of said arm.

3. In a push button, an insulating disk bearing three contacts, a pair of said contacts being connected by a resistance element flatly coiled upon the opposite face of the disk from the contacts, the third contact having attached thereto a spring blade successively engaging the first named contacts as the blade moves toward the disk and a button associated with the disk and movable

theretoward and engaging the blade, the last named contact being arranged at the center of the disk, said pair of contacts being arranged at oposite sides of the disk and of the last named contact, said blade being substantially V-shaped and having its bight portion secured to the last named contact, one arm of the blade having associated therewith a reinforcing spring maintaining said arm out of engagement with its associated contact until after engagement of the other of the arms with its associated contact.

In testimony whereof I hereunto affix my signature.

HARRY E. HILL.