May 28, 1935. G. A. GRAHAM ET AL 2,002,504

TELEPHONE HANDSET SWITCH

Filed Sept. 26, 1932

FIG. 1.

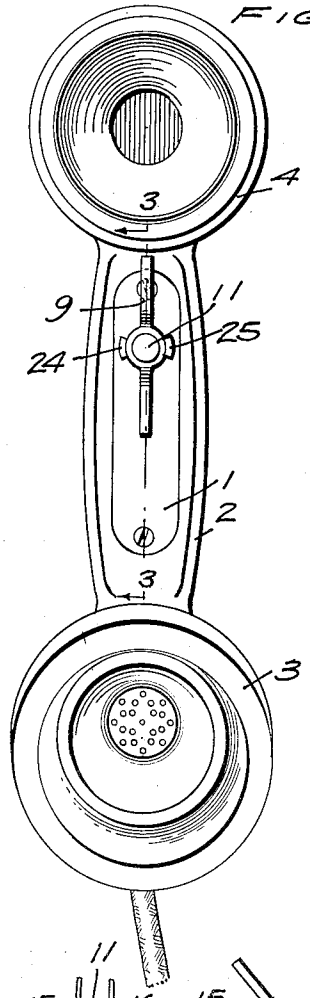


FIG. 2.

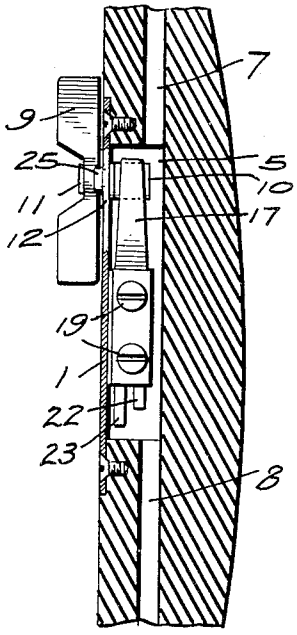


FIG. 3.

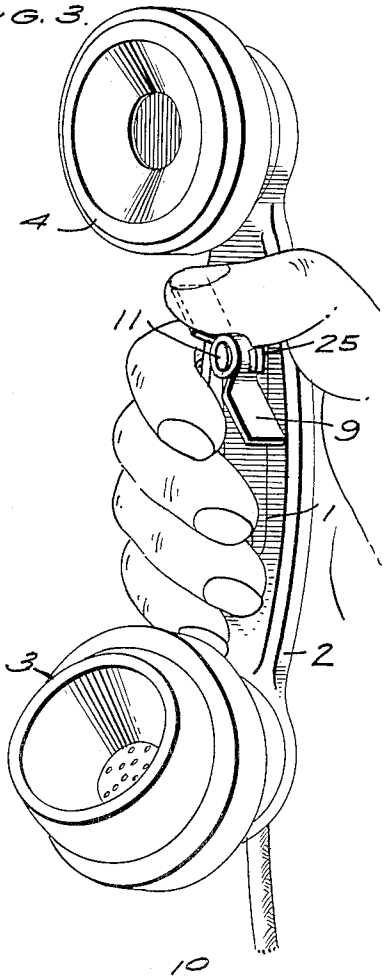
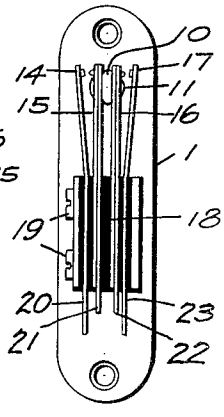


FIG. 4.



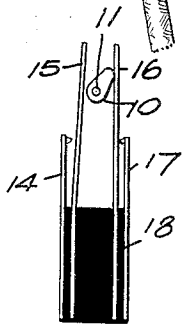


FIG. 5.

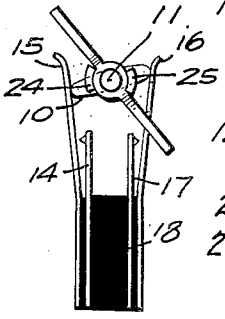


FIG. 6.

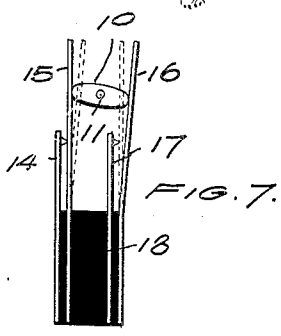


FIG. 7.

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TELEPHONE HANDSET SWITCH

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Application September 26, 1932, Serial No. 634,914

8 Claims. (Cl. 179—103)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to us of any royalty thereon.

This invention relates to telephone handset switches and proposes a switch assembly which may be mounted as a unit in the handle or grip portion of any telephone instrument, and is particularly applicable to a set of that type where the handle serves to carry the transmitter and receiver as a unitary structure.

An object of the invention is to provide a switch which may be used as a transmitter battery supply switch; also to control both the transmitter circuit and the receiver circuit simultaneously.

A further object is to provide a switch which is adapted for use as a transmitter switch when operated in one direction, and as a receiver switch when operated in the other direction, a mode of operation particularly desirable for train dispatching systems or the like.

An important object is to provide a design which will avoid undesired or accidental switching operation when the handset cord is wrapped around the handle of the instrument.

Another object is to provide a conveniently operable switch which may be held actuated by either the right or left hand of the user with equal facility; and also may be manipulated in various postures by using the thumb, the index finger, the second finger, or combination thereof, thus obviating cramping and reducing fatigue to a minimum.

Other purposes and objects of the invention will appear as the description proceeds.

Having regard to the various alternative ways of employing a switching device in accordance with the present invention, a design was sought which would lend itself to manipulation by either the right or left hand, and which would permit of instant switching action. Irrespective of whether it is desired to control one circuit at a time, or two or more circuits, it is possible in a single manipulation of the external switching element, to hold the switch in actuated position by a natural pressure of thumb or finger; and instant release of such pressure provides instant response of the circuit contacts, self-restoring action being an important feature of the present invention. Moreover, a design in accordance with the present invention in a telephone handset switch especially lends itself either to local battery, or common battery usage. Such a design is advantageous in cases where it is desired to control the transmitter circuit at one time and the receiver circuit at another time by a considered manipulation of the external switching element.

Certain embodiments of the invention are illustrated in the accompanying drawing, in which:

Fig. 1 is a front view in perspective of the switch mounted in a handset;

Fig. 2 is a section taken along the line 3—3 of Fig. 1;

Fig. 3 is a perspective of the switch mounted in a handset and held in operative position by the user;

Fig. 4 is a rear view of the switch assembly;

Figs. 5, 6, and 7 show modified forms of cam and contact springs.

Referring to the drawing, all elements of the switch mechanism are mounted on a base plate 1, to the end that the switch assembly may be easily and quickly incorporated into the instrument as a unitary structure. In the embodiment here disclosed by way of example, a handle or grip component 2, which carries both a transmitter 3 and a receiver 4, is formed with a hollow chamber 5 moulded therein to reecive the assembled switch, which may be attached to the handle by any suitable means such as screws 6. Necessary wiring may be introduced through channels 7 and 8 moulded or otherwise formed in the handle portion and casing of the instrument.

The switch proper comprises an external operating element or actuating lever 9, operable with a cam element 10, these elements both being secured for that purpose to a common cam shaft 11, which shaft is journalled in a suitable bearing 12 in base plate 1. Exteriorly of the base plate 1, projections 24 and 25 act as stops to limit the movement of lever 9. Cooperating with cam 10, contact springs are provided as at 14, 15, 16 and 17. The contact springs are spaced and insulated from one another by means of insulating material as at 18, and are held together by screws 19. The whole spring assembly is then suitably attached to base plate 1. Rotation of the actuating lever 9 in either direction serves to control the contact springs and various circuit closing and circuit opening operations or permutations may be obtained, depending upon the shape of the cam element 10 and the arrangement of the contact springs, as will appear by reference to Figs. 4, 5, 6 and 7. It should be noted that the pair of springs with which the cam co-acts function as return or restoring springs and on releasing the lever 9, these springs return the cam and lever to normal. The cam element 10 is formed of insulating material, or is otherwise insulated from the contact springs. Extensions of contact

springs provide terminals as at 20, 21, 22 and 23 for electrical connections which may be soldered thereto or in any suitable way.

Obviously the contact springs may be assembled in various relations or combinations and made to function in different circuit arrangements, as may be desired. For use as a transmitter switch only (see Fig. 4) 21 and 22 may be soldered or secured together electrically, and 20 and 23 also may be soldered together. Then the circuit would be from battery (not shown) to 21 and 22 and from 20 and 23 to transmitter, and through transmitter and return to battery. Again terminals 20 and 21 may be used for the transmitter circuit, and 22 and 23 for the receiver circuit. Where it is desired that the lever 9 should operate in one direction to close contacts 16 and 17, and in the opposite direction to close contacts 14 and 15, it is only necessary to properly form the cam element 10 for such action, as depicted in Fig. 5.

In Figs. 6 and 7, different arrangements or combinations of the contact springs are suggested by way of example. In each case a double acting cam is shown, the arrangement in Fig. 6 being such that both sets of contacts are in open circuit position when the lever 9 is held actuated, while in Fig. 7 one set of contacts are in circuit closing position and the other set in open circuit position when lever 9 is held actuated.

Projections or shoulders 24 and 25 (see Fig. 1) serve as limiting stops in the movement of lever 9. These shoulders or equivalent elements may be formed in such a way that by taking advantage of the tensioning action of the group or groups of contact springs which co-act with cam 10, lever 9 may be held in actuated position by positive mechanical means, permitting the operator to withdraw manual pressure from lever 9 during periods of actual use, as shown in Fig. 6.

Changes and modifications are contemplated within the scope of the invention as defined by the appended claims.

We claim:—

1. In combination with a telephone handset, including a transmitter, a receiver, and a hollow connecting handle; a switch assembly comprising in a unitary structure self-restoring spring contact elements mounted within the handle; and means to effect the circuit controlling action of said elements in groups, said means comprising a cam co-acting with said spring elements; and a lever located to operate entirely clear of the surface of said handle and forming part of the switch assembly for actuating the cam, said lever being formed with a pair of oppositely extending finger grips to permit manipulation of said handset by either hand, and each of said grips providing a different selective control of the switching action.

2. In combination with a telephone handset, including a transmitter, a receiver, and a hollow connecting handle; a switch assembly comprising in a unitary structure self-restoring spring contact elements within the handle; means for effecting the circuit controlling action of said elements, said means including a cam operable against the spring tension of said elements; and a rotatable lever for actuating the cam, said lever being spaced to rotate entirely clear of the surface of the handle, and comprising oppositely extending finger grips to permit balanced operation by either hand against the reactive tension of the contact elements.

3. In combination with a telephone handset, including a transmitter, a receiver and a hollow carrying handle integral therewith; a switch assembly mountable as a unit, comprising spring contact elements housed within the handle; and means for controlling said elements selectively in groups, comprising a cam and a cam actuating lever mounted exteriorly of the handle and rotatable with the cam, said lever being provided with a pair of finger grips to permit manipulation by either hand and balancing of the switching action against the weight of said handset.

4. In combination with a portable telephone instrument, including a transmitter, a receiver, and a hollow carrying handle; a unitary switch assembly comprising a mounting plate; spring contact elements secured to said plate; a rotatable cam for controlling said elements; a lever for actuating the cam, said lever being spaced to rotate clear of the surface of said handle throughout its operative range; and means for limiting the movement of said lever, comprising stops formed in said mounting plate and acting against the tension of said contact elements to retain the same in actuated position.

5. A portable telephone instrument provided with a hollow handle; a switch assembly mountable as a unit in said handle, including spring contact elements and a cam for operating said elements; an exteriorly mounted lever having oppositely disposed finger grips for actuating the cam, said lever being spaced to operate clear of the handle and being rotatable in either direction and said grips permitting single-handed and reversible manipulation of the instrument and selective switching action by either hand.

6. In combination with a portable telephone instrument, including a transmitter, a receiver, and a hollow connecting handle; a switch assembly mountable as a unit in said handle, comprising a mounting plate, multiple spring contact elements secured to said plate; a rotatable cam for controlling said elements; means for actuating the cam comprising an exteriorly mounted lever having oppositely extending finger grips; and means for limiting the swing of said lever, comprising stops formed in said mounting plate, said stops being located out of the path of movement of said grips and cooperating with said lever when acting against the tension of said contact elements to retain the lever in actuated position.

7. In combination with a portable telephone instrument, comprising a transmitter, a receiver, and a hollow connecting handle; a switch assembly mounted as a unit in said handle, including a mounting plate; multiple spring contact elements secured to said plate; means responsive to an initial stage of manipulation to provide single-handed reversible control of the switching action of the contact elements, comprising a double acting cam and a double grip lever operative with said cam to balance the weight of the instrument against the self-restoring action of the contact elements, said lever being positioned to clear the surface of the handle throughout its operative range; and means functioning both to limit the throw of the lever and to retain the same in locked position in response to a further manipulation thereof.

8. In combination with a portable telephone handset, comprising a transmitter, a receiver, and a hollow connecting handle; a switch assembly mounted as a unit in said handle, including a mounting plate; multiple spring contact elements secured to said plate; a cam for con-

trolling the switching action of said elements; means comprising a rotatable lever to actuate the cam, said lever being spaced to clear the surface of said handle and having oppositely extending finger grips to permit single-handed manipulation and balancing of the switching action of the cam against the weight of the handset; bearings for the lever in said mounting plate; and stops formed in said plate adjacent the lever bearings for limiting the throw of the lever and for retaining the lever in locked position as the result of a further manipulation of the lever against the reactive tension of the spring contact elements.

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