June 16, 1959 F. E. RUNGE ET AL 2,891,131

HAND MICROPHONE

Filed April 26, 1956 2 Sheets-Sheet 1

Fig. 1

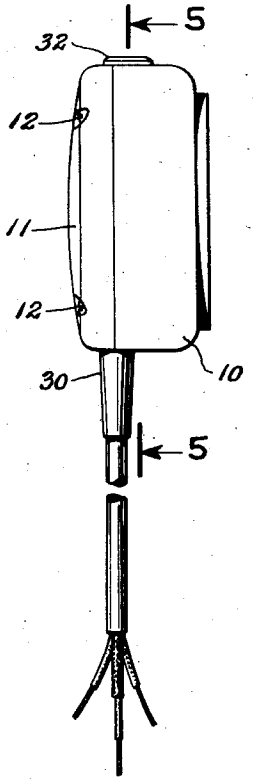


Fig. 2

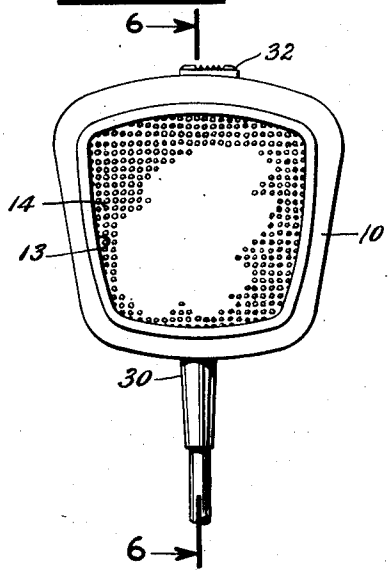


Fig. 4

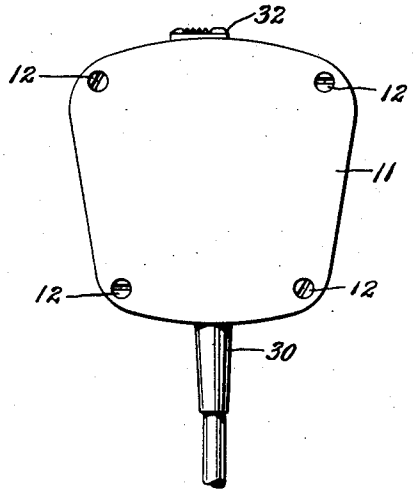
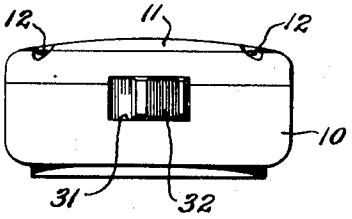


Fig. 3



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Fig. 5

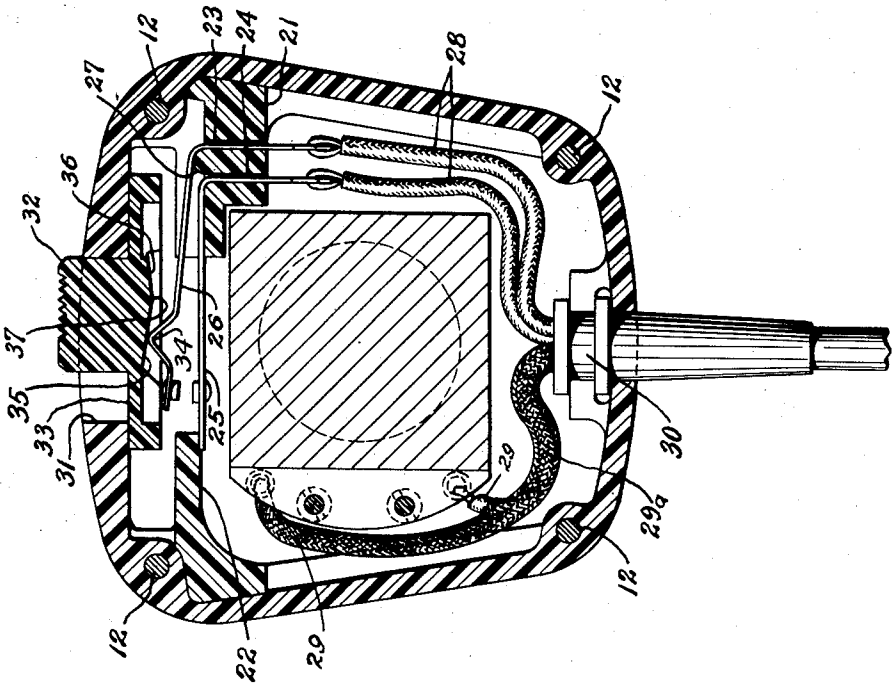
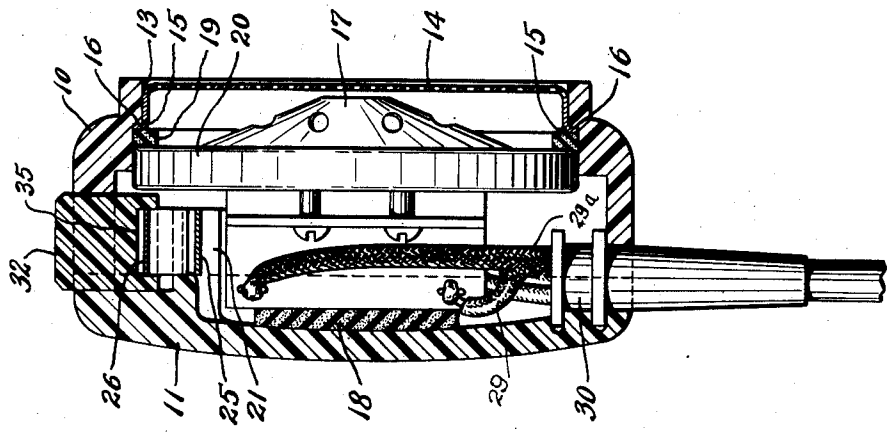


Fig. 6



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United States Patent Office 2,891,131 Patented June 16, 1959

2,891,131

HAND MICROPHONE

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Application April 26, 1956, Serial No. 580,782

5 Claims. (Cl. 200—153)

This invention relates to sound translating devices, and more particularly to a combined hand microphone and switch assembly.

In the operation of sound recording apparatus, it is often desirable to provide a microphone which can be held in the hand, and to employ a switch in the casing of the microphone to control the operation of the mechanism to which the microphone is connected. This is particularly useful in the case of dictating equipment, for permitting the person using the microphone to stop and start the recording apparatus by means of a switch which is accessible to the operator's hand.

The most convenient arrangement is to provide a microphone switch button which may be moved slidably with respect to the casing by the thumb of the operator, the switch being maintained locked in closed circuit condition until the switch button is slid manually in the opposite direction.

The apparatus is also arranged so that the microphone circuit will be closed momentarily when the switch button is inwardly depressed by the operator's thumb, the circuit opening automatically when pressure is removed from the switch button.

One object of this present invention is to provide a combined microphone and switch assembly which may be operated with equal facility when held in either hand of the user.

Another object is to provide a microphone switch having a slidable actuator button adapted to open or close the circuit, wherein the direction of movement of the actuator may be reversed.

A further object is to provide a microphone switch having an actuator which may either be depressed or moved slidably to control the circuit, and wherein the actuator may be arranged to perform such control by slidable movement in either one of two directions.

A further object is to provide a device of the above nature which will be simple in construction, inexpensive to manufacture, easy to install and manipulate, compact, ornamental in appearance, and very efficient and durable in use.

With these and other objects in view there has been illustrated on the accompanying drawings one form in which the invention may conveniently be embodied in practice.

In the drawings,

Fig. 1 represents one form of combined hand microphone and switch assembly embodying the present invention.

Fig. 2 is a front elevation of the same.

Fig. 3 is a top view of the same.

Fig. 4 is a rear view of the same.

Fig. 5 is a cross sectional elevation, on an enlarged scale taken on the line 5—5 of Fig. 1.

Fig. 6 is a cross sectional elevation also on an enlarged scale taken on the line 6—6 of Fig. 2.

Referring now to the drawings in which like reference numerals denote corresponding parts throughout

the several views, the numeral 10 indicates a microphone casing, preferably molded of suitable plastic, and having a rear cover 11 removably secured to the case 10 by screws 12.

The front of the case 10 is provided with a substantially oval shaped opening 13 within which is received a protective cupped grille 14 having an outwardly turned lip 15 which is received in an annular shoulder 16 surrounding the interior of the opening 13.

A microphone diaphragm assembly 17, of conventional construction, and forming no part of this invention, is contained within the casing 10, and is secured therein by means of a yieldable pad 18, preferably of sponge rubber, located between the back of the microphone assembly 17 and the interior of the cover 11, and a yieldable soft rubber gasket ring 19 is positioned between the lip 15 and a flange 20 of the microphone assembly 17. The pad 18 and the gasket ring 19 will be placed under slight compression when the microphone is assembled, in order to protect the assembly 17 from damage due to accidental jarring of the casing 10.

The inside face of the cover 11 is provided with integrally molded ribs 21 and 22. The rib 21 is vertically slotted as at 23 and 24 to receive loosely a pair of flexible metallic contact members 25 and 26 which are bent at right angles to extend substantially horizontally in spaced parallel relationship below the top of the case 10. The contact member 26 is separated from the contact member 25 by a rounded shoulder 27 molded integrally with the rib 21. The rib 22 is arranged to form an abutment for the free end of the flexible contact member 25 when the latter is forced below this abutment under slight deformation, during assembly. A pair of connecting wires 28 for the contact members 25 and 26 and connectors 29 for the diaphragm 17, lead into a cable 29 having a flanged grommet 30. The walls of the casing 10 and the cover 11 are suitably recessed to secure the grommet 30 in place between them when the cover 11 is in position.

A rectangular opening 31 is formed at the top of the apparatus by complementary elongated recesses in the rear of the casing 10, and in the cover 11. A rectangular switch actuator button 32 projects upwardly through the opening 31 and is held in place by a base 33 which extends longitudinally outwardly from both ends of the bottom of said button 32. The button 32 itself is made shorter than the length of the opening to permit lengthwise movement, while the length of the base 33 will be made sufficient to close the opening 31 in all positions of the button. The contact member 26 is bent to form an upwardly projecting hump 34 which is centrally positioned with respect to the opening 31 and bears yieldably upwardly against the bottom of the base 33 of the button 32.

Operation

The arrangement just described permits the circuit to which the connecting wires 28 are connected, such as the driving motor of a dictating machine, to be controled by three different manipulations of the switch button 32.

As shown in Fig. 5, the position of the button 32 is such that the circuit is "open." However, if the button 32 is moved to the left to the full extent permitted by the length of the opening 31, the cam surface 35 will move the contact member 26 downwardly into engagement with the contact member 25 to close the circuit controlled by the wires 28. The amount of downward displacement of the contact member 26 will be at a maximum when the downwardly projecting ridge 37 of said contact member bears against the upwardly projecting hump 34, at which time the contact member

25 will also be moved downwardly so that its free end will be spaced downwardly away from the end of the rib 22. However, the length of the opening 31 is such that the button 32 will not have reached its limit of movement in the left hand direction until the ridge 37 has passed beyond and slightly to the left of the hump 34, at which time the cam surface 36 will bear against it.

Since the inclination of the cam surface 36 is opposite to that of the cam surface 35, the upward pressure exerted by the deformation of the contact members 26 and 25 will tend to yieldingly hold the button 32 in its left hand position.

In addition, the angle of upward inclination of the cam surface 36 being less than that of the cam surface 35, the contacts 26 and 25 will still be depressed downwardly an amount sufficient to keep the circuit controlled by the wires 28 closed until such time as the button 32 is again moved to the right hand end of the opening 31, as shown in Fig. 5.

If more convenient for the user, the operation of the switch button 32 may be reversed by removing the back cover 11 from the casing 10, and reversing, end for end, the position of the switch button 32, so that the cam surface 35 will be on the right hand side, and the cam surface 36 on the left hand side of the device. Under these conditions, the contact member 26 will be in its uppermost open circuit position, out of engagement with the contact member 25, when the switch button 32 is positioned at the left hand end of the opening 31, and the circuit through the wires 28 will be closed by movement of the switch button to the right hand end of opening 31. This reversal of the operation of the button 32 is made possible because of the fact that while the upwardly projecting hump 34 of the contact 26 is positioned centrally of the opening 31, the downwardly projecting ridge 37 of the button 32 is offset longitudinally with respect to the longitudinal limits of movement of said button.

It will be apparent that a third manipulation consists merely of depressing the button 32 in a vertically downward direction to bring the contact member 26 into engagement with the contact member 25 momentarily, for short periods of dictation.

It will thus be seen that the arrangement described, permits the microphone casing 10 to be held in either hand with the front of the microphone facing the user's mouth while the switch button 32 may be slidably moved to locked position by the thumb or forefinger in whichever direction is most convenient to the user.

One advantage of this invention is the ease with which it may be assembled or taken apart. All of the elements contained within the casing 10 are secured in place by the rear cover 11. When the cover 11 is removed, by unscrewing the four screws 12, not only may the button 32 be reversed, but all of the components, including the contact members 25 and 26, the microphone assembly 17, the gasket ring 19, the grille 14, the associated wires 28 and 29, together with the grommet 30 can be easily lifted out of the casing for replacement or repairs.

While there has been disclosed in this specification one form in which the invention may be embodied it is to be understood that this form is shown for the purpose of illustration only and that the invention is not limited to the specific disclosure but may be modified and embodied in various other equivalent forms without departing from its spirit.

Having thus fully described the invention what is claimed as new and for which it is desired to secure Letters Patent is:

1. In a combined hand microphone and switch mechanism, an enclosure having an elongated opening in one face thereof, a switch button located in said enclosure and having a body portion loosely extending through said elongated opening, said switch button having an elongated base below said opening extending longitudinally beyond both ends of said body portion and operative to prevent outward movement of said button through said opening, the bottom of said base having a pair of longitudinally downwardly convergent flat cam surfaces defining an apex portion which is longitudinally offset with respect to the center of said base, the ends of said body portion being located equidistant from the center of said base, and a resilient circuit controlling element positioned within said enclosure and symmetrically located with respect to said opening, said cam surfaces being operative upon sliding movement of said button in one direction to lock said circuit controlling element in switch closing position, and also operative to momentarily close said circuit when said switch button is pushed inwardly.

2. The invention as defined in claim 1, wherein the angle of inclination of said convergent cam surfaces is dissimilar, and wherein said circuit controlling element comprises a switch contact arm disposed to abut against said cam surfaces in a plane normal to the longitudinal axis of the base of said switch button.

3. In a combined hand microphone and switch mechanism, an enclosure having an elongated opening, a switch loosely located in said opening and having an elongated base of greater length than said opening, the bottom of said base having a downwardly inclined convex cam surface extending in a longitudinal direction, a resilient circuit controlling element positioned to bear yieldably against said cam surface in a plane normal to the longitudinal axis of said base and located in alignment with the center of said opening to urge said button upwardly, the lowermost apex of said cam surface being longitudinally offset with respect to the center of said opening.

4. In a combined microphone and switch device, a housing adapted to contain a microphone, a switch mechanism in said housing for controlling the operation of said microphone, said housing having an elongated opening in one side thereof, a switch actuating button passing loosely through said opening and movable longitudinally therein between two limiting positions, said button having a base provided with an inclined convex bottom cam surface, said base extending longitudinally beyond each end of said button to underlie said opening at all positions of said button, a first resilient conductive switch contact arm disposed within said housing and pressing upwardly upon said button, and a second resilient conductive switch contact arm located below said first contact arm and in alignment therewith for engagement by said first contact arm, to close the circuit of said switch when said button is either moved longitudinally or inwardly.

5. The device as defined in claim 4, wherein said opening and said button are rectangular in shape, and whereby said button may be selectively reversed in end-to-end longitudinal position in said opening to reverse the alternating sequence of said first switch contact arm upon sliding longitudinal movement of said button in a given direction in said opening.

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2,504,307	Dalton	Apr. 18, 1950
2,561,320	Stone et al.	July 17, 1951
2,709,723	Breisch et al.	May 31, 1955

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

June 16, 1959

Patent No. 2,891,131

Frank E. Runge et al.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 4, lines 67 to 73, the list of references cited should appear as shown below instead of as in the patent:

2,174,877	Graubner et al. -----	Oct. 3, 1939
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Signed and sealed this 27th day of October 1959.

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UNITED STATES PATENT OFFICE

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