

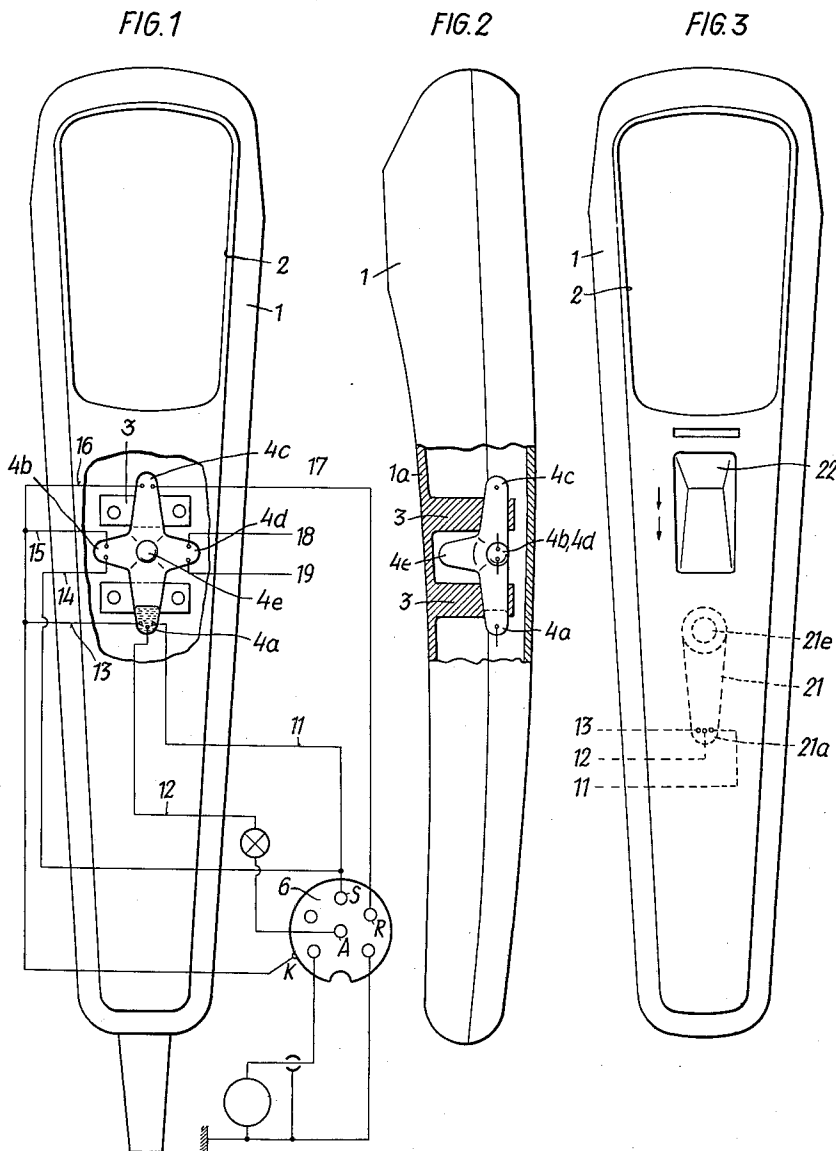
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SWITCHING DEVICE COMBINED WITH SOUND TRANSDUCER

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## SWITCHING DEVICE COMBINED WITH SOUND TRANSDUCER

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This invention relates to a sound transducer, particularly a hand microphone, which may also serve as a sound reproducer, if desired, and which is provided with a switching device for controlling various functions of sound recording and reproducing apparatus so that this apparatus can be controlled by the sound transducer in a known manner to perform the "recording," "stop," "reverse" and "reproducing," operations, as required.

Previously known sound transducers comprise switching devices which cause the various operations to be performed by the sound recording and reproducing apparatus in response of the actuation of one or several push buttons or a slide button or push-slide button, with a finger, preferably with the thumb. As the operations, particularly "recording" and "stop," are very frequently initiated, the continual actuation of the switch knobs is very inconvenient.

In order to avoid a frequent operation of the push button of the sound transducer the sound transducer according to the invention provides for the electrical switching operations in the switching device to be performed by masses having weight in response to a change in the position of the sound transducer.

With this arrangement it is sufficient to swing the sound transducer in one of the indicated directions in order to cause the switching operation associated with this movement to be effected by the mass in the switching device.

The masses which are arranged to be displaced by and effective under the action of gravity are suitably arranged to control, upon each change in the position of the sound transducer to a predetermined position, another group of contacts which are arranged in conductive paths of the switching device for controlling the circuits. With this arrangement the conductive paths may be curved or angled because the mass is effective owing to its weight.

The mass may consist of a liquid provided in a closed vessel, which comprises as a contact unit for each controlled operation a recess in the wall of the vessel, which recess receives the liquid and is provided with the contact element so that a change in the position of the sound transmitter will cause the liquid to flow into the recess controlling the desired operation. In this device the liquid itself may be electrically conducting and consist, e.g., of mercury, so that the circuit is directly closed by the liquid between the contacts arranged in each recess.

It has been found desirable to provide in the sound transducer, in addition to the switching device which is controlled by masses which are displaced under the action of gravity in response to a change in position of such device, a mechanical switching device known per

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se, and to control the several operations with one of the two switching devices or the other or both.

Some illustrative embodiments of the invention are diagrammatically shown in the accompanying drawings.

FIGS. 1 and 2 are a front elevation and side elevation, respectively, showing a hand microphone with the housing wall broken away adjacent to the switching device.

FIG. 3 shows a modification of the hand microphone of FIGS. 1 and 2.

In FIGS. 1 and 2, 1 is the housing of the sound transmitter. This housing has an opening 2, in which the microphone, not shown, is disposed, which may also serve as a speaker. The switching device is mounted on brackets 3 in the grip portion of the housing 1. This switching device comprises a vessel 4 the housing wall of which is formed with recesses in a substantially star-shaped configuration. At the bottom of the recesses 4a-d the contacts required for controlling the operations of a dictating apparatus are provided. There are no contacts in the recess 4e which is directed toward the rear wall 1a. Mercury constituting a mass 5 which can be displaced by gravity and which makes direct contact is contained in the vessel 4. Depending on the position of the sound transmitter housing 1 this mercury will be contained in any of the five recesses 4a-e.

The contacts provided in the recess 4a control the recording operation of a dictating apparatus and are connected by the leads 11, 12 and 13 to the start contact S, the recording contact A and the ground contact M of a multiple plug socket 6. The contacts in the recess 4b control the playback operation and are connected by the leads 14, 15 also to the start contact S and the ground contact M. The circuit which is closed at the leads 16, 17 leading to the ground contact M and the reversing contact R controls the reversing (rewinding) operation of the dictating apparatus whereas the contacts in the recess 4d are connected to the leads 18, 19 to control an additional operation, e.g., a superimposed recording or marking of the sound carrier. The recess 4e has no contacts because the dictating apparatus will be in the stop position when the mass is disposed in this recess.

Depending on the position of the hand microphone the several functions of the dictating apparatus will thus be automatically switched. When the microphone is in inverted position with the grip downwardly directed, as the hand microphone will be held during recording, the dictating device will be in recording position. When the hand microphone is laid on its rear wall 1a or held in a corresponding position the dictating device will be inoperative. In vertical position with the grip directed upwardly the dictating apparatus will be in reversing position and in horizontal position with the recess 4b, directed downwardly it will be in playback position. Thus this transducer can control the various functions of the dictating apparatus by a mere change in the position of the transducer, without need for operating a push- or slide button.

It may be psychologically desirable for the dictating person to control with the device according to the invention in the sound transducer only the recording operation and the stopping of the apparatus. These control functions are most frequently needed when dictating.

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The two other operations "playback" and "reverse" may then be controlled by means of a push-button operated switch mechanism known per se. As is shown in FIG. 3 the vessel 21 has only two recesses 21a and 21e, which correspond to the recesses 4a and 4e in the embodiment of FIGS. 1 and 2 so that the vertical position will provide for the recording operation and the horizontal position with the rear wall facing downwardly will provide for a stop. The reversing and playback operations of the dictating device are much less frequently initiated and are controlled by the known switching device, not shown, which is incorporated in the housing and operated by the slide button 22, which can also be moved to an intermediate deenergizing position.

It is obvious that for the switching operations to be performed in the embodiment of FIGS. 1 and 2 the liquid mass 5 may be replaced by a metal ball which is contained in the vessel, provided that the contacts are appropriately disposed. Instead of a ball, a metal roller or an electrically conducting sliding member of metal may be used in the vessel 21 of FIG. 3 for the switching operations.

Although specific embodiments of the invention have been described in detail herein with reference to the accompanying drawing, it is to be understood that the invention is not limited to those precise embodiments, and that various changes and modifications may be effected therein without departing from the scope or spirit of the invention, except as defined in the appended claims.

We claim:

1. The combination of sound recording and reproducing apparatus having recording, reproducing, and reversing control circuits, and a hand microphone comprising a housing having a rear wall, a closed vessel in said housing containing a flowable switching mass which occupies only part of the interior of said vessel, said vessel being formed with a plurality of recesses opening inwardly in different directions, contact means located in said housing for each of said circuits, the contact means for said recording circuit extending into a first one of said recesses, the contact means connected to said reversing circuit extending into a second one of said recesses, the cubic capacity of each of said recesses being sufficiently large relative to the volume of said switching mass in said vessel so that only a selected one of said recesses receives said switching mass at any time depending on the position of said housing, each of said contact means extending into a recess being arranged to assume a circuit-closing condition in response to said switching mass flowing into the related recess, said first recess containing the contact means connected to said recording circuit extending parallel to said rear wall and opening upwardly in the upright position of said microphone to then receive said switching mass, said second recess containing the contact means connected to said reversing circuit being upwardly directed in said upright position of the microphone so that the reversing circuit is completed when the microphone is held in an inverted position, a third one of said recesses being free of said contact means, and said apparatus being adapted to stop in response to said switching mass flowing into said third recess free of said contact means.

2. The combination of sound recording and reproducing apparatus having recording, reproducing, and reversing control circuits, and a hand microphone comprising a housing having a rear wall, a closed vessel in said housing containing a flowable switching mass which occupies only part of the interior of said vessel, said vessel being formed with a plurality of recesses opening inwardly in different directions, contact means located in said housing for each of said circuits, the contact means for said recording circuit extending into a first one of said recesses, the contact means connected to said reproducing circuit extending into a second one of said recesses, the

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cubic capacity of each of said recesses being sufficiently large relative to the volume of said switching mass in said vessel so that only a selected one of said recesses receives said switching mass at any time depending on the position of said housing, each of said contact means extending into a recess being arranged to assume a circuit-closing condition in response to said switching mass flowing into the related recess, said first recess containing the contact means connected to said recording circuit extending parallel to said rear wall and opening upwardly in the upright position of said microphone to then receive said switching mass, said second recess containing the contact means connected to said reproducing circuit being laterally directed in said upright position of the microphone and extending parallel to said rear wall so that the reproducing circuit is completed only when said microphone is disposed on a side thereof with said laterally directed second recess extending downwardly to receive the switching mass, a third one of said recesses being free of said contact means, and said apparatus being adapted to stop in response to said switching mass flowing into said third recess free of said contact means.

3. The combination as in claim 2, in which said control circuits include a further circuit operable to cause an additional mode of operation of said apparatus, and said recesses further include a fourth recess which extends laterally in a direction opposite to said second recess containing the contact means connected to the reproducing circuit and contains said contact means connected to said further circuit.

4. The combination of sound recording and reproducing apparatus having recording, reproducing, and reversing control circuits, and a hand microphone comprising a housing, a closed vessel in said housing containing a flowable switching mass which occupies only part of the interior of said vessel, said vessel being formed with a plurality of recesses opening inwardly in different directions, contact means located in said housing for each of said circuits, at least the contact means for said recording circuit extending into one of said recesses, the cubic capacity of each of said recesses being sufficiently large relative to the volume of said switching mass in said vessel so that only one of said recesses receives said switching mass at any time depending on the position of said housing, each of said contact means extending into a recess being arranged to assume a circuit-closing condition in response to said switching mass flowing into the related recess, another of said recesses being free of said contact means, said apparatus being adapted to stop in response to said switching mass flowing into said other recess free of said contact means, said hand microphone further comprising positively acting switching means carried by said housing, said switching means being manually operable relative to said housing to control said reproducing and reversing circuits and to cause the stopping of said apparatus.

5. The combination of sound recording and reproducing apparatus having recording, reproducing, and reversing control circuits, and a hand microphone comprising a housing having a rear wall, a closed vessel in said housing containing a flowable switching mass which occupies only part of the interior of said vessel, said vessel being formed with a plurality of recesses opening inwardly in different directions, contact means located in said housing for each of said circuits, at least the contact means for said recording circuit extending into one of said recesses, the cubic capacity of each of said recesses being sufficiently large relative to the volume of said switching mass in said vessel so that only a selected one of said recesses receives said switching mass at any time depending on the position of said housing, each of said contact means extending into a recess being arranged to assume a circuit-closing condition in response to said switching mass flowing into the related recess, another of said recesses being free of said contact means, said apparatus

being adapted to stop in response to said switching mass flowing into said other recess free of said contact means, said one recess containing the contact means connected to the recording circuit extending parallel to said rear wall and opening upwardly in an upright position of said microphone to then receive said switching mass, said other recess free of contact means extending rearwardly toward said rear wall in said upright position to receive the switching mass and thus stop the apparatus when said microphone is laid on said rear wall.

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