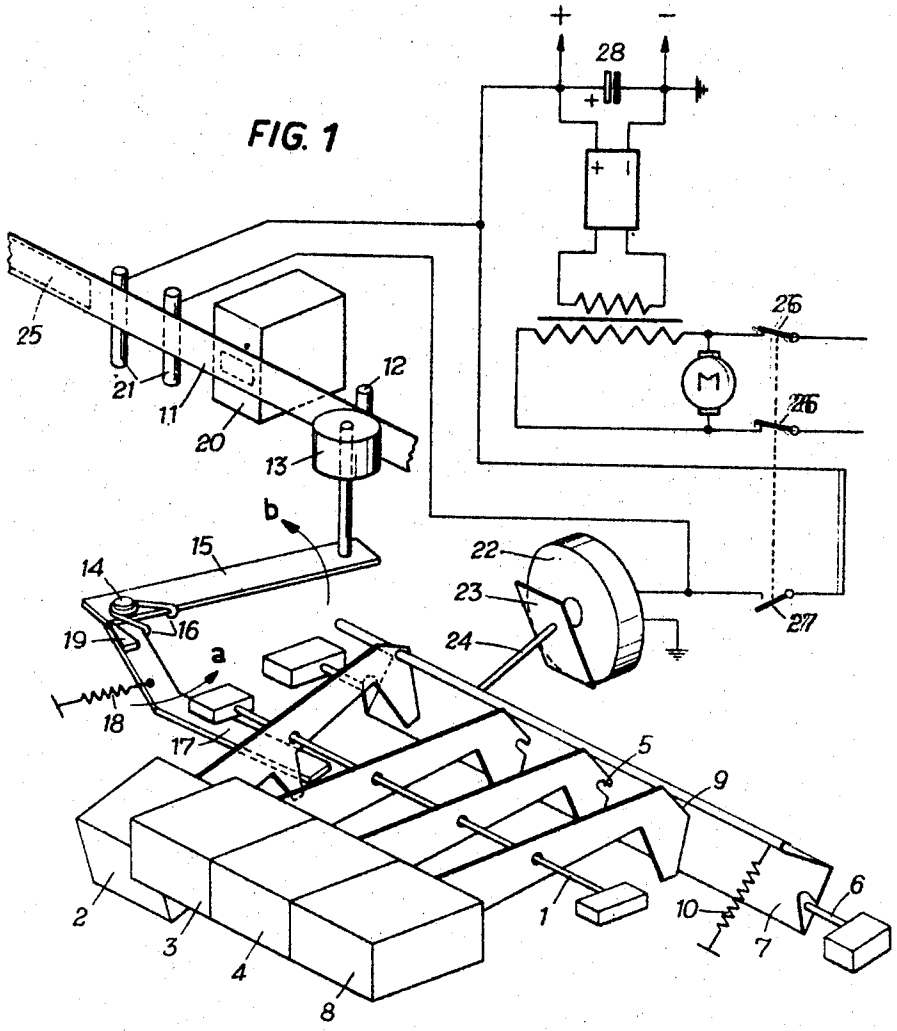
March 25, 1969 W. EIBENSTEINER 3,434,725

AUTOMATIC STOP APPARATUS FOR A RECORDER REPRODUCER

Filed Dec. 20, 1965

FIG. 1



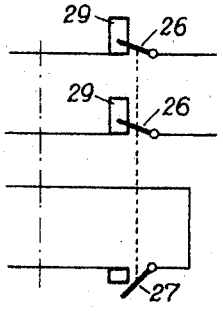


FIG. 2

INVENTOR.
WALTER EIBENSTEINER

BY

Frank R. Trifari
AGENT

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AUTOMATIC STOP APPARATUS FOR A RECORDER/REPRODUCER

Walter Eibensteiner, Vienna, Austria, assignor to North American Philips Company Inc., New York, N.Y., a corporation of Delaware

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9 Claims

This invention relates to means for automatically turning "off" a magnetic tape recorder/reproducer or at least termination of one of the operating conditions of such apparatus.

Operating conditions are to be understood to mean herein not only the various types of movement of a record carrier, for example, the forward and backward movement at a speed adjusted for scanning or the fast forward and backward movement, but also the conditions "playback" or "record."

Magnetic recorder/reproducers of the type to which the invention relates, and having automatic shut off means, are known, for example, United States Patent 2,631,855. An embodiment of this invention is to provide an improved system for automatically turning off a recorder/reproducer which is economical to manufacture and reliable in operation.

In order that the invention may readily be carried into effect, it will now be described in detail by way of example, with reference to the embodiments shown in the accompanying drawing. In this drawing, FIGURE 1 diagrammatically shows a device according to the invention and FIGURE 2 shows a switch which may be used in a device according to the invention.

FIGURE 1 shows the device according to the invention in a recording and/or play-back apparatus having push buttons or keys 2, 3, 4 for the normal forward and fast forward and fast backward movements respectively. For simplicity, components which strictly are not essential to understand this invention—for example, operating levers cooperating with the keys for switching on the various types of movement, the driving mechanism for the record carrier, and so on—are not shown in the drawing or are shown diagrammatically only.

The keys 2, 3 and 4 are rotatably mounted on the shaft 1 and are provided with notches 5 for snapping into engagement with the locking bar 7 which locks a depressed key in its depressed position. Bar 7 is rotatably mounted on the pivots 6. The key 2 is shown in its depressed position. The key 8 is constructed as a release key. When the said release key, or any of the other keys, is depressed, the locking bar 7 is pivoted out of its operating position by the edge 9, so that any key in engagement with the bar is released and returned to its rest position. The release key 8 does not comprise a notch for snapping into engagement with the locking bar so that said key, after having been depressed, returns to its initial position. The locking bar 7 is maintained in its operating position by a spring 10.

Normal forward movement of the record carrier, in this case the tape 11, is provided by means of the key 2. For this purpose, a driving shaft or capstan 12 is provided which is driven by a motor M in known manner (not shown) and cooperates with a pressure roller 13. The pressure roller 13 is mounted on a lever 15 which is rotatable on the pivot 14. Said lever 15 is coupled by means of the spring 16 to the lever 17 which likewise is rotatable on the pivot 14 and cooperates with the key 2. When the key 2 is depressed, the levers 15 and 17 are rotated in the manner shown by arrows *a* and *b* by arrows

a and *b* in the drawing while the pressure roller 13 is tion, the lever 17 is rotated under the action of the reset- as a pressure compensating spring. When the key 2 is released, that is to say when it is returned to its rest posi- forced against the driving shaft 12. The spring 16 serves ting spring 18 and, by means of the abutment 19 provided on it, takes along the lever 15 which carries the pressure roller 13 so that same is moved out of engagement with the driving shaft 12.

In the case of fast travel (forward and reverse) which is controlled by means of the keys 3 and 4, the driving of the tape may be effected, for example, directly through tape reel turntables (not shown).

Magnetic heads for recording and/or playing-back and erasing information respectively are arranged along the path of the tape, as is known, in the drawing only one head 20 is shown. In addition, a pair of contacts 21 which is included in the current circuit of an electromagnet 22, serving for releasing the locking device 7 for the keys, is arranged along the path of the tape. For this purpose the armature 23 of the magnet is connected through a rod 24 to the locking bar 7 so that, as soon as the armature of the electromagnet is attracted, the locking bar is rotated so that the depressed keys are released. The electromagnet 22 is energized as soon as the two components of the pair of contacts 21 are conductively connected together. As is known, this connection takes place by marking strips (switching foils) 25 arranged on the tape 11. Such marking strips are provided, for example, at some distance before the end of the tape, so that the tape drive is stopped as soon as the total quantity of tape is uncoiled from the supply reel.

A switch 27 whose two contacts are opened when the mains switch is closed is mechanically coupled to the mains switch 26 and arranged in parallel with the said pair of contacts 21 in the supply line of the electromagnet 22. When the apparatus is switched off by means of the mains switch 26, the switch 27, which is coupled mechanically to the mains switch, is actuated so that the current circuit of the electromagnet 22 is closed. As a result the charge capacitor 28, included in the mains circuit is discharged through the electromagnet 22 so that the armature 23 is attracted and the depressed key or keys is or are released by a rotation of the locking bar 7. By releasing the keys the driving mechanism for the tape is set in its rest position, that is to say the pressure roller 13 is moved out of engagement with the driving shaft 12 and any intermediate wheels are reset in their rest position respectively. Consequently release of the keys 2, 3, 4 by means of the manual released button 8 is no longer absolutely necessary so that damaging the apparatus in that flat sides are formed on the driving elements, is no longer possible.

FIGURE 2 shows another device for energizing the electromagnet 22 when the mains switch 26 is switched off. In this device the mains switch 26 and the switch 27 coupled mechanically to the mains switch and included in the current circuit of the electromagnet are constructed so that the switch 27 is closed at an instant earlier than that at which the mains switch 26 is opened. In this case the switch 26 is provided with contact members 29 which are longer than the stroke which the contact arm of the switch 27 has to perform to close the said switch 27. The contact members 29, however, are shorter than the maximum stroke of the said arm.

Numerous structural variations of the device according to the invention are possible. For example, when using a number of keys each having a separate locking device it is possible that the electromagnet has a releasing action on each of the locking devices through a suitably constructed system of levers. In addition it is possible that the electromagnet does not act directly on the keys, but

on the component of the apparatus moved by the keys or on the locking devices of the said components. Alternatively, the device may be constructed so that the components of the apparatus in question, for example, the pressure roller and the intermediate wheels, are not reset entirely in their rest condition, but that only their working contact is removed. The device according to the invention may also be used in arrangements having keys which are constructed in a different way than described hereinbefore.

What is claimed is:

1. Apparatus for switching off at least one of the operating conditions of a recording and/or reproducing device, comprising: at least one key for actuating an operating condition of the device, said key actuating selected components of the device, locking means for locking said key, an electromagnet adapted to release said locking means, a line switch adapted to connect an external energization source to said apparatus, an auxiliary energization source, and an auxiliary switch mechanically coupled to said line switch, said auxiliary switch being included in the energizing circuit of the electromagnet, said auxiliary switch acting to close said energizing circuit and connect said auxiliary energization source to said electromagnet when said line switch disconnects said external energization source, whereby said electromagnet is energized and said locking means is released when said external energization source is disconnected.

2. Apparatus as claimed in claim 1, wherein said auxiliary energization source comprises a charge capacitor.

3. Apparatus as claimed in claim 1, wherein said auxiliary energization source comprises a charge capacitor which is charged by said external source when said line switch connects said external source to said apparatus.

4. Apparatus as claimed in claim 1, wherein said auxiliary switch closes said energizing circuit before said line switch disconnects said external energization source.

5. Apparatus as recited in claim 1, wherein a plurality of keys are provided, said locking means being at least partially common to said keys, said electromagnet having an armature which co-acts mechanically with said locking means.

6. Apparatus for switching off at least one of the operating conditions of a device for recording and/or reproducing signals on a carrier, comprising: at least one key for actuating an operating condition of the device in which the carrier moves at a predetermined speed, said key actuating selected components of the device, locking means for locking said key, an electromagnet adapted to release said locking means, a line switch adapted to connect an external energization source to said apparatus, an auxiliary energization source, and an auxiliary switch mechanically coupled to said line switch, said auxiliary switch being included in the energizing circuit of the electromagnet, said auxiliary switch acting to close said energizing circuit and connect said auxiliary energization source to said electromagnet when said line switch disconnects said external energization source, a pair of contacts arranged in said energizing circuit, said contacts being adapted to be shunted by conductive markings on said carrier, said auxiliary switch being connected in parallel with said contacts, whereby said electromagnet is energized when said external energization source is disconnected or when said pair of contacts are engaged by said conductive markings.

7. Apparatus as recited in claim 6, wherein said auxiliary energization source comprises a charge capacitor.

8. Apparatus as recited in claim 6, wherein said auxiliary energization source comprises a charge capacitor which is charged by said external source when said line switch connects said external source to said apparatus.

9. Apparatus as recited in claim 6, wherein said auxiliary switch closes said energizing circuit before said line switch disconnects said external energization source.

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BERNARD KONICK, *Primary Examiner.*

J. RUSSELL GOUDEAU, *Assistant Examiner.*

U.S. Cl. X.R.

179—100.2

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,434,725 March 25,

Walter Eibensteiner

It is certified that error appears in the above identified patent and that said Letters Patent are hereby corrected as shown below:

Column 2, line 2, beginning with "tion, the" cancel all to and includ "spring 16 serves" in line 5, same column 2, and insert -- forced against the driving shaft 12. The spring 16 serves as a pressure compensating spr When the key 2 is released, that is to say when it is returned to its posi the lever 17 is rotated under the action of the reset --.

Signed and sealed this 14th day of April 1970.

(SEAL)
Attest:

Edward M. Fletcher, Jr.
Attesting Officer

WILLIAM E. SCHUYLER,
Commissioner of Pate