

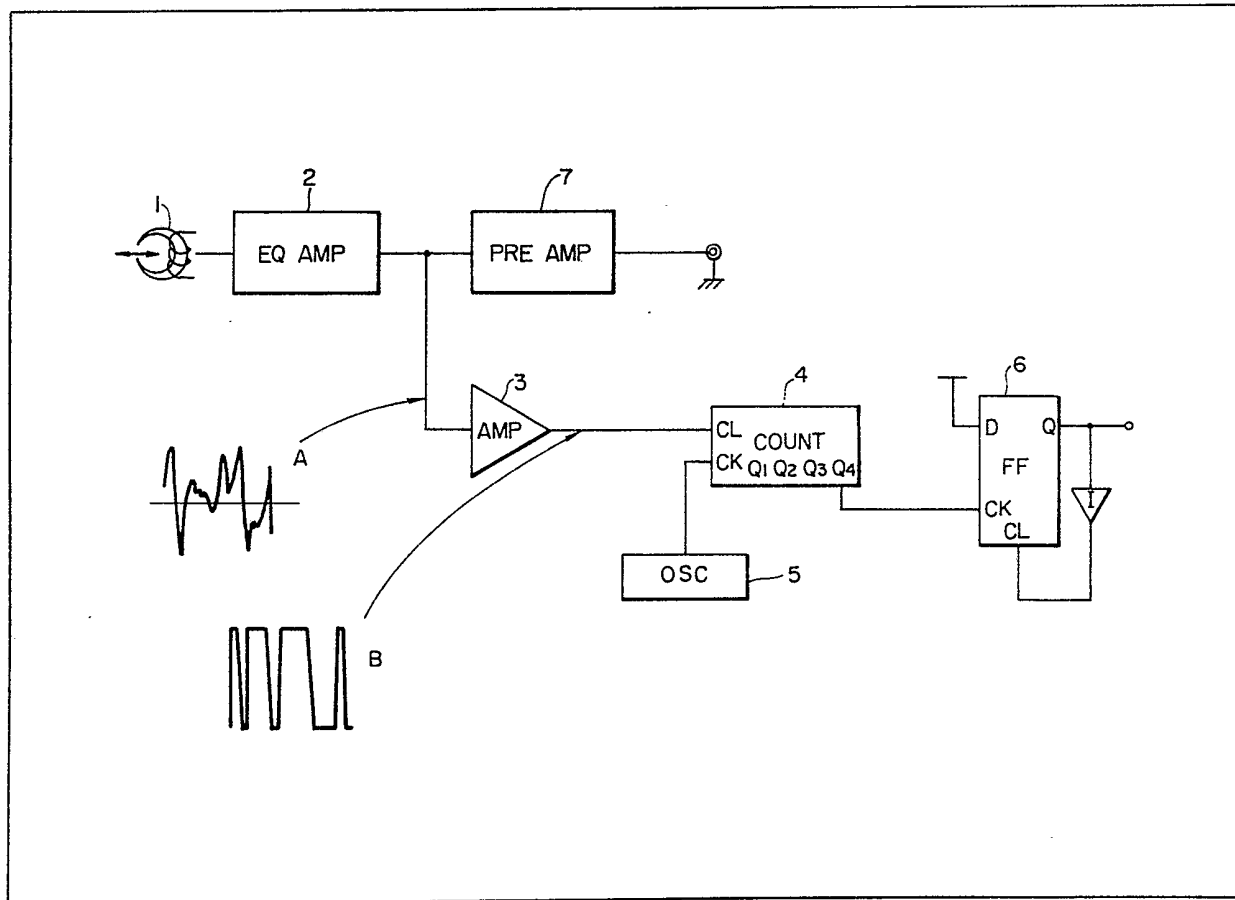
(12) **UK Patent Application** (19) **GB** (11) **2 096 381 A**

- (21) Application No **8110473**
- (22) Date of filing **3 Apr 1981**
- (43) Application published  
**13 Oct 1982**
- (51) **INT CL<sup>3</sup>**  
**G11B 27/22**
- (52) Domestic classification  
**G5R B264 B336 B37Y B443**  
**B60X JA**
- (56) Documents cited  
**GB 1403386**  
**US 3350580**
- (58) Field of search  
**G5R**  
**G1U**
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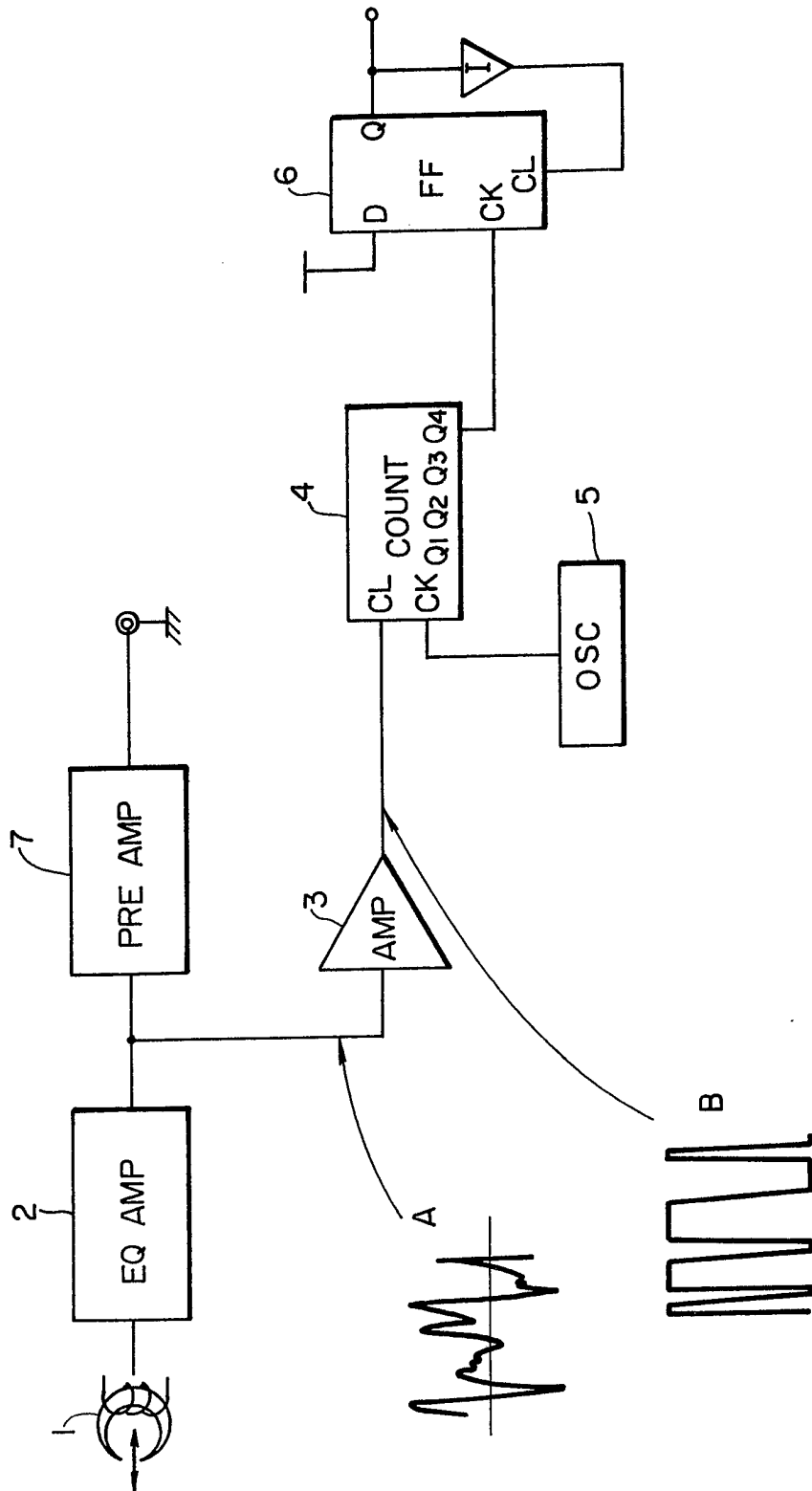
(54) **Device for detecting a non-recorded segment on magnetic tape**

(57) A device for accurately detecting non-recorded segments on a magnetic tape in fast-forward and rewind modes. The output of a magnetic head (1) is coupled through an equalizer amplifier (2) and limiter amplifier (3) to convert it to a digital pulse signal (waveform B) which is applied to the clear input of a counter (4) the clock

input of which is coupled to an oscillator (5). A higher order output bit (Q4) is connected to the clock input of a flip-flop (6) which controls solenoids for setting the fast-forward and rewind modes. When no pulses of the digital pulse signal are received within a predetermined period, indicative of the presence of a non-recorded segment, the counter (4) produces an output signal which operates the flip-flop (6).



GB 2 096 381 A



## SPECIFICATION

**Device for detecting a non-recorded segment on magnetic tape**

The present invention relates to a detecting device for detecting a non-recorded segment interposed between recorded segments on a magnetic tape during a fast-forwarding or playback mode.

Heretofore, detection of a non-recorded segment interposed between recorded segments on magnetic tape has been carried out in such a manner that the tape is brought into contact with a magnetic head during the fast-forwarding, rewinding or play-back mode to pick up recorded signals, the signal thus picked up is thereafter amplified and is further filtered by a low-pass filter, and a low level output of the low-pass filter is sensed to detect the non-recorded segment. This technique is disadvantageous in that a set time for determining the non-recorded segment tends to vary because variations in the value of a capacitor and a resistor constituting the low-pass filter cause variations in the time constant of the low-pass filter. It is further disadvantageous in that, even if the device is formed with an IC, the total number of components including those coupled to the IC is high.

In view of the foregoing, an object of the invention is to provide a device for detecting non-recorded segments on a tape in which the detection operation is carried out digitally thereby allowing the device to be easily implemented with an IC.

In accordance with this and other objects of the invention, there is provided a device for detecting non-recorded segments on a magnetic tape including oscillator means for producing clock pulses of a predetermined frequency, counter means having a clear input terminal and a clock terminal with the clock pulses applied to the clock input terminal, and means for applying a digital signal corresponding to a reproduced signal to the clear input terminal. The counter means produces an output signal when the digital signal represents that the duration of a non-recorded segment is longer than a predetermined time. Preferably, the means for applying the digital signal includes an equalizer amplifier the input of which is coupled to the output of a magnetic head and a limiter amplifier which amplifies and limits the output of the equalizer amplifier. Also, the flip-flop having a clock input terminal coupled to receive the output signal of the counter means can be provided with at least an output of the flip-flop controlling fast-forward and rewind modes within the tape recorder.

The single Figure is a circuit diagram of a preferred embodiment of a detecting device of the invention.

A preferred embodiment according to the invention will be described with reference to the single Figure.

A reproduced signal obtained from a magnetic head 1 is inputted to an equalizer amplifier 2, the

output of which, signal A, is applied to both a preamplifier 7 and a limiter amplifier 3. In the limiter amplifier, the signal A is subjected to amplification by about 60 decibels and limitation to provide an output signal having a waveform shaped as signal B shown in the Figure. The signal B thus obtained is applied to a clear terminal CL of a counter 4 to the clock terminal of which clock pulses are constantly applied from an oscillator 5. The output  $Q_x$  (in the embodiment described,  $Q_4$ ) of the counter 4 is fed to a clock terminal CK of a D-type flip-flop 6 as a set signal. The Q output of the flip-flop 6 is used as a control signal for controlling solenoids which have plungers which set the fast-forward or rewind mode so as to halt the tape running. The Q output of the flip-flop 6 is coupled to a clear input terminal CL of the flip-flop 6 through an inverter. Accordingly, the clear input is rendered LOW when the Q output of the flip-flop 6 is HIGH.

In the fast forward or rewind mode, the counter 4 is cleared when the signal B is present. Therefore, the output  $Q_4$  of the counter 4 is maintained in the LOW state as long as a reproduced signal is present. During the playback of non-recorded segments on the tape, the signal B applied to the clear terminal of the counter 4 is in the LOW state. During this time, the counter 4 counts the clock pulses read from the oscillation circuit 5. When the counter counts more than a predetermined number of the clock pulses, the output  $Q_4$  of the counter 4 changes to HIGH to thereby set the flip-flop 6. As a result, the output Q of the counter 4 is rendered HIGH. In this manner, a signal indicating the presence of non-recorded segments on the tape is obtained. If the duration of a non-recorded segment is within a preset period of time, the non-recorded segment detecting signal is not produced because the counter 4 is cleared prior to the counting of the predetermined number of the clock pulses.

As is apparent from the above description, in accordance with the invention it is possible to preset the time for determining non-recorded segments on a tape as desired or to change the time therefor because the time therefor is set by a count of a number of clock pulses. Moreover, very precise operations can be performed if the frequency of the clock pulses is made sufficiently high. Furthermore, if the control of the overall tape recorder system is implemented with a microcomputer, the clock applied to the microcomputer can be used as the clock signal applied to the counter upon effecting frequency division of the clock pulse signal. In such a case, the device according to the invention can be formed with a simpler IC chip.

## CLAIMS

1. A device for detecting non-recorded segments on a magnetic tape comprising:  
oscillator means for producing clock pulses of a predetermined frequency; counter means having a clear input terminal and a clock terminal, said clock pulses being applied to said clock input

terminal; means for applying a digital signal corresponding to a reproduced signal to said clear input terminal; and wherein said counter means produces an output signal when said digital signal represents that the duration of a non-recorded segment is more than a predetermined time.

5 2. The detecting device of claim 1 wherein said means for applying a digital signal corresponding to a reproduced signal comprises an equalizer  
10 amplifier having an input coupled to an output of a magnetic head and a limiter amplifier having an input coupled to an output of said equalizer

amplifier, said limiter amplifier outputting said digital signal.

15 3. The device as claimed in claim 1 or 2 further comprising a flip-flop having a clock input coupled to receive said output signal from said counter means, said flip-flop having an output coupled to operate solenoids controlling at least fast-forward  
20 and rewinding modes.

4. A device for detecting non-recorded segments on a magnetic tape substantially as hereinbefore described with reference to the accompanying drawings.