

PATENT SPECIFICATION

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(54) RECORDING AND REPRODUCING VIDEO SIGNALS

(71) We, VEB ELEKTRO-TECHNIK EISENACH KOMBINAT STERN-RADIO BERLIN, of Alstadstrasse 27, 59 Eisenach, German Democratic Republic, a Corporation organised and existing under the laws of the German Democratic Republic, do hereby declare the invention, which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a television video signal recording and reproduction system in which only a single field is recorded.

Such a system is especially suitable for use in the recording and reproduction of video signals using magnetic storage media. In a known system only every n -th field signal is recorded and this field signal is then reproduced n times. The number n is limited in that with a high number n a substantial signal difference occurs between the field signal recorded and then reproduced for the n -th time, and the next field signal recorded, and then reproduced for the first time, this reducing the quality of the image reproduced.

According to this invention there is provided a television video signal recording and reproduction system of the type in which only a single field is recorded, in which the field signals to be recorded are fed by way of a changeover switch alternately to a first recording and reproduction head or a difference device having a second input supplied by a second recording and reproduction head arranged to reproduce a first field signal recorded by the first head and supply this signal to the difference device simultaneously with receipt by the difference device of the subsequent second field signal for recording received by the system, the difference signal formed by the difference device from the two field signals supplied

thereto being fed by way of a switch to the first head for recording thereby, whereafter the first head is supplied with the third field signal received by the system for recording and then with the difference signal formed by the difference device from the recorded third field signal reproduced by the second head and the simultaneously received fourth field signal for recording, this cycle of operation being repeated for subsequently received field signals for recording.

Preferably the first and second recording and reproduction heads are connected to respective inputs of an adder device from the output of which a video signal for reproduction is obtained.

In the system of this invention each n -th field signal is directly recorded while during the intervening periods difference signals formed by the difference device are recorded, while for reproduction the outputs of the first and second recording and reproduction heads are combined to form a signal for reproduction.

The system enables recording of the field signals to be effected at a relatively low frequency and this can be achieved by means of suitable measures in the recording and reproduction heads, or preferably by a reduced relative speed between the recording medium and the recording and reproduction heads, with a resulting reduction in the band width.

The system of the invention ensures that by the quantification of the error for each field signal, satisfactory image quality is obtained from the video signals reproduced, with increased re-play time for a given storage capacity, the reduced relative speed possible also reducing wear on relatively moving parts.

The system enables the single field signal recording method to be used for numbers of n larger than 2, with the recording band width reduced accordingly.

The invention will now be described by

way of example with reference to the drawings wherein:—

Figure 1 shows a system according to the invention having two recording and reproduction heads, and

Figure 2 shows the reproduction part of a system according to the invention having four recording and reproduction heads.

In Figure 1 the system has a first recording and reproduction head 1 and a second recording and reproduction head 2 both arranged so that at the relative speed and frequencies, they take effect at the same point on a storage medium, but in succession, the time between the heads taking effect corresponding to that occurring between two field signals. The first head 1 is connected to a change-over switch 3 through which a field signal of a video signal to be recorded is passed and with a by-pass switch 4 which, after the first field signal has been received, connects the output of a difference device 6 to the first head 1. The second head 2 is connected to an input 7 of the difference device 6, the other input 8 of which is connected with the other pole of switch 3.

For recording of the video signal a field signal is recorded by the head 1, and the next receiver field signal is directed by switch 3 to the input 8 of the difference device 6.

The recorded field signal is then reproduced by the head 2, connected to the input 7 of the difference device 6. At the output 5 of the difference device 6 the difference signal between the recorded field signal and the next field signal is produced, and by means of the switch 4 which is closed during the period of this next field signal is fed to the head 1 and thus recorded. The entire process is then repeated.

For reproduction the signals are passed from both heads 1 and 2 into inputs 9 and 10 of an adder device 11, from the output 12 of which the video signal is once again available as the n^{th} field signal together with the difference either in respect of the $(n+1)^{\text{th}}$ field signal, or the n^{th} field signal together with the difference of the $(n-1)^{\text{th}}$ in respect of the $(n-2)^{\text{th}}$ field signal.

Figure 2 shows a system according to the invention having a first recording and reproduction head 1 and three further heads 2, each connected through respective switches 13, 14 and 15 with separate inputs

16, 17 and 18 of an adder device 19, the output 20 of which is connected with the input 7 of the difference device 6. As n is 4 the change-over switches 3, 4, 13, 14, 15 operate at the frequencies $f_{v/4}$, f_v being the frequency of the sequence of the field signals.

The position of the change-over switches may be seen from the following matrix of the change-over functions:

Switch	Half-image				
	1	2	3	4	5
3	a	b	b	b	a
4	a	b	b	b	a
13	a	b	b	b	a
14	a	a	b	b	a
15	a	a	a	b	a

Here again, the method of operation is such that each n^{th} field signal is recorded with reduced frequency, after which the difference signals obtained with the respective subsequent field signals are recorded.

WHAT WE CLAIM IS:—

1. A television video signal recording and reproduction system of the type in which only a single field is recorded, in which the field signals to be recorded are fed by way of a change-over switch alternately to a first recording and reproduction head or a difference device having a second input supplied by a second recording and reproduction head arranged to reproduce a first field signal recorded by the first head and supply this signal to the difference device simultaneously with receipt by the difference device of the subsequent second field signal for recording received by the system, the difference signal formed by the difference device from the two field signals supplied thereto being fed by way of a switch to the first head for recording thereby, whereafter the first head is supplied with the third field signal received by the system for recording and then with the difference signal formed by the difference device from the recorded third field signal reproduced by the second head and the simultaneously received fourth field signal reproduced by the second head operation being repeated for subsequently received field signals for recording.

2. A system as claimed in Claim 1, in which the first and second recording and reproduction heads are connected to

respective inputs of an adder device from the output of which a video signal for reproduction is obtained.

- 5 3. A television video signal recording and reproduction system substantially as herein described with reference to Figure 1 or Figure 2 of the drawings.

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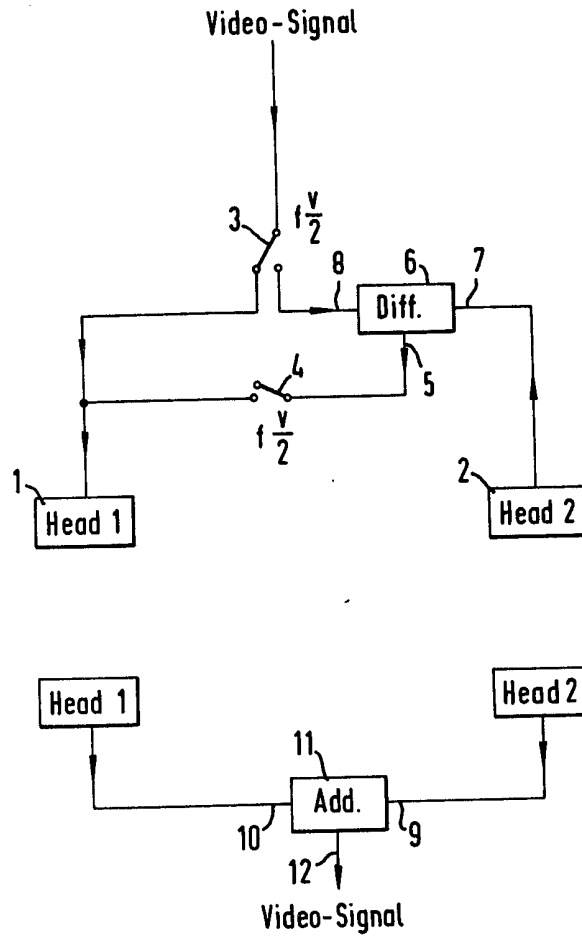


FIG. 1

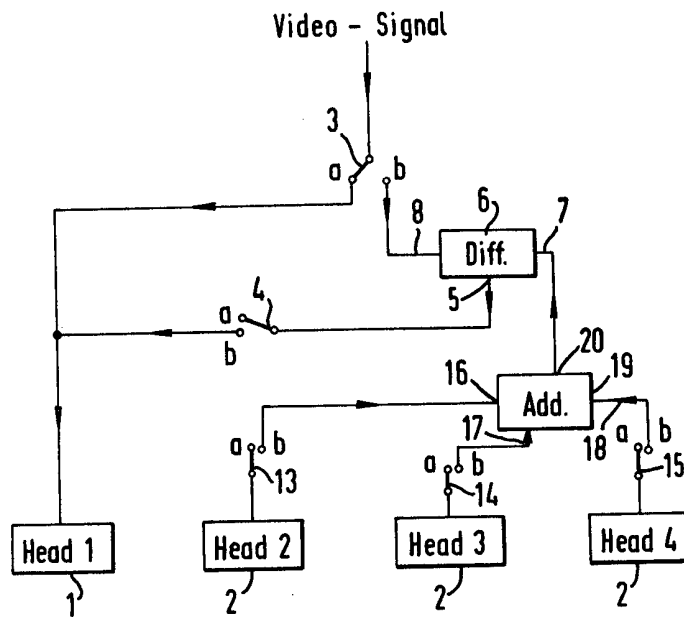


FIG. 2