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[54] **ANALOG STORAGE ARRANGEMENT USING TRANSFLUXOR**

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[51] **Int. Cl.**.....**G11c 27/00**, H04b 1/06, H04b 7/00

[58] **Field of Search**.....325/37, 391, 392; 340/174 CT; 343/225, 228; 178/5.4 HE

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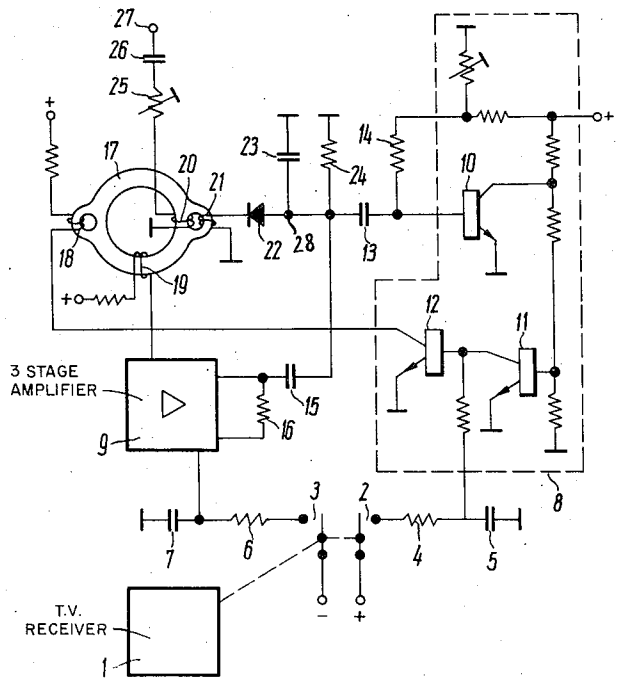
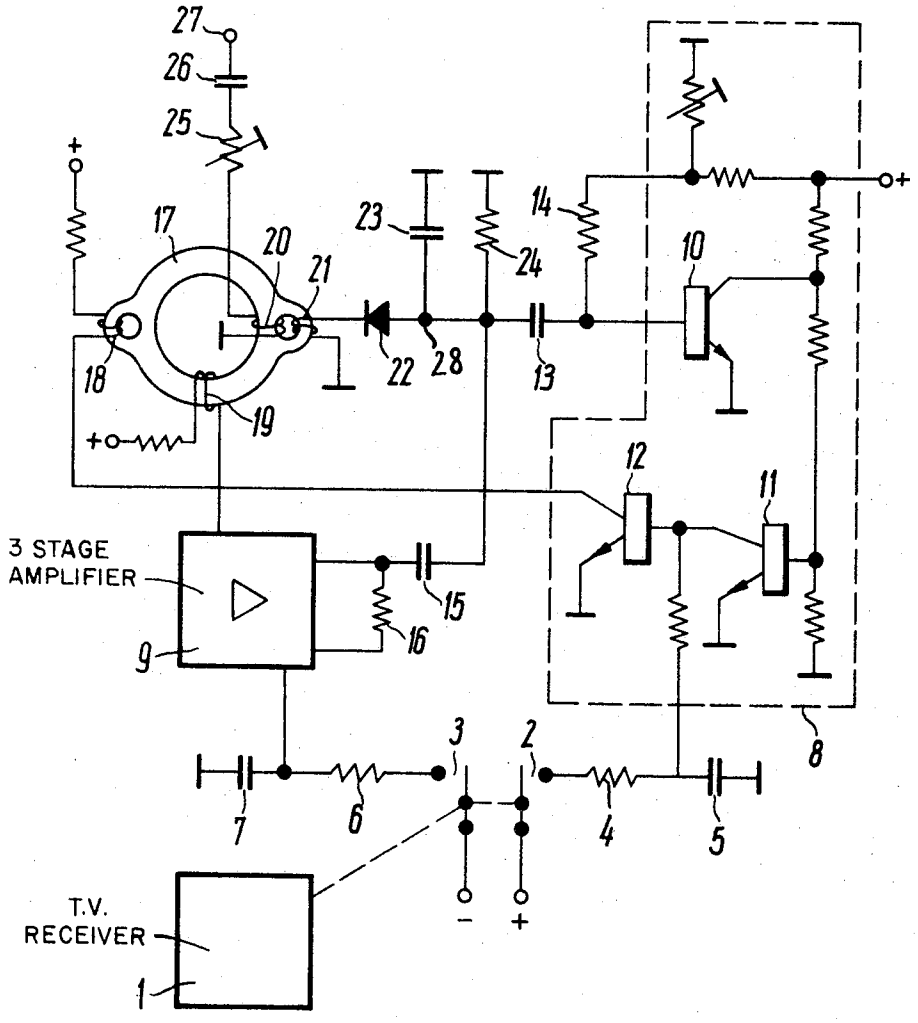
[57] **ABSTRACT**

A rectifier is connected to transfluxor output winding. A first feedback circuit is connected between rectifier output and setting winding, a second feedback circuit between rectifier output and blocking winding. The first and second feedback circuits have first and second three-stage amplifier respectively. The operating voltage for one stage of first or second three-stage amplifier applied selectively to produce increase or decrease of stored analog value respectively.

20 Claims, 1 Drawing Figure

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ANALOG STORAGE ARRANGEMENT USING TRANSFLUXOR

BACKGROUND OF THE INVENTION

This invention relates to a circuit arrangement using a transfluxor for the storage of analog values. In particular, it relates to circuits using a transfluxor for which the setting and blocking currents are supplied in the form of pulses.

In known arrangements of the above-described type of circuit, blocking and setting pulses are furnished by means of a pulse generator, control circuits being furnished to regulate the storage of a particular analog value. This type of circuits have the disadvantage that a great deal of equipment is required.

SUMMARY OF THE INVENTION

It is an object of the present invention to furnish a transfluxor analog storage circuit controlled by pulses applied to the setting and blocking windings, but not requiring an additional pulse generator and further requiring a minimum of other additional equipment.

The present invention is an analog signal storage arrangement which comprises transfluxor means having a setting winding and an output winding, which transfluxor means store an analog value corresponding to the number of setting pulses applied to said setting winding and furnish an output signal corresponding to the so-stored analog value at said output winding. Further, self-excitation circuit means are connected between said output winding and said setting winding for furnishing said setting pulses to said setting winding in correspondence to external activation, thereby causing the storing of said analog value.

The arrangement in accordance with this invention further has additional self-excitation circuit means connected between said output winding and the blocking winding of said transfluxor means. Upon additional external activation, said additional self-excitation circuit means cause blocking pulses to be applied to said blocking winding, thereby decreasing said stored analog value.

The self-excitation circuit means and the additional self-excitation means comprise first circuit means furnishing a first signal having an amplitude corresponding to the rate of change of amplitude of said output signal, and amplifier means amplifying said first signal. The first circuit means, in a preferred embodiment, may comprise a rectifier and a differentiating circuit.

The amplifier means comprise a plurality of amplifier stages. One of these amplifier stages receives an operating voltage only when a stored analog value is to be changed. This operating voltage is thus applied by external activation and may be applied to integrating means prior to application to the stage to serve as operating voltage thereof.

The operating voltage for one of the amplifier stages, a D.C. voltage, is applied by means of a first switch to the self-excitation circuit applying pulses to the setting winding and through a second switch to the amplifier stage in the self-excitation circuit supplying the blocking winding. Because an analog value once stored in the transfluxor may be maintained indefinitely, the arrangement of the present invention is particularly useful when used in conjunction with remote control means for controlling communication equipment.

When the present invention is used in conjunction with television receivers, it is particularly desirable that the drive winding of the transfluxor be controlled by pulses derived from the horizontal deflection transformer of the television receiver.

The volume, tone, brightness, contrast, hue, color saturation and station selection in either radio or television receivers all lend themselves particularly well for remote control by a circuit arrangement of the present invention.

Since in the present invention the setting and blocking pulses are generated by means of a feedback (self-excitation) circuit, the additional pulse generator is no longer required. Further, the feedback circuit may be used to effect a change in the analog value stored in the transfluxor which varies in direct proportion to time. By the insertion of other active and/or passive circuit elements into the feedback circuit, the change in analog values stored in the transfluxor may also be caused to vary as other functions of time.

A further pulse generator may be saved by use of the pulses from the horizontal deflection transformer of a television receiver as driving pulses.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWING

The single FIGURE shows a circuit arrangement in accordance with the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

A preferred embodiment of the present invention will now be described with reference to the drawing.

In the circuit shown in the FIGURE one of the switches **2, 3** is closed when it is desired to change the value stored in the transfluxor in a increasing and decreasing direction respectively. In particular, one of these switches is held closed until the desired analog valve has been reached. In the following example it will be assumed that it is desired to increase the value stored in the transfluxor. Thus, switch **2** is closed. Closing of switch **2** causes a positive voltage to be applied to integrating means comprising a resistance **4** and a capacitor **5.** The voltage across capacitor **5** is applied through a further resistance to the collector of a transistor **11** whose emitter is connected to ground and whose base is connected to one tap of a voltage divider connected between the positive supply side and ground. The operating voltage for transistor **11** thus increases in correspondence to the time constant determined by the values of resistance **4** and capacitor **5.** The voltage applied to the collector of transistor **11** is also applied to the base of a transistor **12** whose emitter is connected to ground and whose collector is connected to the driving winding **18** of transfluxor **17.** The other terminal of the driving winding **18** is connected to the positive supply line via a resistance. Because of the voltage applied to the base, transistor **12** becomes conductive causing a current to flow through setting winding **18** of transfluxor **17.**

The A.C. output voltage furnished at the output winding, **21**, of transfluxor **17**, therefore also increases. The A.C. output voltage is rectified by a rectifier **22** having a cathode connected to one terminal of the output winding and an anode connected to one terminal of a resistance **24** whose other terminal is connected to ground. Connected in parallel with resistance **24** is a filtering capacitor **23**. The common point of diode **22** and resistance **23** is denoted by reference numeral **28**. Thus a negative voltage of increasing magnitude appears at terminal **28** when switch **2** is closed. This voltage is differentiated by a differentiating circuit comprising a capacitor **13** connected to a resistance **14**, thereby causing a negative voltage surge of amplitude corresponding to the rate of change of transfluxor output voltage to be generated at the common point of capacitor **13** and resistance **14**. This common point is connected to the base of a transistor **10** whose emitter is connected to ground and whose collector is connected to a second tap of the voltage divider furnishing the base voltage for transistor **11**. Transistor **10** amplifies the voltage surge applied to its base. The so-amplified surge is again amplified by transistor **11**, thereby causing transistor **12** to block. The blocking of transistor **12** causes an interruption of the current through setting winding **18**. The output voltage at terminal **28** therefore remains constant, eliminating the voltage at the output of the differentiating circuit. This in turn causes transistor **10** to become conductive, causing transistor **11** to block. If switch **2** is still closed, an increasing positive voltage is again applied to the base of transistor **12** and the current through the setting winding **18** again flows.

This cycling repeats until switch **2** is opened again. For each new cycle the setting current increases, thus increasing the analog value stored in transfluxor **17**. The voltage at terminal **28** is proportional to the so-stored analog value and is therefore suitable for electronically controlling the setting of communication apparatus, for example the volume of such apparatus. If the stored value is to be decreased, switch **3** is closed causing the above-described cycle to be implemented in conjunction with blocking winding **19** of transfluxor **17**. Specifically, the switch **3**, when closed, causes negative voltage to be applied to additional integrating means comprising a resistance **6** and a capacitor **7**. The voltage across capacitor **7** is applied to additional amplifier means, denoted by reference numeral **9** in the FIGURE, in the same fashion as the voltage across capacitor **5** was applied to transistors **11** and **12** of three-stage amplifier **8**. The driving voltage for three-stage amplifier **9** is supplied by means of an additional differentiating circuit comprising a capacitor **15** and a resistance **16** in the same manner as the output of the differentiating circuit comprising capacitor **13** and resistance **14** was applied to transistor **10**. If, as shown in the FIGURE, the voltage applied to the additional integrating means through switch **3** is a negative voltage, the transistors constituting amplifier stage **9** must be of opposite conductivity type to those utilized in amplifier **8**. It is of course also possible to use a positive voltage and transistors of the same conductivity type.

The particular values chosen for the differentiating and integrating circuits (**4–7** and **13–16**) can serve to control the pulse width in the setting and blocking winding and further the rate of change of output voltage resulting fom the closing from one of the switches **2, 3**. The pulse widths and thus the voltage increments at the output winding can be maintained sufficiently small that the process may be considered a continuous process. Thus the invention may be used for storing stations in tuness associated with radio and television receivers.

When the transfluxor is used as a storage in conjunction with a television receiver, the driving current for transfluxor **17** may be derived from the transformer furnishing the horizontal deflection pulses. Terminal **27** in the FIGURE is connected to such a transformer. This terminal is further connected to a capacitor **26** connected in series with a variable resistance **25** which is in turn connected to the driving winding **20** of transfluxor **17**. Resistance **25** may be adjusted to yield the most advantageous pulse shape.

In the drawing switches **2** and **3** are connected to a receiver **1** through which they may be operated by means of wireless remote control.

While the invention has been illustrated and described as embodied in specific self-excitation circuits, it is not intended to be limited to the details shown, since various modifications and circuit changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be protected by Letters Patent is set forth in the appended claims:

1. Analog storage arrangement comprising, in combination, transfluxor means having a setting winding, an output winding, a transfluxor output connected to said output winding and a transfluxor input connected to said setting winding, for storing an analog value corresponding to setting signals applied to said setting winding and furnishing an output signal having an amplitude corresponding to said so-furnished setting signals at said transfluxor output; and wireless remote control switch means connected to said transfluxor input for furnishing said setting signals to said setting winding upon external activation, whereby said output signal at said transfluxor output varies in response to said external activation.

2. A storage arrangement as set forth in claim **1**, further comprising remote control means for operating said wireless remote control switch means.

3. A storage arrangement as set forth in claim **1**, further comprising television receiver means having transformer means furnishing horizontal deflection signals; wherein said transfluxor means further has a driving winding; and means connecting said driving winding to said transformer means.

4. An arrangement as set forth in claim **3**, wherein said television receiver means comprise a hue control circuit; further comprising means interconnecting said rectifier means and said hue control circuits.

5. Storage arrangement as set forth in claim **1**, further comprising communications equipment associated with said storage arrangement.

6. A storage arrangement as set forth in claim 5, further comprising rectifier means interconnected between said output winding of said transfluxor means and said transfluxor output.

7. A storage arrangement as set forth in claim 6, wherein said communication equipment comprises volume control circuits; further comprising means interconnecting said rectifier means and said volume control circuits.

8. An arrangement as set forth in claim 6, wherein said communications equipment comprise tone control circuits; further comprising means interconnecting said rectifier means and said tone control circuits.

9. A storage arrangement as set forth in claim 6, wherein said communication equipment comprises station selection circuits; further comprising means interconnecting said rectifier means and said station selection circuits.

10. A storage arrangement as set forth in claim 1, wherein said setting signals are setting pulses; further comprising self-exitation circuit means connected between said output winding, said second winding and said remote control switch means for furnishing said setting pulses to said setting winding under control of said external activation.

11. Storage arrangement as set forth in claim 10, wherein said transfluxor means further has a blocking winding; and wherein said self-excitation circuit means comprise additional self-excitation circuit means connected between said output winding and said blocking winding, for furnishing blocking pulses to said blocking winding upon additional external activation, thereby decreasing said stored analog value.

12. Storage arrangement as set forth in claim 11, wherein said output winding furnishes an A.C. output signal; and wherein said self-excitation circuit means comprise first circuit means furnishing a first signal having an amplitude corresponding to the rate of change amplitude of said A.C. output signal, and amplifier means amplifying said first signal.

13. Storage arrangement as set forth in claim 12, further comprising rectifier means interconnected between said output winding and said first circuit means.

14. An arrangement as set forth in claim 13, wherein said first circuit means comprise a differentiating circuit.

15. A storage arrangement as set forth in claim 14, wherein said amplifier means comprise a multistage amplifier.

16. Storage arrangement as set forth in claim 15, wherein said multistage amplifier comprises a first stage requiring an operating voltage; further comprising means for furnishing said external activation, said means comprising means furnishing said operating voltage to said first stage.

17. Storage arrangement as set forth in claim 16, wherein said means furnishing said operating voltage comprise first switch means; and first integrator circuit means connected between said first switch means and said first stage of said multistage amplifier.

18. Storage arrangement as set forth in claim 15, wherein said additional self-excitation circuit means comprise an additional multistage amplifier.

19. Storage arrangement as set forth in claim 18, wherein said additional multistage amplifier comprises an additional first stage requiring an operating voltage; further comprising means for furnishing said additional external activation, said means comprising means furnishing said operating voltage to said additional first stage.

20. Storage arrangement as set forth in claim 19, wherein said means furnishing said operating voltage to said additional first stage comprise second switch means, and second integrator circuit means interconnected between said first switch means and said first additional stage.

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