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(54) IMPROVEMENTS IN TELEVISION PROGRAMME SELECTION MONITORING

(71) We, INFAS INSTITUT FUR ANGEWANDTE SOZIALWISSENSCHAFT GMBH, a Company duly organised under the Laws of the Federal Republic of Germany, of 5 Margarethenstrasse 1, 5300 Bonn-Bad Godesberg, Federal Republic of Germany, do hereby declare the invention, for which we pray that a Patent may be granted to us, and the method by which it is to be performed, 10 to be particularly described in and by the following statement:-

The invention relates to a device for detecting and indicating information on television viewer behaviour and programme selection, the device consisting of an AC mains 15 power unit and a data detector with an electronic memory connected to an input logical circuit and an output logical circuit, the input logical circuit being connected to a 20 clock, a sender-station selector and a viewer-operated selector switch unit, the device also having an electronic control unit for controlling all the processes.

Devices are known which identify the sender 25 station chosen by the viewer of a television receiver, this being done by measuring the frequency to which the tuner of the television receiver has been adjusted. Other known devices detect the selector switches which the 30 viewer has actuated, or the position of this selector switch. But in order to ensure that there devices reliably detect the relevant data, it is necessary to interfere technically to a considerable degree with the television receiver and this not only makes the installation of the 35 detecting device in the television receiver a considerable operation, but also involves an undesirable interference with private property. The construction of the known devices makes 40 this kind of interference necessary, if accurate results are to be obtained.

The problem tackled in the present invention is to avoid the necessity of interfering with the viewer's television receiver, this being obtained 45 by constructing the detector in such a way that

the desired information on viewer switching behaviour is detected accurately and reliably without it being necessary to interfere technically in any way with the viewer's television receiver. 50

According to the invention there is provided a device for monitoring selection of channels by a viewer of a multi-channel television receiver, the device being separate from such receiver and arranged for interposition between 55 a receiver antenna and an antenna input terminal of a receiver, comprising channel selector means operable by a viewer, a clock, and memory means for recording information provided by the selector means and the clock, 60 wherein the selector means includes a tuner, an input signal connection for enabling the tuner to be connected to an antenna, a frequency convertor adapted to convert the signals from the tuner into signals of a predetermined frequency range, and an output signal connection 65 for enabling signals from the convertor to be supplied to an antenna input terminal of a receiver.

In the first version of the invention the 70 sender-station detector has its own station selector in the form of a diode tuner equipped with a set of viewer-operated selector switches, this set being combined with a further set of selector switches electrically connected to 75 the input logical circuit, the station selector having an input terminal connected to the antenna of the television receiver, a converter being interposed between the station selector and the television receiver, the converter 80 transforming the antenna signals delivered by the station selector into a certain television channel or television frequency range and delivering the transformed signals over a cable to the antenna socket of the television receiver. 85

In the operation of the detector it is necessary to determine whether the television receiver is really switched on, or not. To obtain this information the device according to 90

the invention is arranged so that in addition to the sender-station detector, the device has a sensor acting as a switch-on detector, for detecting whether the television receiver has been switched on, or not, the sensor having an oscillation circuit tuned to the line frequency of the television receiver and having an amplifier for amplifying the signals delivered by the oscillation circuit, a memory unit for storing these signals, and an electronic switch connected to the input logical circuit.

Nowadays a considerable percentage of television receivers are equipped with remote control, and it is desirable, in further development of the invention, to ensure that the detector operates without inconveniencing viewers who are using remote control for their television receivers.

Further details and advantages of the present invention may be derived from the following description of several examples, and with the help of the drawing, in which:

Figure 1 is a block circuit diagram of a device according to the invention for detecting and indicating technical information on television viewer behaviour and programme selection.

Figure 2 shows details of the sender-station detector of the device shown in Figure 1.

Figure 3 illustrates an extra switch-on detector for the device shown in Figures 1 and 2.

In the drawing corresponding parts have the same index numbers.

The block circuit diagram of Figure 1 shows the circuit units of the device according to the invention as blocks which are connected together electrically as indicated. The device has a power supply unit 1 for connection to the AC mains 2. The power supply unit 1 supplies DC current to all the circuit units of the device according to the invention. For the sake of simplicity the electric leads used for this purpose are not shown in the diagram.

Further important circuit units comprise an input logical circuit 3, an electronic memory unit 4, an output logical unit 5, a clock 6, a central control unit 7, a viewer-operated selector switch unit 8 and a sender-station detector 9.

The input logical circuit 3 has input terminals 10, 11, 12 feeding signals to the input logical circuit 3 from the viewer-operated selector switch unit 8, the sender-station detector 9 and the clock 6, which can for example be a quartz clock. The input logical circuit 3 detects changes of state in the viewer-operated selector switch unit 8 and in the sender-station detector 9, delivering signals, combined with a time signal from the clock 6, to the electronic memory unit 4.

After processing these signals, the electronic memory unit 4 delivers signals to the output logical unit 5. The central control unit 7 is connected to the input logical circuit 3, the electronic memory unit 4, the output logical

unit 5 and the clock 6. The central control unit 7 controls all the functions of the device on the basis of periodic time signals delivered by the clock 6. The output logical unit 5 is connected over a cable 13 to a "post-modem" in such a way that when interrogated the output logical unit 5 delivers the memorized data on the basis of the postal standard.

The sender-station detector 9 can be constructed in either of two alternative ways, which are represented in Figures 2 and 3.

The first version of the sender-station detector 9 is shown in Figure 2. In this version the sender-station detector 9 has its own station selector 20 in the form of a diode tuner with a set of viewer-operated selector switches 21, which are themselves combined with further selector switches 23 connected to the input logical circuit 3. The station-selector 20 is connected over its input terminal 24 to the antenna of the television receiver 27, the station selector 20 being adjusted to agree with the transmission frequencies of the locally operative television senders. The station selector 20 delivers signals to a converter 25 which converts the received signals into a certain television channel or television frequency range and delivers the converted signals over a cable 26 to the antenna socket of the television receiver 27, which is tuned to the output frequency of the converter 25. When the viewer selects a programme, actuation of the further selector switches 23 applies signals to the electronic memory unit 4. After transmission over the "post-modem" to the central exchange (not shown) the signals are decoded and indicate the sender station which has been engaged by the television receiver 27.

In order to determine whether the television receiver 27 is switched on, or not, a switch-on detector can be used of the kind shown in detail in Figure 3. The switch-on detector has a coil 30 which responds to the 15 625 kHz signal of the line transformer with which a conventional television receiver is equipped. The signal delivered by the coil 30 is encoded and stored in a memory unit to indicate that the television receiver has been switched on. The switch-on detector is arranged as follows:

In addition to the sender-station detector 9 shown in Figures 1 and 2, the television receiver 27 is equipped with a switch-on detector which has an oscillation circuit tuned to the line frequency of the television receiver, the switch-on detector comprising the coil 30 and a capacitor C1. The oscillation circuit is connected to an operational amplifier OP1, whose amplification is determined by the ratio between two resistors R2 and R1. The operational amplifier OP1 delivers signals to a memory unit consisting of a diode D1, a capacitor C2 and a resistor R3. The memory unit is connected to an electronic switch consisting of a resistor R4, a transistor T1 and a resistor R5. The switch-on detector is connected over a lead 31 to the in-

put logical circuit 3.

Detection that the television receiver has been switched on is obtained as follows:

The coil 30, together with the capacitor C1, forms an oscillation circuit tuned to the line frequency. When this oscillation circuit receives a signal, this is transmitted to the operational amplifier OP1, which amplifies the signal in the ratio of resistors R2 and R1. The amplified signals are rectified by the diode D1 of the memory unit, the resulting DC current charging capacitor C2 up to a voltage U, which is applied over resistor R4 to the base of transistor T1, making the transistor conductive, The current flowing over transistor T1 allows the voltage U across resistor 5 to rise to about 4 volts. This voltage is stored and is evaluated as indicating that the television receiver has been switched on. Subsequently after the television receiver has been switched off, so that the coil is no longer receiving a signal, the resistor R3 discharges capacitor C2. Consequently transistor T1 becomes non-conductive and the voltage U across resistor 5 falls to almost zero. This fact is stored and evaluated as an indication that the television receiver has been switched off.

WHAT WE CLAIM IS:—

1. A device for monitoring selection of channels by a viewer of a multi-channel television receiver, the device being separate from such receiver and arranged for interposition between a receiver antenna and an antenna input terminal of a receiver, the device comprising a channel selector means operable by a viewer, a clock, and memory means for recording information provided by the selector means and the clock, wherein the selector means includes a

tuner, an input signal connection for enabling the tuner to be connected to an antenna, a frequency convertor adapted to convert the signals from the tuner into signals of a predetermined frequency range, and an output signal connection for enabling signals from the convertor to be supplied to an antenna input terminal of a receiver.

2. The device as claimed in claim 1 and including an oscillator tuned to a standard receiver line frequency, and means for indicating whether the oscillator is energised whereby to indicate that the receiver is switched on.

3. Device according to Claims 1 and 2, characterised in that in addition to the sender-station detector, the device has a sensor acting as a switch-on detector, for detecting whether the television receiver has been switched on, or not, the sensor having an oscillation circuit tuned to the line frequency of the television receiver and having an amplifier for amplifying the signals delivered by the oscillation circuit, a memory unit for storing these signals, and an electronic switch connected to the input logical circuit.

4. Device for detecting and indicating information on television viewer behaviour and programme selection, substantially as hereinbefore described with reference to the accompanying drawings.

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AGENTS FOR APPLICANT

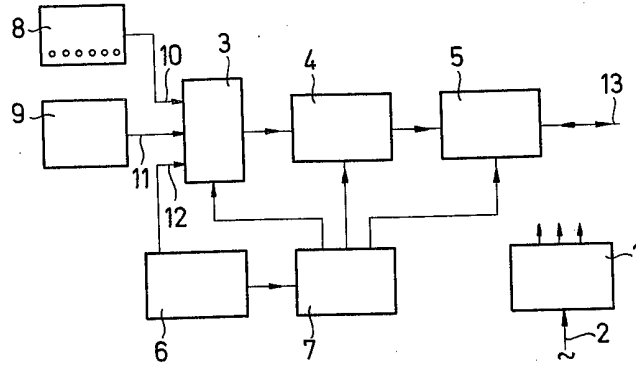


FIG. 1

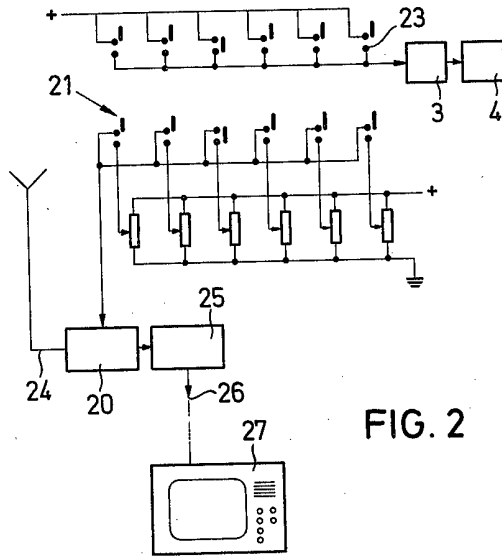


FIG. 2

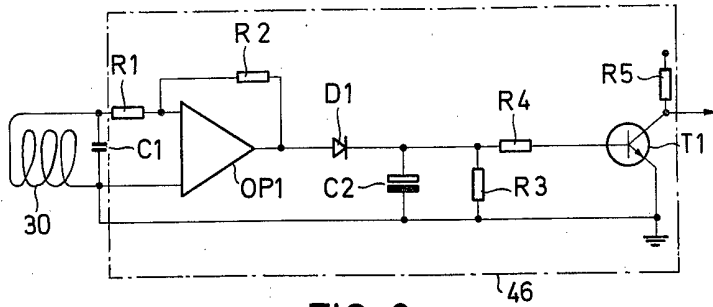


FIG. 3