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2,101,256

CARRIER TELEGRAPH RECEIVER

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FIG. 1

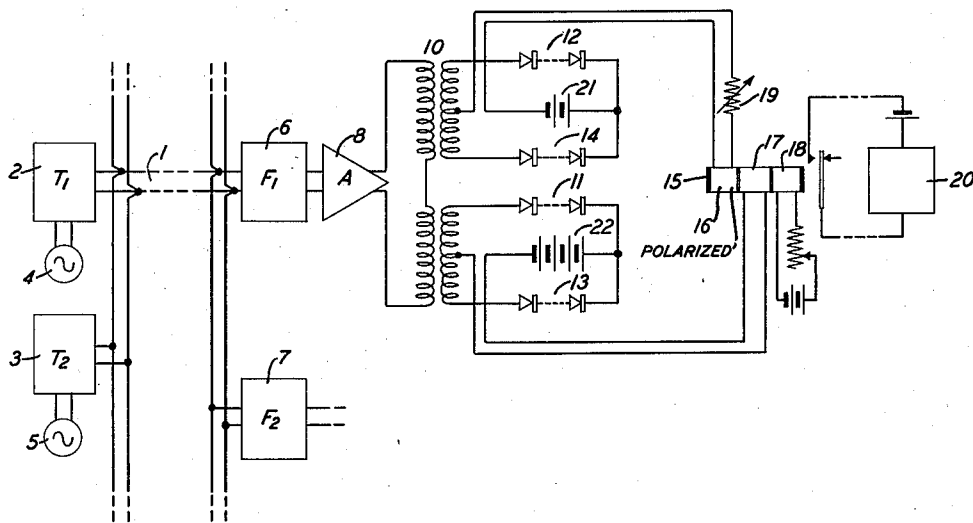
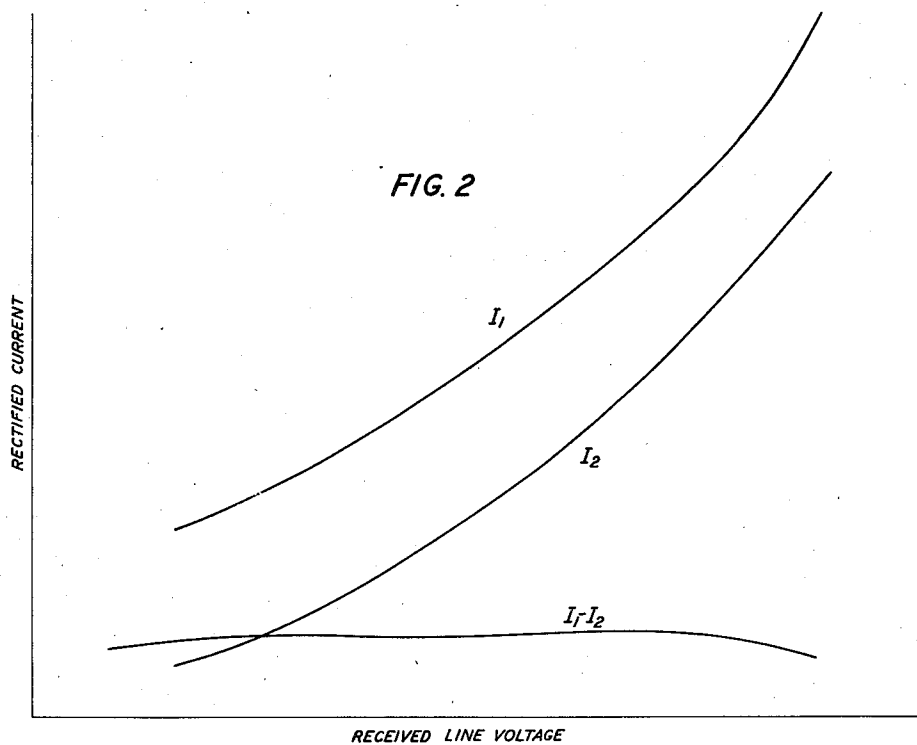


FIG. 2



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CARRIER TELEGRAPH RECEIVER

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6 Claims. (Cl. 178-66)

The present invention relates to signaling and more particularly to the reception of signal waves or impulses by rectification.

The invention will be described with particular reference to carrier telegraphy although it is capable of more general use. In signaling systems, such as in carrier telegraphy, variations in line equivalent tend to give rise to faulty reception on account of the variation in strength of received signals. It is difficult to set a receiving printer or other recorder to be equally responsive to received impulses of widely differing strength. Consequently it is customary for an attendant from time to time to change the adjustments of a receiver to suit the different line current conditions.

It is an object of the present invention to provide a signal receiving circuit which will respond equally to received current impulses that vary in strength from time to time.

This object is attained in accordance with the invention by use of circuits including rectifiers, such as copper oxide rectifiers, which while individually responding differently to different strengths of received current, give the same resultant or effective response over a range of signal strengths. The substantially constant resultant response is used to control any suitable indicating or response device.

In the drawing:

Fig. 1 is a simplified schematic circuit diagram of a carrier telegraph system embodying a receiver in accordance with the present invention; and

Fig. 2 shows curves illustrating the operating characteristics of the receiver of Fig. 1.

In Fig. 1, the line 1 is shown terminating at the left in a transmitting station and at the right in a receiving station. The transmitting station is indicated as comprising a number of transmitters of which two are shown at 2 and 3 each provided with a source of carrier waves as at 4 and 5, respectively. Other similar transmitters may be provided. It will be understood that each of these transmitters will include any suitable means for controlling the carrier wave in accordance with signals to be transmitted, such as an interrupter or other suitable type of sender together with any filtering elements that may be required, all in accordance with well-known practice in this art.

At the receiver two filters are provided as at 6 and 7 for separating received current into various channels, there being as many of these filters as there are channels to be received at this station.

These filters may be usual type of band filters or tuned circuits or other selective networks. Only the channel associated with the filter 6 is shown in detail, it being understood that the other receiving channels will be similarly equipped. Amplification may be introduced as needed, one amplifier being indicated at 8 in the output side of the filter 6.

The receiving relay 15 which is a polarized relay, is controlled by the current selectively transmitted through the filter 6 by means of two circuits leading to two windings 16 and 17, respectively. The circuit for winding 16 includes one of the secondaries of transformer 10 in the output of amplifier 8, a full wave rectifier circuit including rectifiers 12 and 14 and as shown, an adjustable resistance 19 which may or may not be needed. The circuit for the winding 17 comprises the other secondary of transformer 10 and full wave rectifier comprising rectifier elements 11 and 13. Bias batteries 21 and 22 of preferably different voltage are used to bias the two rectifying circuits for a purpose to be described. Relay 15 is provided with a bias winding with suitable battery and controlling resistance as shown.

In the operation of the system of Fig. 1, carrier telegraph signals are produced at the sending station and sent over the line 1 and are selectively received through the filtering circuits 6, 7, etc. The carrier signals in the output of filter 6 and amplifier 8 are separately rectified in the two circuits connected to the two secondaries of the transformer 10. The connections of the windings 16 and 17 to these two rectifying circuits are such that the rectified output from the two rectifying circuits oppose each other in their effect upon the relay 15. The two rectifying and control circuits are given characteristics, however, so that they do not nullify one another, but they rather produce a differential action on the relay 15.

For example, referring to Fig. 2, the curve marked I_1 may be the current output from the rectifier circuit 12, 14 while the curve marked I_2 may be that from the rectifier circuit 11, 13. The difference between these two curves is shown as the curve marked $I_1 - I_2$. It is this difference current which may be considered effective in controlling the operation of the relay 15.

As the characteristics of the line 1 vary from time to time the received voltage also varies, other things being equal. If the relay 15 were directly responsive to the rectified received signal current, this current might be assumed to vary from time

to time at a rate corresponding to the curve I_1 or the curve I_2 of Fig. 2, resulting in a variable operation of the relay. By employing the differential action of a pair of rectifiers, the effective operating current for the relay 15 is made substantially constant for varying received line voltage as indicated by the curve I_1-I_2 . The relay 15 is shown as operating a suitable signal device 20 locally or at a distance.

There are various means available for displacing the individual response curves such as I_1 and I_2 of the two rectifiers. Two such means are shown in Fig. 1, namely, the use of different bias potentials on the two rectifiers and the use of a control resistance 19 in one of the relay winding circuits. The voltage ratio of the transformer 10 may differ in the case of the two rectifiers or entirely separate transformers could be used with different ratios, or different amounts of loss or of amplification could be introduced into the circuit leading from the output of the amplifier 8 or the filter 6 to the two rectifying circuits. Some or all of these various means may be used together in the same circuit. These different ways of securing a differential effect have been mentioned by way of example and are not to be taken as limiting.

It is to be understood that the invention is not to be construed as limited to the specific types of rectifiers disclosed nor to the specific type of receiving circuit since various modifications are possible within the spirit and scope of the invention as defined in the claims.

What is claimed is:

1. In a signaling system in which the received signals are subject to variations in strength, a signal input circuit, a signal receiving circuit comprising two response elements both individually coupled to receive simultaneously signal energy from said input circuit, said elements having a substantially constant difference in response over a range of signal strength, and a receiver responsive to the difference in response of said elements whereby received signals of varying

strength within said range affect said receiver substantially alike.

2. In a carrier telegraph system subject to variable attenuation, a signal input circuit, a pair of rectifier units both individually coupled to receive simultaneously signal energy from said input circuit for rectifying the same received signal wave trains, said units having different response characteristics, the difference in response being substantially constant over a range of input voltages, and a receiver connected differentially to said rectifier units whereby said receiver is substantially uniformly affected by input signals of varying strength.

3. In a carrier telegraph system, a line having an equivalent which is variable, means to send signal wave trains over said line, a pair of copper oxide rectifier units at a receiving station on said line, means to give one of said units a different rectifying characteristic from the other such that for impressed signals of varying strength the difference in strength of the rectified signals produced by said units is substantially constant for a range of impressed signal strengths, and a relay responsive to the difference in rectified output of said units.

4. A system in accordance with claim 3 in which the means to give one of said rectifying units a different characteristic from the other comprises an attenuator in the circuit of one of said rectifying units.

5. A system in accordance with claim 3 in which the means to give one of said rectifying units a different characteristic from the other comprises a source of bias voltage in the circuit of one of said rectifying units.

6. A system in accordance with claim 3 in which the means to give one of said rectifying units a different characteristic from the other comprises transformers for impressing the received signal wave trains on said rectifying units, one of said transformers having a higher voltage ratio than the other.

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