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SIGNALING CIRCUIT

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FIG. 1

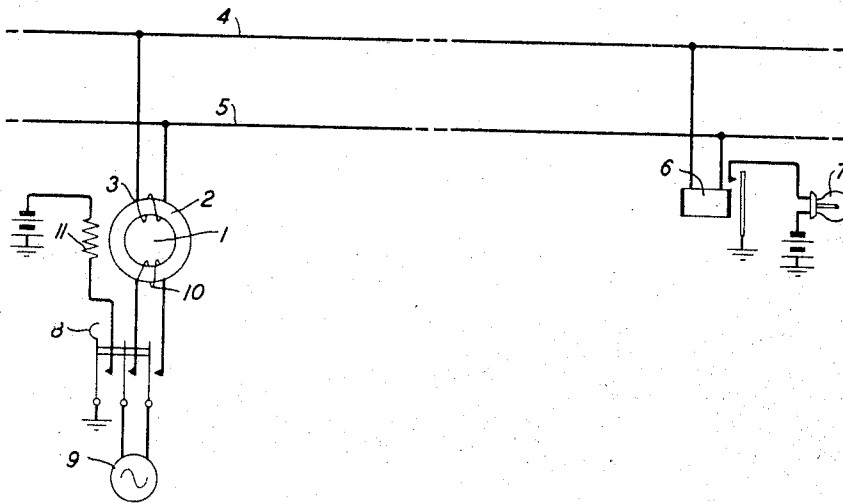
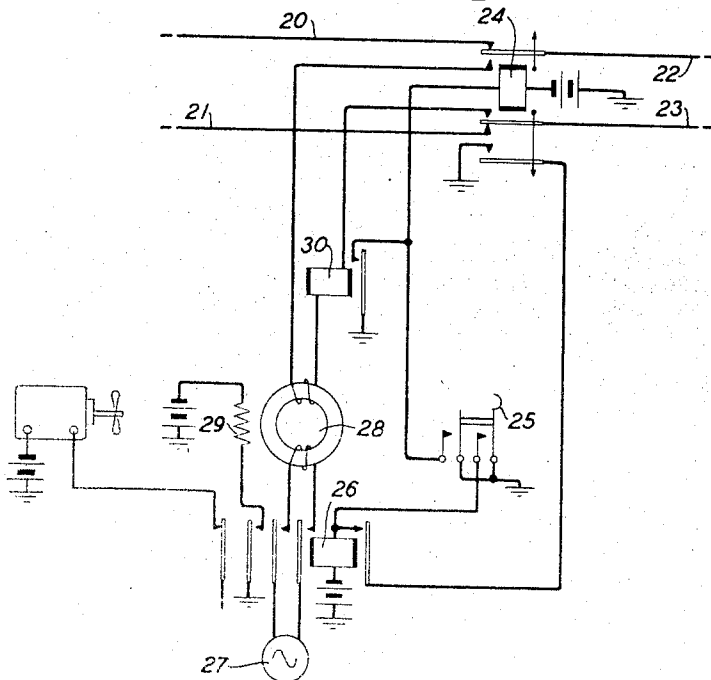


FIG. 2



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SIGNALING CIRCUIT

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4 Claims. (Cl. 177—380)

This invention relates to signaling systems and has for its object an improved control of timed signaling.

Heretofore, in controlling the time of application of signaling current, it has been necessary to open the signaling circuit in order to terminate the signal. The consequent damage to the contact at which the interruption takes place has necessitated the use of precious metal contacts, thereby increasing the cost of such control circuits.

In accordance with the present invention a signal may be terminated by including in the signaling circuit a transformer having a core of a magnetic alloy, the Curie point of which is slightly above room temperature, and heating the transformer to a temperature above the Curie point.

The invention will be more clearly understood from a consideration of the following description in connection with the drawing in which:

Fig. 1 shows the essentials of the invention; while

Fig. 2 shows the invention together with certain typical control circuits.

It is known that materials such as iron or nickel, when heated, reach a temperature at which they become nonmagnetic. This temperature, known as the Curie point, is fixed for the material, being, for example, 350° C. for pure nickel. However, in the case of magnetic alloys, it has been found that by varying the proportions of the components, an alloy may be obtained having a Curie point slightly above room temperature.

Referring to Fig. 1, transformer 1 is formed with a core 2 of a magnetic alloy having a Curie point slightly above room temperature. The secondary winding 3 of the transformer is connected to conductors 4 and 5 leading to a distant point where a signal represented by relay 6 is connected to conductors 4 and 5. Relay 6 controls an obvious circuit for an indicator such as lamp 7.

When key 8 is operated, signaling current from source 9 is connected to the primary winding 10 of transformer 1. Signaling current is thereupon transmitted by means of the transformer to the conductors 4 and 5 operating signal 6.

At the same time an obvious circuit is closed for heating element 11. This element is so arranged with relation to transformer 1 and is selected to have such heating properties that the core 2 will reach its Curie point in the desired length of time. When the Curie point is reached, the permeability of core 2 drops to a very low value, the current induced in the secondary winding 3 of the

transformer 1 becomes negligible and signal 6 releases. Therefore it is possible to transmit a signal of fixed duration without opening the signaling circuit to mark the end of the desired duration.

In Fig. 2 are shown typical circuits by which the invention may be used in a telephone system. Conductors 20, 21, 22 and 23 represent incoming and outgoing sections of a trunk circuit, connected over back contacts of relay 24. When it is desired to transmit a signal over conductors 22 and 23, key 25 is closed, completing obvious circuits for relays 24 and 26. Relay 26 connects signaling source 27 to the primary winding of transformer 28 and also completes a circuit for heater 29. Relay 24 in operating connects the secondary winding of transformer 28 to conductors 22 and 23 and closes a locking circuit for relay 26. With the core of transformer 28 at room temperature, signaling current is transmitted through the secondary winding of transformer 28 to conductors 22 and 23 and relay 30 is energized to provide a holding circuit for relay 24. Ordinarily key 25 is operated only briefly, the signaling circuit being held under the control of relay 30 but no harm is done if the key is held. When the core of transformer 28 reaches its Curie point, the signaling current disappears from the secondary winding, terminating the signal, and relay 30 releases. If key 25 has been released, relays 24 and 26 in turn release. The release of relay 24 recloses the talking circuit while the release of relay 26 opens the primary circuit of transformer 28 and the circuit of heater 29.

By this arrangement the relay contacts in the talking circuit do not open while the signaling current is passing over them and are therefore protected from damage. Therefore the contact metal need not be of as expensive a type as would otherwise be required. In addition the reduction of the permeability of the core of transformer 28 also reduces the inductive discharge when the primary circuit of the transformer is opened, also reducing the wear on these contacts.

In general, the permeability of a core may be restored by the natural forces of radiation and convection, but assuming speedy restoration is important, relay 26 is shown to actuate artificial cooling means, such as fan 32.

What is claimed is:

1. In a signaling system, means for transmitting a signal of definite duration comprising a signaling source, a receiving circuit, a repeating coil connecting said source to said circuit, the core of

said coil made of an alloy having a Curie point slightly above room temperature, means for automatically arresting the transmission of current from said source to said circuit comprising means for heating said core to said Curie point to terminate said signal and means for simultaneously starting said signaling and said heating operation.

2. In a signaling system, a source of signaling current, a receiving circuit, means for connecting said signaling current from said source to said circuit including a repeating coil and one or more contacts, means for arresting the transmission of current from said source to said circuit prior to opening said contacts comprising a core for said repeating coil having a Curie point above room temperature and means for heating said core to said Curie point, means for simultaneously starting said signaling and said heating operation and means effective in response to the removal of said current to open said contacts to disconnect said source from said circuit.

3. In a signaling system, means for transmitting a signal of definite duration comprising a signaling source, a receiving circuit, a repeating coil connecting said source to said circuit, the

core of said coil made of an alloy having a Curie point slightly above room temperature, means for automatically arresting the transmission of current from said source to said circuit comprising means for heating said core to said Curie point to terminate said signal means for simultaneously starting said signaling and said heating operation, and means responsive to the termination of said signal to restore the temperature of said core.

4. In a signaling system, a source of signaling current, a receiving circuit, means for connecting said signaling current from said source to said circuit including a repeating coil and one or more contacts, means for arresting the transmission of current from said source to said circuit prior to opening said contacts comprising a core for said repeating coil having a Curie point above room temperature and means for heating said core to said Curie point, means for simultaneously starting said signaling and said heating operation, means effective in response to the removal of said current to open said contacts to disconnect said source from said circuit, and means to restore the temperature of said core.

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