Oct. 17, 1933. J. HERMAN 1,930,616

SIGNALING SYSTEM

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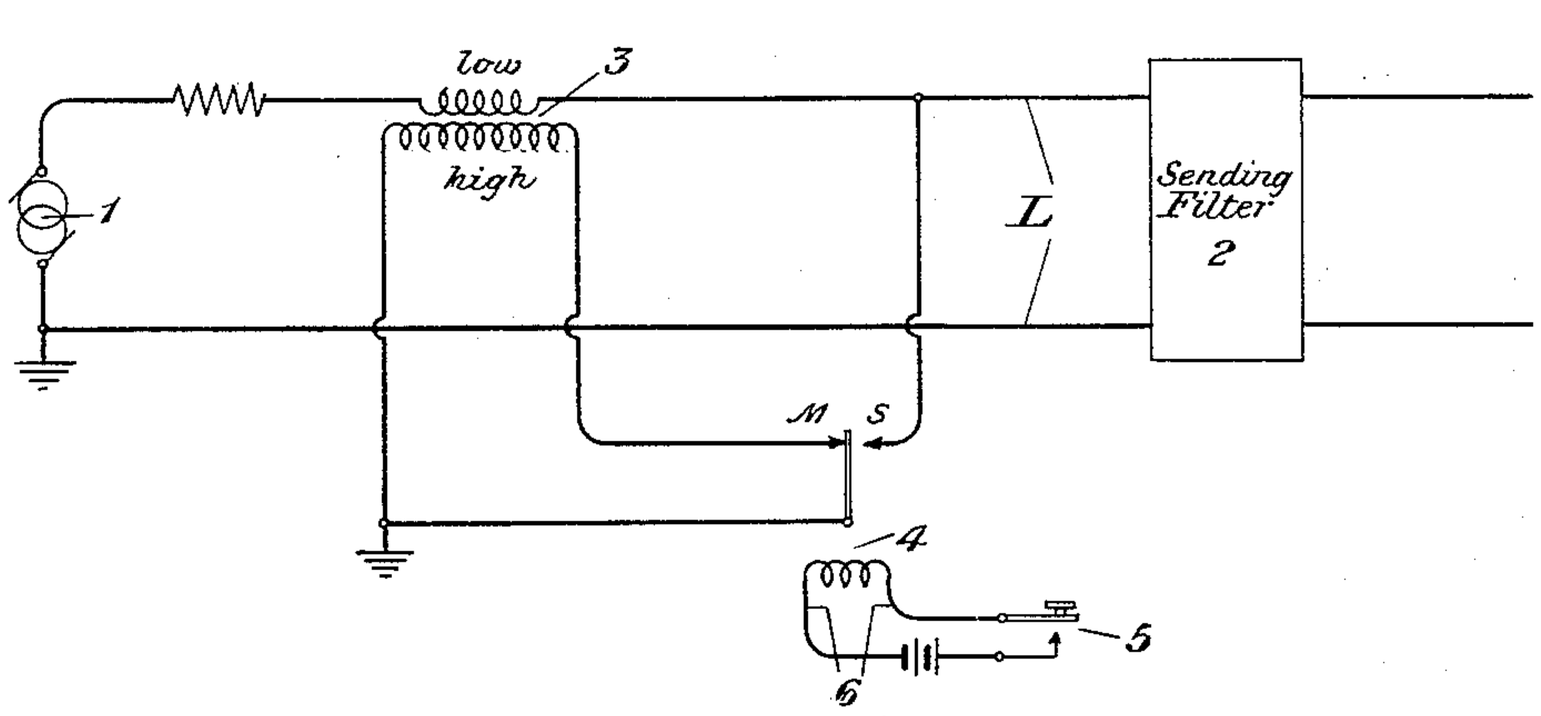

Fig. 1

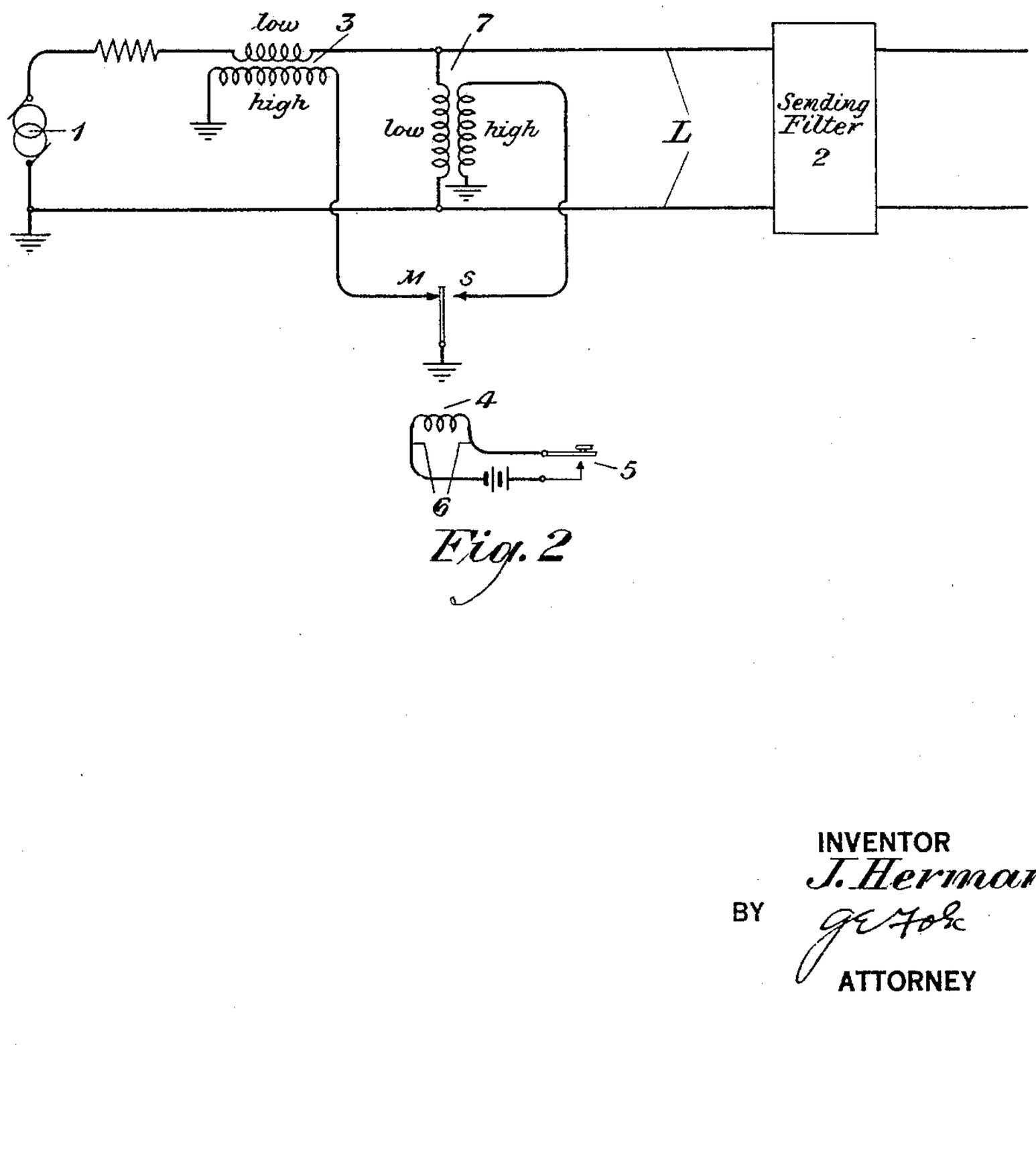

Fig. 2

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SIGNALING SYSTEM

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4 Claims. (Cl. 178—66)

This invention relates to telegraph systems, and more particularly to improvements in the transmission of signals in such systems when such transmission is dependent upon the operation of relay contacts or switching devices therein.

The arrangements of the invention are particularly applicable to carrier telegraph systems, in the transmitting circuits of which the contacts of a sending relay are utilized to effectively open and close a short-circuit across the line, to which is connected a source of carrier frequency current, and thus control the signals. The primary object of the arrangements of the invention is to improve the transmission of the signals by reducing the effect of resistance at the sending relay contacts. Other objects and features of the invention will appear more fully from the detailed description thereof hereinafter given.

In the present circuit arrangements used in voice frequency carrier telegraph systems, for example, the armature and spacing contact of the sending relay, are used to short-circuit the input to the sending filter when it is desired to transmit a spacing signal. Some trouble has been experienced with this arrangement due to an occasional high resistance contact between the armature and spacing contact, presumably caused by the presence of dirt or a film on the contacts which is not broken down by the very low voltages applied. This would result in allowing some carrier current to be transmitted during a spacing signal. In the arrangements of the invention this difficulty is obviated by providing in the input circuit of the sending filter a step-up transformer in order to increase the voltage across the relay contacts, and to increase the impedance of the circuit in which the contacts operate.

The invention may be more fully understood from the following description together with the accompanying drawing, in the Figures 1 and 2 of which the invention is illustrated. Fig. 1 is a circuit diagram embodying a preferred form of the invention; Fig. 2 is a modification thereof. Similar reference characters have been utilized to denote like parts in both figures of the invention.

In Fig. 1 is shown a line L which might be part of the transmitting circuit of a carrier telegraph system. A source 1 of carrier telegraph frequency current would be connected to the line. A sending filter 2 would also be provided in the line. By operating the key 5 in the sending loop 6, the sending relay 4 may switch its armature back and forth between the marking and spacing contacts M and S. A transformer 3 is provided having high and low windings. The low winding of the transformer 3 is connected in series in the line L with the sending filter. During the transmission of a marking signal the high winding of the transformer will be short-circuited. During the transmission of a spacing signal, a short circuit is also placed across the input to the sending filter by the spacing contact of the relay. With this arrangement the low winding of the transformer offers little impedance to the flow of current during a marking signal because of the short-circuited high winding, but offers a large impedance during a spacing signal when the high winding is open. The effect of contact resistance at the marking contact is reduced by the step-up transformer 3 because the contact operates into a high impedance circuit and the voltage is stepped up across the armature and marking contact. In the arrangements shown in Fig. 1 the effect of contact resistance at the spacing contact is not reduced since a low voltage is still impressed across it. However, the use of the spacing contact in the manner shown gives an additional factor of safety against poor contact operation and reduces the requirements on the transformer design.

In the arrangements of Fig. 2 provision is made to reduce the effect of contact resistance at the spacing contact, as well as at the marking contact. Instead of a direct short circuit across the line over the spacing contact a second step-up transformer 7 is provided which has a low winding bridged across the line and a high winding adapted to be short-circuited by the spacing contact. When the spacing contact S is closed the high winding of transformer 7 is short-circuited and the low winding operates a short circuit across the line. When a marking signal is sent the high winding of transformer 7 is open and the transformer acts as a high impedance shunt across the line. The transformer 7 will step up the voltage across the armature and spacing contact and they will now operate into a high impedance circuit, thus reducing the effect of resistance at the spacing contact. In other respects the arrangements are similar to Fig. 1.

While the invention has been disclosed as embodied in certain specific arrangements which are deemed desirable, it is understood that they are capable of embodiment in many and other widely varied forms without departing from the spirit of the invention as defined by the appended claims.

What is claimed is:

1. A circuit, a source of current connected thereto, a transformer having a low winding and

a high winding, said low winding being connected serially in said circuit, and means for short-circuiting the high winding of said transformer.

2. A circuit, a source of current connected thereto, a transformer having a low winding and a high winding, the low winding of said transformer being connected in series in said circuit, a second transformer having a low winding and a high winding, the low winding of said second transformer being bridged across said circuit, and switching means operative to short circuit the high winding of one of said transformers and to open the high winding of the other of said transformers.

3. A circuit, a source of current connected thereto, a transformer having a low winding and a high winding, the low winding of said transformer being connected in series in said circuit, a second transformer having a low winding and a high winding, the low winding of said second transformer being bridged across said circuit, a sending relay having an armature and marking and spacing contacts, and means operative when the armature is on said marking contact for short-circuiting the high winding of said first transformer, and means operative when said armature is on the spacing contact for short-circuiting the high winding of said second transformer.

4. A circuit, a source of current connected thereto, a transformer having a low winding and a high winding, said low winding being connected serially in said circuit, a relay having an armature and a pair of contacts, means operative when the armature is on one of said contacts for short circuiting the high winding of said transformer, and means operative when the armature is on the other of said contacts for connecting a short circuit across said circuit.

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