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R. D. MERSHON.

CIRCUIT CONTROLLING APPARATUS.

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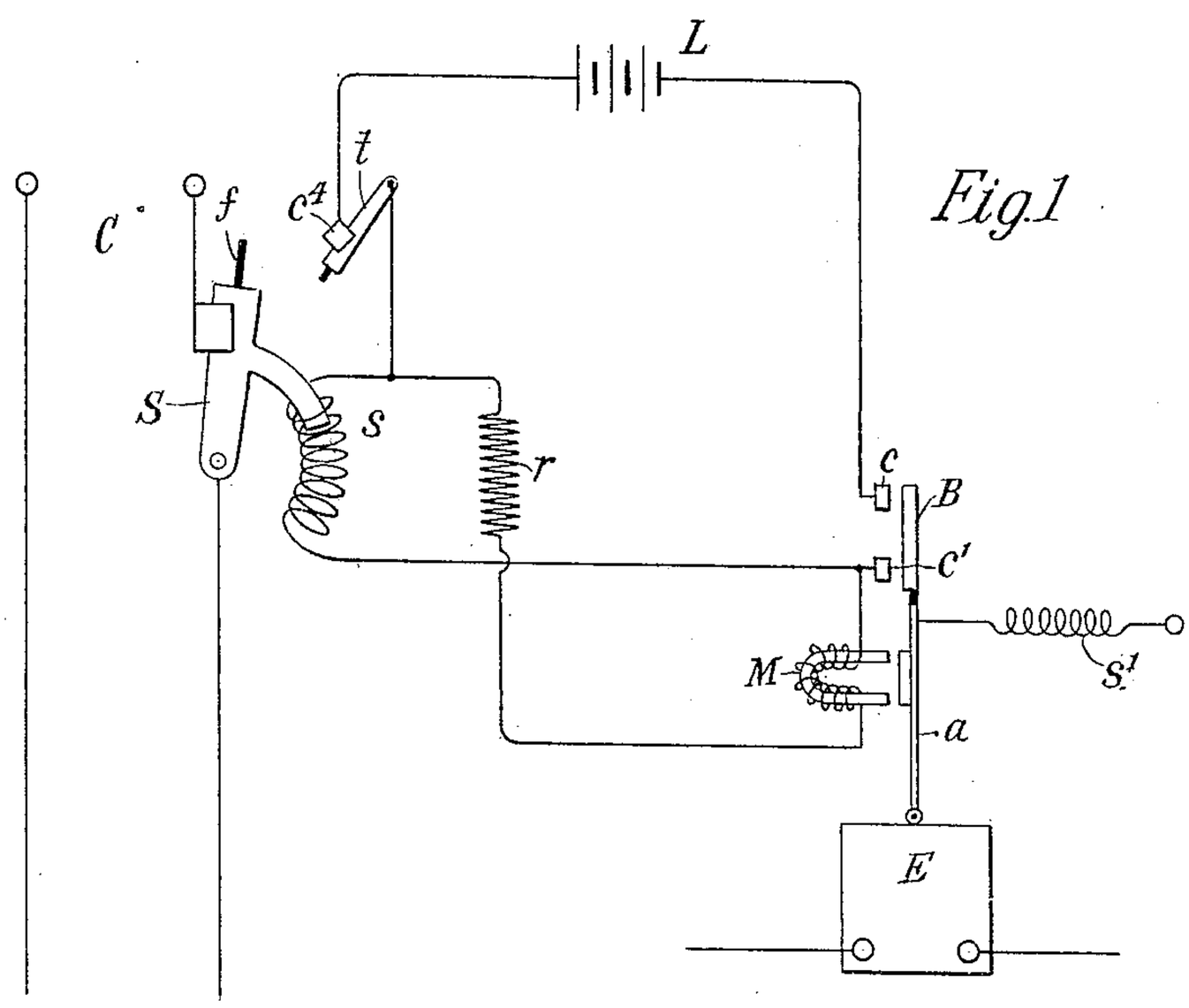

Fig. 1

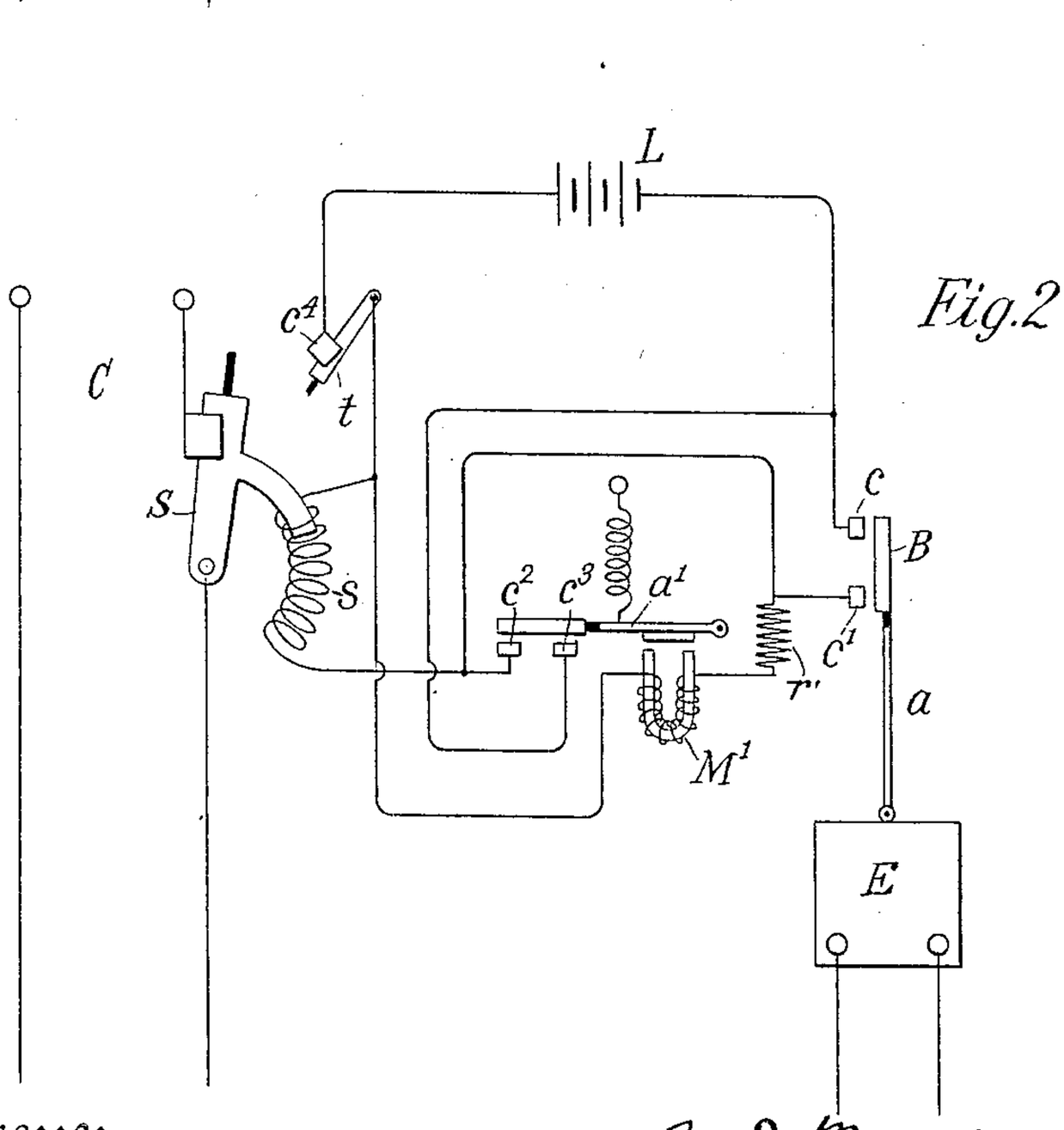

Fig. 2

Witnesses
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CIRCUIT-CONTROLLING APPARATUS.

No. 816,112. Specification of Letters Patent. Patented March 27, 1906.

Application filed December 27, 1904. Serial No. 238,324.

To all whom it may concern:

Be it known that I, RALPH D. MERSHON, a citizen of the United States, residing at New York, in the county and State of New York, have invented certain new and useful Improvements in Circuit-Controlling Apparatus, of which the following is a specification, reference being had to the drawings accompanying and forming part of the same.

My invention relates to means for securing a positive and firm engagement of electrical contacts, one of which is movable under the control of electroresponsive devices of such character as to cause the said contact to have a weak or trembling movement.

Where the circuit to be established by the impingement of such contact or contacts is to energize electromagnetic devices, it is often the case that the "time constant" of the electromagnetic devices is such that the momentary closing of the circuit by the trembling or vibrating contact or contacts is not of sufficient duration to permit the said devices to be energized or to develop sufficient power to perform their intended functions. To overcome this defect, I propose to use an auxiliary device or devices, preferably electromagnetic and of relatively small time constant, in connection with the apparatus and arrange the same so that the feeble or momentary contact of the main device will be sufficient to energize the auxiliary mechanism, which will then cause the main circuit to be established and to remain so at least until the translating devices therein have been energized sufficiently to perform their functions.

In general, the invention is applicable wherever an electroresponsive instrument or apparatus is used to control a circuit in which there are translating devices of any desired kind. In such cases it is desirable and usually necessary if uniform effectiveness is to be obtained at all times that the controlling contacts should be actuated positively. If the instrument upon which the actuation of the contact or contacts depends is so delicate that it cannot or at times does not operate with the desired degree of positiveness, my present invention may be advantageously employed. For example, in "reverse-relays" (intended to open a circuit when abnormal conditions arise therein) the reverse movement of the operative element is often feeble or trembling, and when such element is designed in its backward movement to control contacts in a local circuit having therein a translating device of large time constant which is to perform the work of breaking the main circuit my invention will be found of special value. In such case it assumes positive control of the local circuit upon the momentary actuation of the reverse-relay devices and causes the circuit-breaking apparatus to operate with certainty.

The invention may be carried out in various ways.

In the accompanying drawings I have shown two embodiments, of which—

Figure 1 is the preferred form, shown applied to a circuit in which is a device controlling a transmission-line. Fig. 2 is a modification applied to the same kind of apparatus as in Fig. 1.

Throughout the drawings, C indicates the main circuit, which is controlled by a switch S. The latter is actuated by a solenoid *s*, energized from any suitable source, as the independent or local source L. The local circuit includes a pair of contacts *c c'*, which may be bridged by a contact B. In the apparatus herein shown the latter contact is held normally out of engagement with the others by a spring *s'* and is moved toward the same by an electroresponsive device, (indicated by E.)

In the operation of the system it is intended that the solenoid *s* be energized and actuate the switch S whenever the contact B is brought against the terminals *c c'* by the device E. However, if the solenoid *s* has sufficient power to perform its desired function it will in most cases have a large time constant—that is, its energizing-circuit must be closed for a relatively considerable time before it can develop the necessary power. If the device E is of such character or is subjected to such conditions that its contact B is vibrated or moved with too little force, the said contact may not remain on the terminals *c c'* long enough or firmly enough for the solenoid *s* to be energized. I therefore have provided means which operate to establish a circuit through the translating device—that is, the solenoid *s* or other apparatus—long enough to energize the same to the degree necessary for the successful performance of its function. The preferred arrangement for this purpose is shown in Fig. 1. In the solenoid-circuit in parallel with the solenoid is an electromagnetic device, such as the electromagnet M. In series with the latter is a high resistance *r*. The magnet M has a very small time constant—that is to say, it is af-

fected by even an instantaneous bridging of the contacts *c c'*. It is arranged to exert its force on the armature *a*, which carries the contact B—as, for example, in the manner indicated in Fig. 1. The result is that the magnet M, energized by the lightest touch of bar B on the terminals *c c'*, will seize the arm *a* and draw it over in the same direction as it is urged by the electroresponsive device E, thus pressing the contacts firmly together. The local circuit is thus taken out of control of the device E and remains closed, giving the solenoid *s* all the time necessary for its energization and enabling it to actuate the switch S.

A modified form is shown in Fig. 2. Here the electromagnet M', also in parallel with the solenoid *s* and in series with a resistance *r'*, operates upon an independent armature *a'*. As in the former case, the vibrating contact of the arm *a* is sufficient to energize the magnet M'. The latter then draws down its armature *a'*, which connects the contacts c^2 c^3 and establishes the local circuit through the switch-solenoid *s*.

The local circuit may be provided with a switch, as *t*, arranged to be opened by the large switch S when the latter is actuated. In the particular embodiments illustrated the switch S carries a finger *f*, which engages the lever of the local-circuit breaker and carries it away from its contact c^4. The electromagnet M or M', as the case may be, is then demagnetized, and its control of the circuit is broken.

From the foregoing it will be seen that in my invention the feeble or momentary actuation of the contacts B *c c'* energizes the electromagnet in the circuit, which then takes control of the circuit independently of the electroresponsive devices which established the circuit in the first place. Thus completed by the small magnet the circuit through the solenoid is energized and the switch S operated.

It will of course be understood that the two forms of apparatus diagrammatically illustrated and described herein are merely indicative of the invention, which may be embodied in a great variety of forms without departure from its proper scope.

What I claim is—

1. The combination with a circuit, coöperating contacts, and electroresponsive means for actuating the same, of electromagnetic means in the said circuit arranged to become operative upon an actuation of the said contacts and then control the said circuit independently of the said electroresponsive means, as set forth.

2. The combination with a circuit, coöperating contacts, and electroresponsive means for bringing the contacts together to complete the circuit, of an electromagnet in the circuit, and an armature therefor adapted to control the circuit independently of the said electroresponsive means, as set forth.

3. The combination with a circuit, coöperating contacts, electroresponsive means for actuating the same, and translating devices in the circuit, of electromagnetic means in the circuit arranged to become operative upon an actuation of the said contacts and then control the circuit independently of the said electroresponsive means, as set forth.

4. The combination with a circuit, coöperating contacts, and electroresponsive means for bringing the contacts together to complete the circuit, of an electromagnet in the circuit adapted to be energized by the closing of the contacts and arranged to hold the said contacts together independently of the electroresponsive means, as set forth.

5. The combination with a circuit, coöperating contacts, electroresponsive means for actuating the same, and a translating device of relatively high time constant in the circuit, of electromagnetic devices of relative low time constant in the circuit arranged to become operative upon actuation of the said contacts and then control the circuit independently of the said electroresponsive means, as set forth.

6. The combination with a circuit, coöperating contacts, electroresponsive means for bringing the same together, and a translating device of relatively high time constant in the circuit, of an electromagnet of relatively low time constant in the circuit adapted to be energized by the closing of the contacts and arranged to hold the contacts together independently of the said electroresponsive means, as set forth.

7. The combination with a circuit, coöperating contacts, and electroresponsive means for actuating the contacts, of an electromagnet in the circuit, and an armature therefor connected with one of the contacts, whereby the energization of the electromagnet will hold the contacts together independently of the electroresponsive means, as set forth.

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Witnesses:
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