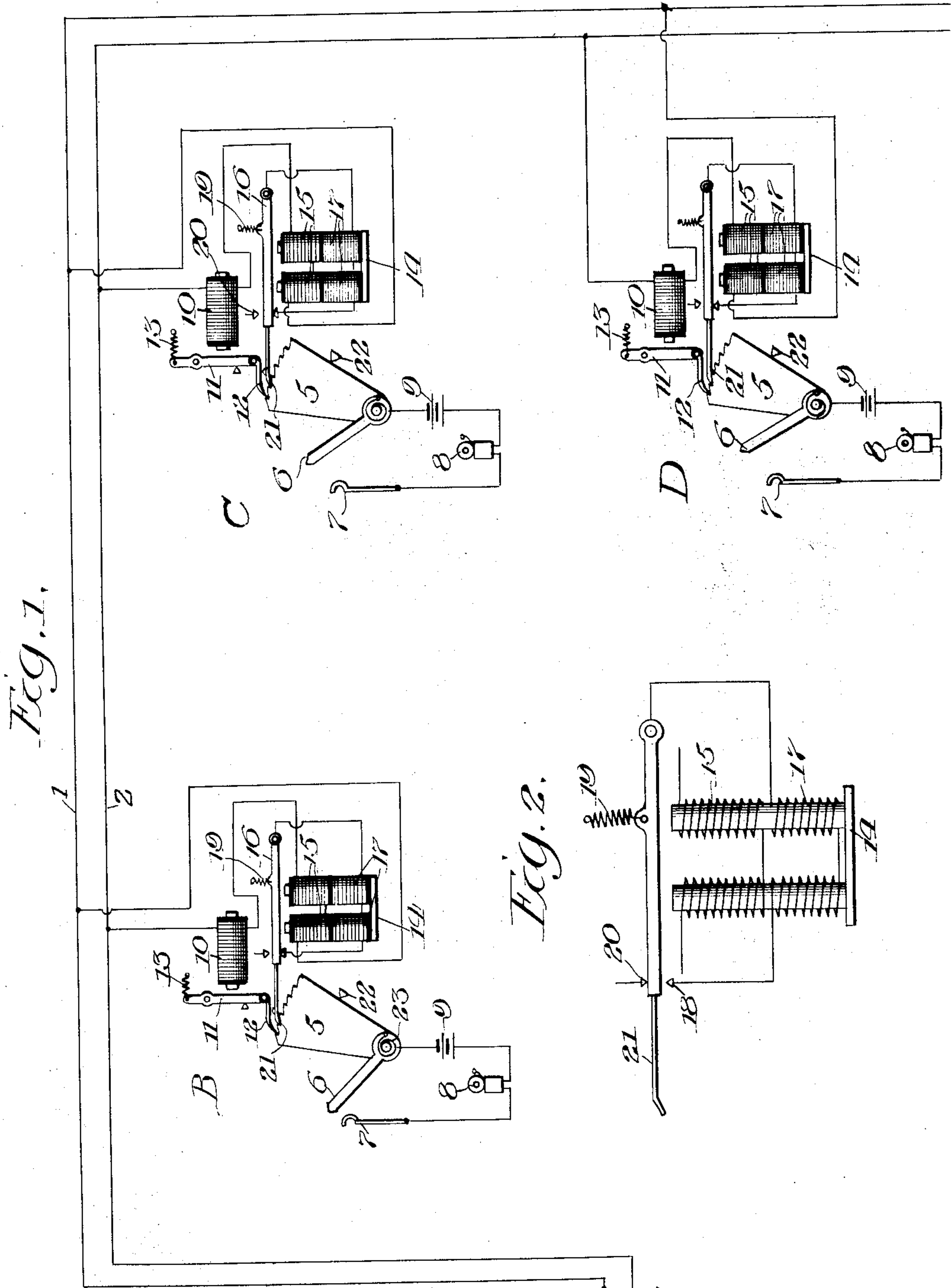


998,552.

Patented July 18, 1911.



Witnesses  
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# UNITED STATES PATENT OFFICE.

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## ELECTROMAGNET.

998,552.

Specification of Letters Patent.

Patented July 18, 1911.

Original application filed March 15, 1910, Serial No. 549,522. Divided and this application filed July 29, 1910. Serial No. 574,584.

*To all whom it may concern:*

Be it known that I, HARRY O. RUGH, a citizen of the United States, residing at Sandwich, in the county of Dekalb and State of Illinois, have invented a certain new and useful Improvement in Electromagnets, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to relays or magnets and I find it is of particular utility in connection with selective signaling systems.

My invention herein disclosed forms a divisional application of my application Serial No. 549,522, filed March 15, 1910.

The improved magnet or relay herein is designed to be under some conditions of operation slow-acting, and under other conditions to be rapid in its response to impressed currents. In the form herein disclosed, my improved magnet has an armature energizing and attracting winding, and in addition has a winding which under certain operative positions of the armature is designed to be short circuited, thus to make the magnet slow-acting when the second winding is thus short circuited.

I will describe the invention in detail in connection with a signaling system as illustrated in my said co-pending application in connection with which I find the relay can be very advantageously used. The claims covering the signaling system as a whole will be found in my said co-pending application.

I will describe the invention more in detail by reference to the accompanying drawing illustrating one embodiment thereof in which:

Figure 1 diagrammatically sets forth a signaling system using my improved magnet or relay, and Fig. 2 is a diagrammatic view of said magnet or relay.

In the illustration, I show a central station A, and substations B, C and D, which various stations are united by a line circuit consisting of the conductors 1 and 2. At the central station I have a key 3, which through the agency of a battery 4, is designed to send impulses over the line conductors 1 and 2. At each substation I have an impulse element 5, carrying a pointer 6, which pointer when the impulse mechanism

is in its proper position, engages a stationary contact 7 to close the circuit through a local signal 8, through the agency of the battery 9. It will, of course, be understood that the pointer 6, or else the contacts 7 are disposed to different angular positions, so that each substation responds to a different number of impulses. Likewise it is stated that when impulses are being sent and these impulses carry the pointer 6 past the spring 7, the impulses are of such a rapid character that in passing the spring 7 the local signal 8 is not actuated. In order to step up the element 5 I use a step-up magnet 10, whose armature 11 carries a spring arm 12, which armature has a retractile spring 13, so that the impulse mechanism 5 is actuated on the return movement of the armature 11.

My improved magnet 14 which forms the subject matter of this application has an actuating winding consisting of the two coils 15, and an armature 16. In the preferred form the release magnet 14 has its actuating coils 15 in series with the magnet 10 in bridge of the line conductors 1 and 2. The release magnet 14 also carries two additional coils 17, 17, which have one terminal attached to the armature 16, and the other terminal ending in a contact 18, so that when the armature 16 is attracted, the winding 17 is short circuited thus making a slow-acting magnet out of this magnet 14. A strong retractile spring 19 is provided for the armature 16. It will be seen that when no impulses are sent over the line and there is no current on the line wires 1 and 2, the retractile spring 19 has withdrawn the armature 16 against a stop 20, and the extension 21 of the armature 16 has actuated the spring arm 12 to push it out of engagement with the impulse mechanism 5, in which position neither the spring pawl 12 nor the spring pawl 21 are in engagement with the impulse mechanism, and which is thereby free to move against its initial stop 22 through the agency of a spring 23. Now the first impulse sent over the line wires will attract the armature 11 and also the armature 16 instantaneously, as the winding 17 is not yet short circuited. This throws the pawl 21 and the spring pawl 12 into the teeth of the impulse mechanism 5, and after the impulse has ceased allows the retractile



spring 13 to operate to move impulse mechanism 5 one step forward, the pawl 21 preventing its return. This pawl 21 remains in engagement with the impulse mechanism 5, as the time interval between impulses from the central station does not give this now slow acting magnet 14 time to release its armature 16. After the required number of impulses to call any desired station the circuit closer 3 at the central station is opened, and after being opened a certain length of time retractile spring 19 releases the armature 16 and this armature thereby releases the pawl 21 from the impulse mechanism, which pawl at the same time engages the pawl 12 and removes it also from the teeth of the impulse mechanism 5, thus permitting the impulse mechanism 5 to be returned to its normal position. It will be seen from this that I do not have to send first a long impulse to operate a slow operating magnet, but that all of the impulses can be of the same duration, provided the time interval between them is not sufficient to allow the magnet 14 to release its armature. The first short impulse, of course transforms the magnet 14 into a slow-acting element, at the same time placing its pawl 21 in engagement with the mechanism 5. The further advantage of also placing the release magnet in series with the step-up magnet permits me to secure the desired selective features without the use of different kinds of impulses.

I have herein shown and set forth one embodiment of my invention, but of course do not limit myself to the special arrangement as herein set forth, as my invention is capa-

ble of being transformed into many different embodiments, but

Having thus described a magnet which will operate in accordance with my invention, what I claim as new and desire to secure by Letters Patent is:

1. An electro-magnetic device having an actuating coil, an armature under the influence thereof, and means under the control of said armature to establish a closed circuited secondary for said actuating coil upon energization of said actuating coil.

2. An electro-magnetic device having an actuating coil, an armature under the influence thereof, and means under the control of said armature to establish a short circuited secondary for said actuating coil upon energization of said actuating coil.

3. An electro-magnetic device having an actuating coil and an armature rapidly responsive to initial current change in said coil, and means under the control of said armature operative after the initial current change whereby said armature is sluggishly responsive to current changes.

4. An electro-magnetic device having an actuating coil and an armature responsive thereto after a given time interval, and means under the control of said armature to shorten the length of said time interval upon energization of said actuating coil.

In witness whereof, I hereunto subscribe my name this 22nd day of July A. D., 1910.

HARRY O. RUGH.

Witnesses:

HAZEL JONES,

A. LYDA JONES.