

(No Model.)

2 Sheets—Sheet 1.

P. B. DELANY.

RELAY FOR SYNCHRONOUS MULTIPLEX TELEGRAPHY.

No. 322,808.

Patented July 21, 1885.

Fig. 1.

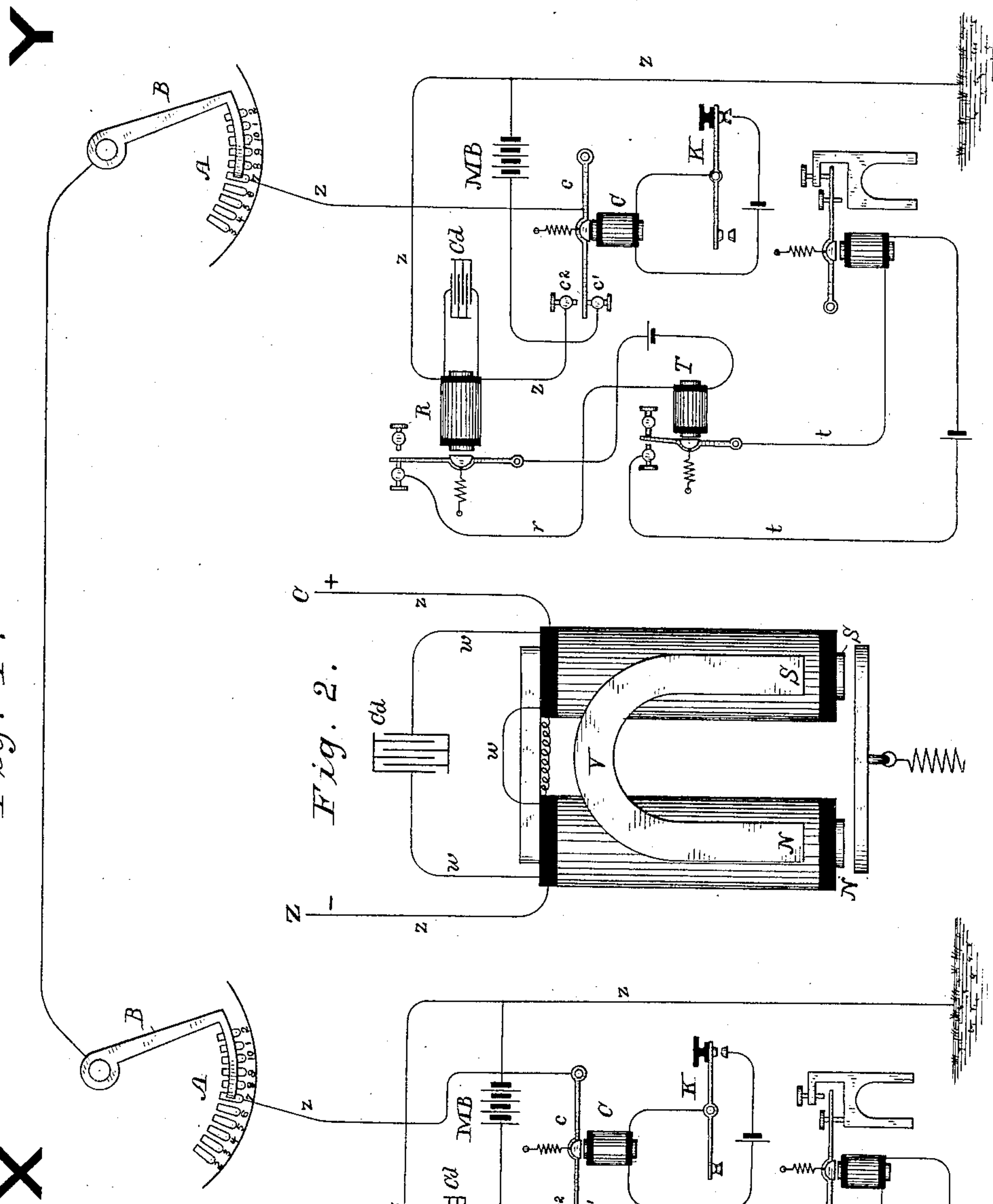
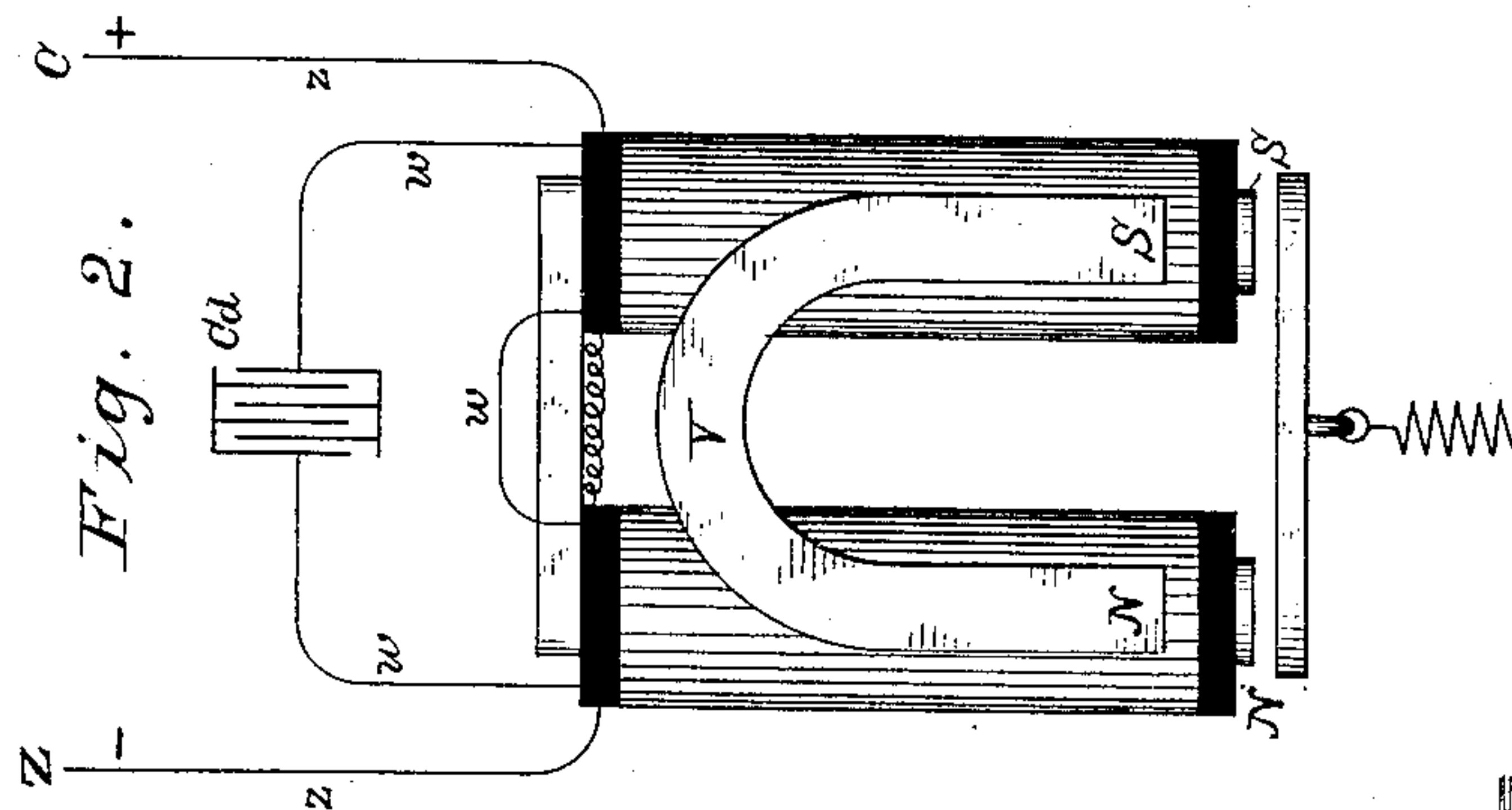


Fig. 2.



WITNESSES

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(No Model.)

2 Sheets—Sheet 2.

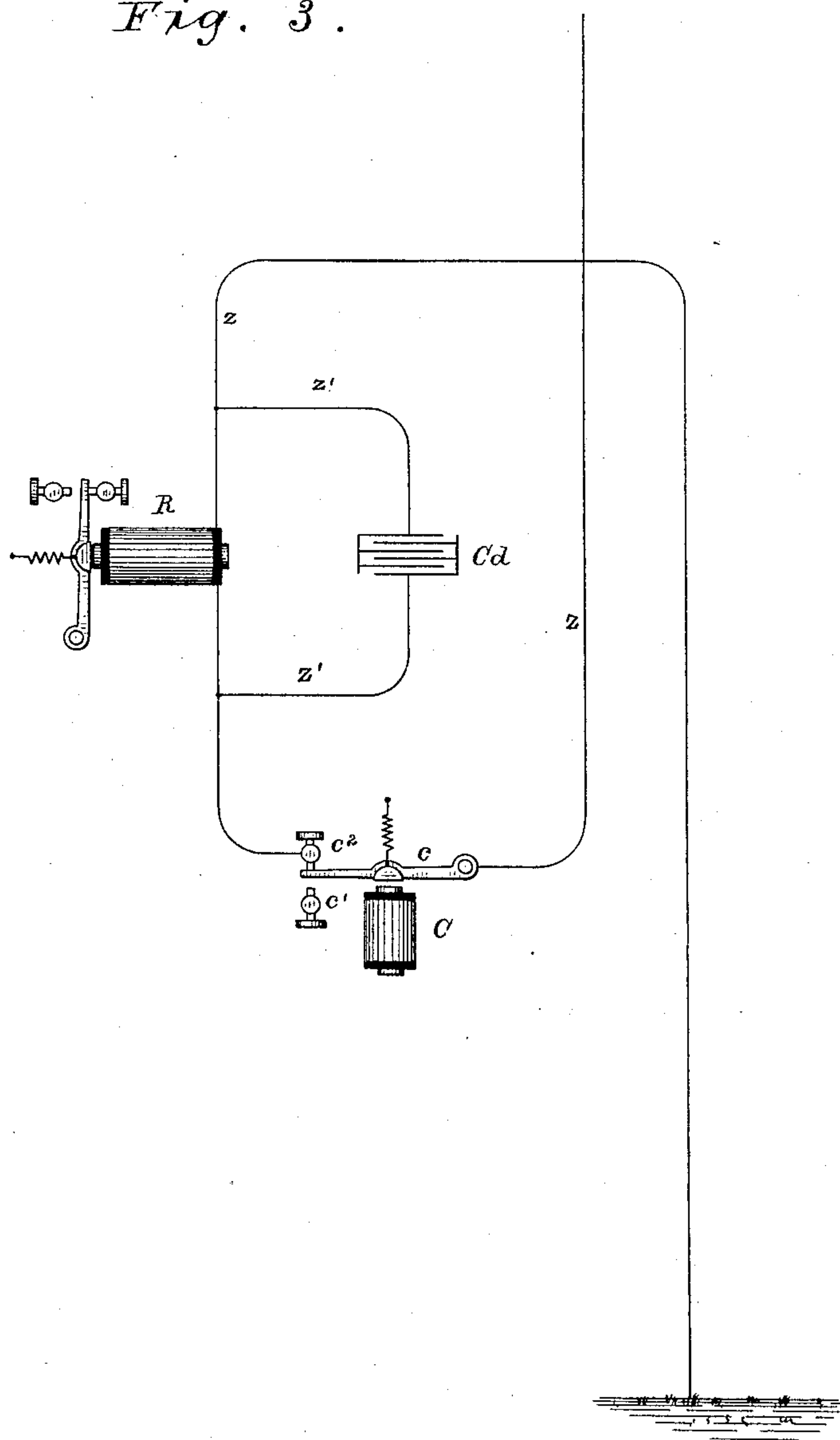
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Fig. 3.



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UNITED STATES PATENT OFFICE.

PATRICK B. DELANY, OF NEW YORK, N. Y., ASSIGNOR TO THE STANDARD MULTIPLEX TELEGRAPH COMPANY, OF SAME PLACE.

RELAY FOR SYNCHRONOUS MULTIPLEX TELEGRAPHY.

SPECIFICATION forming part of Letters Patent No. 322,808, dated July 21, 1885.

Application filed April 2, 1885. (No model.)

To all whom it may concern:

Be it known that I, PATRICK B. DELANY, of New York city, State of New York, have invented certain new and useful Improvements in Synchronous Telegraphy and Relays, of which the following is a specification.

In my system of synchronous multiplex telegraphy set forth in Letters Patent No. 286,278, dated October 9, 1883, each actuation of the relay-armature is produced by a group or series of separate and distinct impulses sent over the line. With an ordinary telegraphic relay such an interrupted current would cause a singing or chattering of the relay and sounder fatal to the correct transmission of messages. In order to overcome this difficulty, I have shown in that patent a polarized relay in each line and a split transmitting-battery. There are certain objections to the arrangement shown in that patent. For instance, the reversals of current on the line produce electrical disturbances therein, and under the arrangement shown the receiving operator could not "break" the sending operator, as the sending-operator's relay was preferably shown disconnected from the main line while he was transmitting. With my present invention the transmitting operator works from one pole of the battery only, and the arrangement is such that the receiving operator can break him at any time. At the same time the reception is perfectly clear and distinct and the relay free from any chattering or singing.

While my invention is specially designed for use in connection with my system of multiplex synchronous telegraphy, it is also capable of application to any other system of telegraphy where vibratory or interrupted circuits are used, or where more than one impulse is required to make a single signal.

In the accompanying drawings, Figure 1 is a diagram view illustrating so much of two stations, X and Y, as is necessary, with corresponding operating-lines at each station arranged according to my invention. Fig. 2 is a detail view of the relay, and Fig. 3 a view of a modified form of relay.

At each station I have illustrated only a portion of a circular table, A, with contacts arranged thereon.

The structure and arrangement of the contacts, and also of the devices for maintaining the synchronous movements of the two rotating circuit-completers B, are fully set forth in my patent before mentioned, as well as in sundry other Letters Patent granted to me on the 9th of October, 1883. I have here shown a branch or operator's circuit at each station connected with a single contact, No. 7, on the table A. These circuits are marked *z*.

As fully set forth in my Patent No. 286,278, before mentioned, each branch circuit will be connected with a number of contacts taken at intervals on the table of contacts, so that the rotating circuit-completers B, which rotate nearly three times a second, will place each branch line in connection with the main line a number of times in each second—say eighteen—and as the fingers rest upon corresponding contacts at the same time, there will be a complete and independent circuit or connection from the operator in the branch line *z* at station Y to the operator in the branch line *z* at station X eighteen times per second. With such a number of contacts the operators are practically unaware that the circuit is ever taken from them, and they can therefore transmit and receive with as much freedom as if they had a line devoted entirely to their own use. At each station the line *z* is connected with the armature *c* of a transmitting-magnet, C, included in a local circuit with the transmitting-key K. When the key is depressed so as to close the local transmitting-circuit through the magnet C, the armature is attracted and the main battery MB is sent to line through the front contact, *c'*, of the armature-lever *c*. Normally, however, the armature-lever *c* is drawn back against its back contact, *c''*, so that the line *z* is connected directly through the armature-lever *c*, contact *c''*, coil or relay R to earth. Assuming that the operator at Y is telegraphing to the operator at station X, whenever his key is depressed the main battery is sent to line, and whenever his key is raised the main line through the line *z* is put to ground through his relay R. The operator at station X may therefore at any time break the operator at Y by depressing his key.

My improved relay is illustrated in Fig. 2.

It may be a double-pole or double-coil relay, though not preferably so.

Referring to the double-coil relay shown in Fig. 2, the coils are wound with two wires side by side, one of which is directly connected with the branch circuit z , and the other with a wire, w , connected with a condenser, Cd. When the current from the negative pole of the transmitting-battery at the distant station enters the relay by the line marked —, the polarity of the poles of the relay-magnet will be as lettered, and will correspond with those of the permanent magnet V. The magnet V is preferably arranged either above or below the coils of the relay-magnet and attached directly thereto. Its poles N S are arranged in proximity to the ends of the coils. The purpose of this arrangement is to increase the lines of force in the field of the relay-magnet and prevent its rapid demagnetization; in other words, to cause the magnet to act lazily or slowly in releasing the armature. With a relay so constructed the fact that a number of distinct electrical impulses are sent through it while the operator at the transmitting-station holds down his key to make a given signal will not, with a proper adjustment of the armature-spring, be apparent at the receiving-station.

The individual impulses which are received in the formation of any one signal at the receiving-station each induces a current in the wire w which charges the condenser, and during the brief intervals between the impulses when there is momentarily no main-line current, the condenser is discharged through the wire w and the armature of relay R is held against its front stop. Under the arrangement shown there will, however, be no chattering of the sounder unless the relay-armature makes and breaks contact with the back post of the relay.

The relay R may actuate the local sounder directly in the ordinary way; but, if desired, an intermediate relay, placed between the main-line relay R and the sounder, may be employed. Such a relay is shown in the drawings, and is marked T. Its local circuit r is opened when the armature of the relay R leaves its back stop, thus permitting the armature of the relay T to go to its back stop and complete the local sounder-circuit t . In the drawings the same arrangement is illustrated at both stations. Any form of intermediate relay and any form of sounder may of course be used in connection with my improved relay.

In Fig. 3 I have shown an arrangement in which the condenser is placed in a shunt, z' , around the coils of the relay R. In this case, as before described, during the reception of a group of impulses forming a signal, at the time when the main-line circuit is broken and there is no current passing from the transmit-

ting-battery through the coil of the relay R, a discharge takes place from the condenser through the relay-coils, and holds the armature firmly to its front stop.

I am aware that, broadly, a relay having a condenser included in a shunt thrown around it for the purpose of preventing the falling away of the armature during reversals of current at the distant station is old—as shown, for instance, in the reissued patent of Thompson and Selden, of September 9, 1879—and I therefore make no claim, broadly, to such an organization. I am also aware that condensers have been used in connection with relays in various other telegraphic organizations for the purpose of overcoming the static discharge of the line, or for other purposes. So far, therefore, as a condenser-relay, broadly, is concerned, my invention is confined to its use in connection with my synchronous telegraph system, various advantages resulting from such combination, as fully above set forth. My peculiar features of construction, however, claimed below, are novel and useful.

I claim as my invention—

1. A main line having a table of contacts and a rotating circuit-completer which traverses the table at each end of the line, whereby each signal transmitted over said line is formed by a series or group of momentary impulses of electricity, in combination with a relay and a condenser or source of electric energy from which a current is discharged to magnetize the relay-magnet during the brief interval between the successive impulses of electricity composing a given signal.

2. The combination, with a synchronous system of telegraphy, in which each unitary signal is made up of a group of impulses, of a relay having a permanent magnet arranged with its poles adjacent to the poles of the relay, the adjacent poles being of like polarity when the current is traversing the circuit, substantially as and for the purpose set forth.

3. The combination of the relay-magnet, its armature, the permanent magnet arranged in proximity thereto, an electric circuit in which the relay is included, a source of electric energy the current from which produces in such relay-core a polarity the same as the polarity of the adjacent pole of the permanent magnet, and the condenser, and circuit connections whereby the discharge from the condenser prevents the relay from releasing its armature when momentary interruptions in the main line occur during the transmission of a unitary signal.

In testimony whereof I have hereunto subscribed my name.

PATRICK B. DELANY.

Witnesses:

WENDELL GOODWIN,
J. A. F. SIMPSON.