

No. 848,849.

PATENTED APR. 2, 1907.

W. P. PHILLIPS.
TELEGRAPHY.

APPLICATION FILED JULY 27, 1904.

4 SHEETS—SHEET 1.

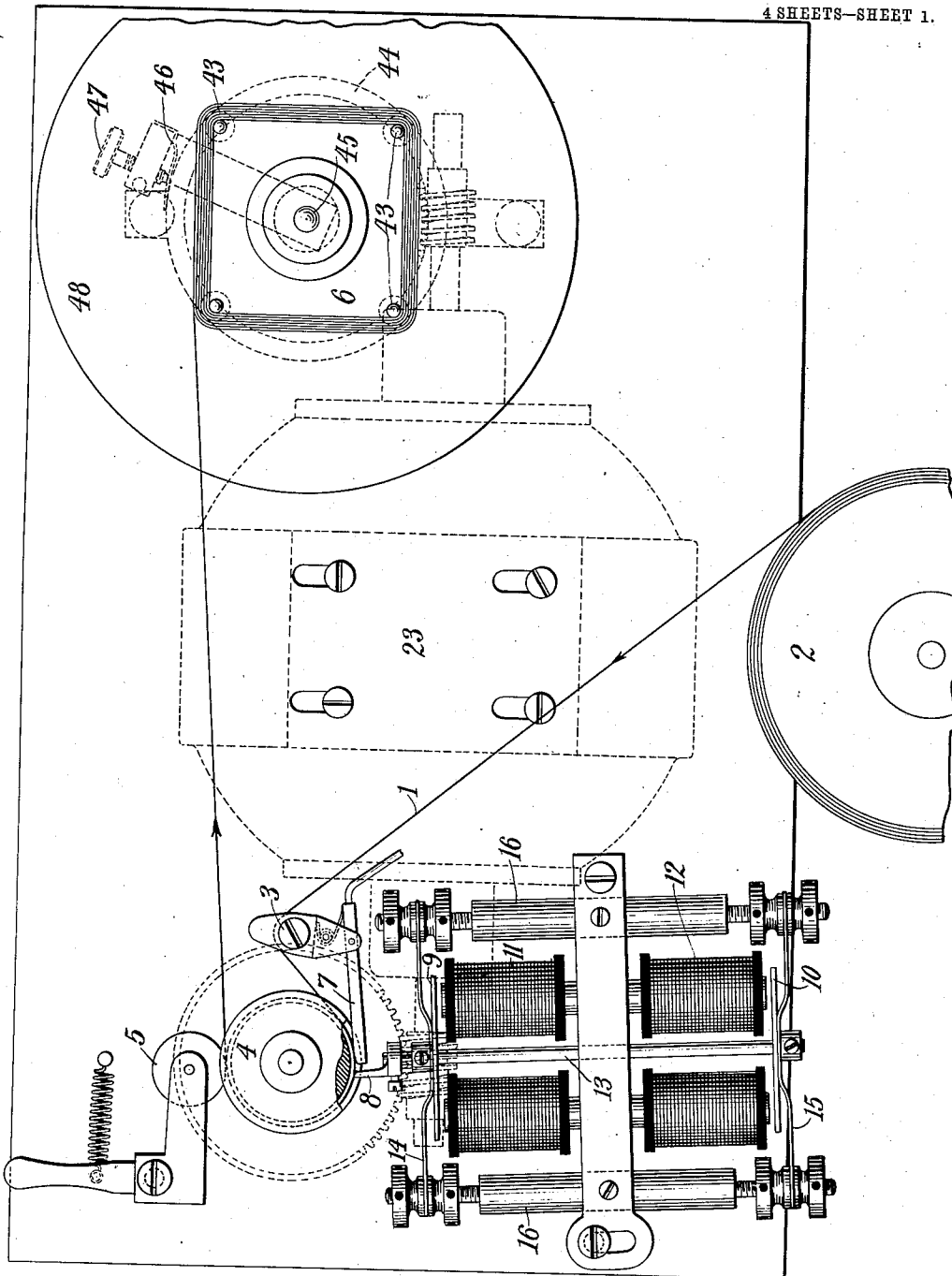


Fig 1

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Walter P. Phillips, Inventor,

by Kerr, Page & Cooper Attys

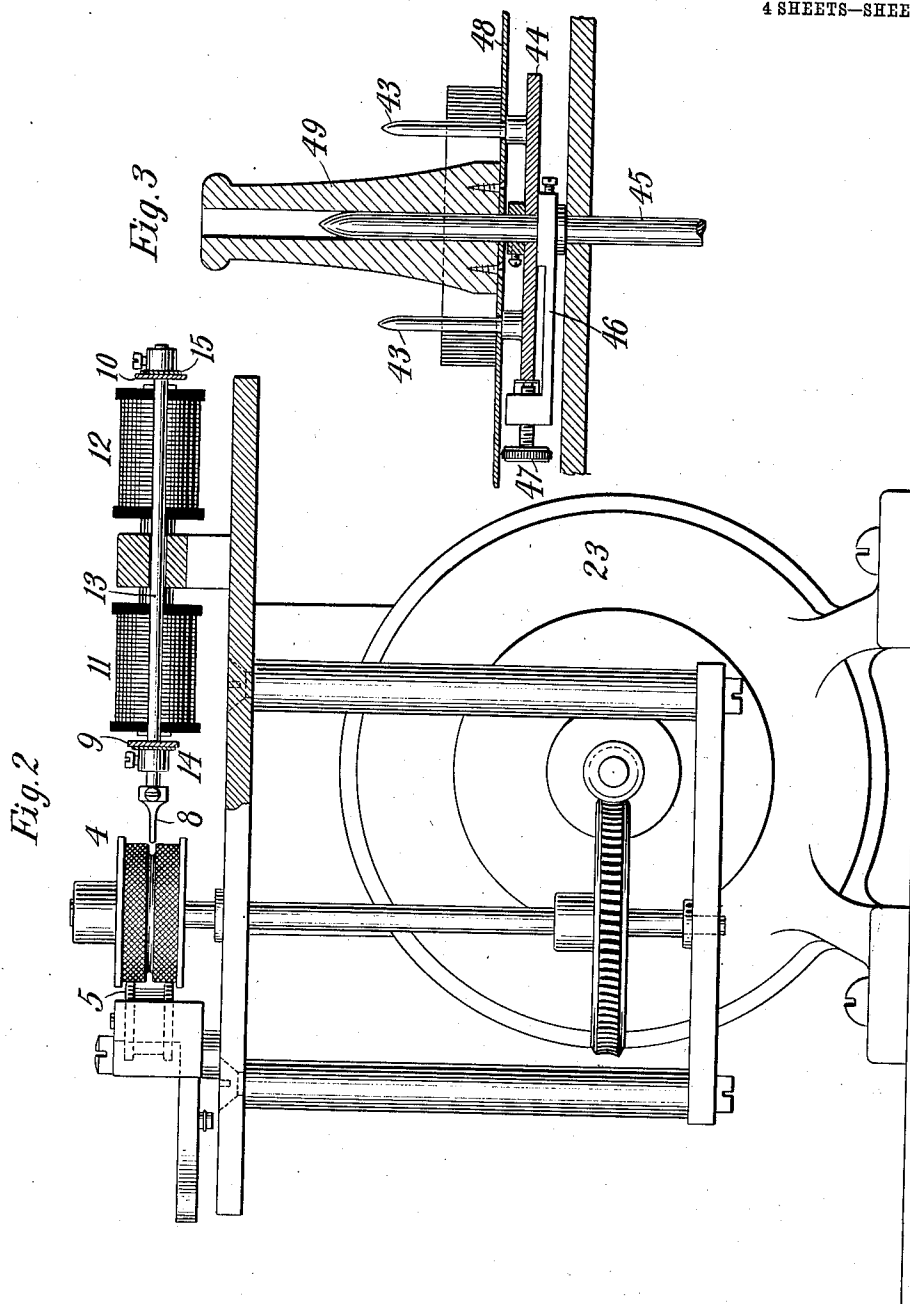
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4 SHEETS—SHEET 2.



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4 SHEETS—SHEET 3.

Fig. 4

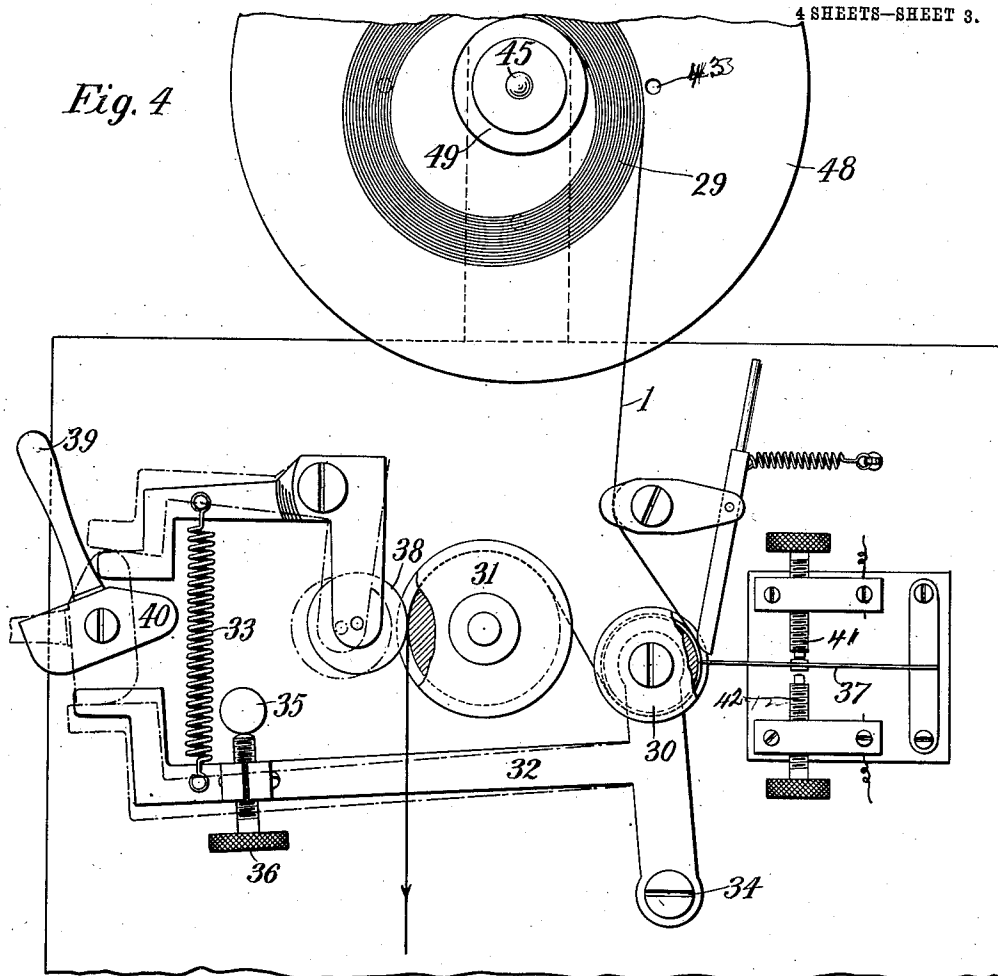
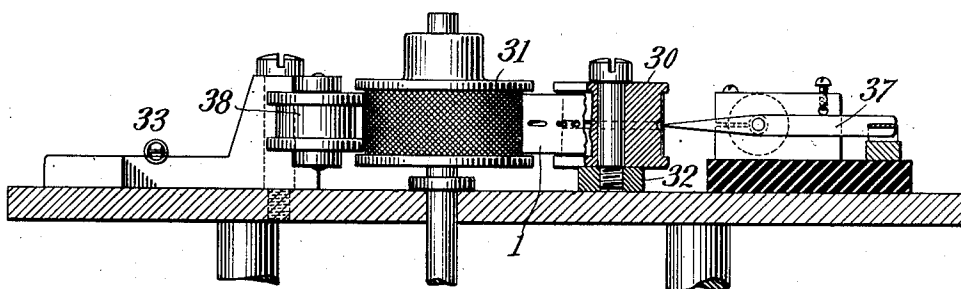


Fig. 5



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4 SHEETS—SHEET 4.

Fig. 6

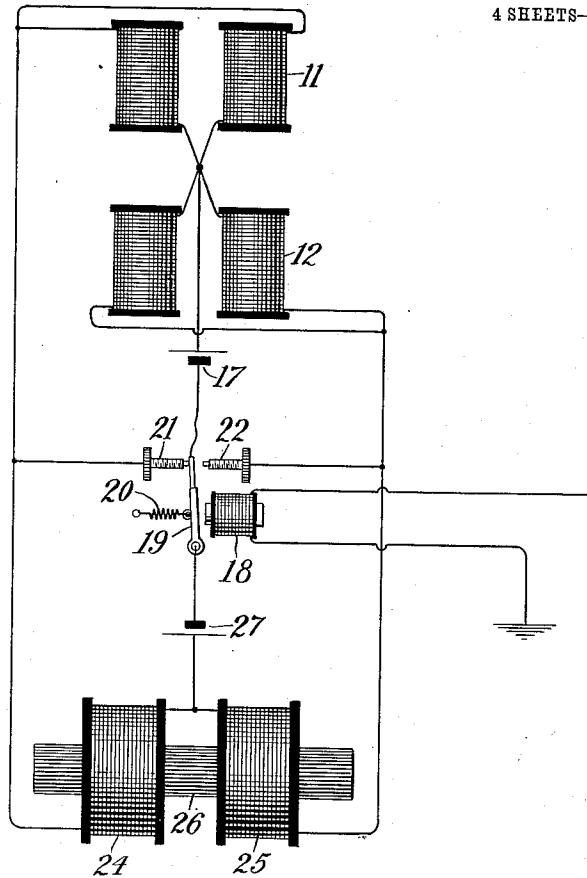
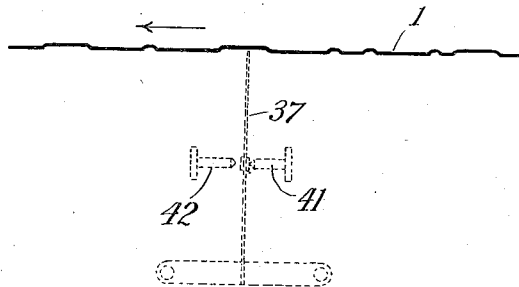


Fig. 7



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UNITED STATES PATENT OFFICE.

WALTER P. PHILLIPS, OF NEW YORK, N. Y.

TELEGRAPHY.

No. 848,849.

Specification of Letters Patent.

Patented April 2, 1907.

Application filed July 27, 1904. Serial No. 218,434.

To all whom it may concern:

Be it known that I, WALTER P. PHILLIPS, a citizen of the United States, residing at New York, in the county and State of New York, and in the borough of Manhattan, have invented certain new and useful Improvements in Telegraphy, of which the following is a specification, reference being had to the drawings accompanying and forming a part of the same.

The invention subject of my present application is an improvement in systems of telegraphy, more particularly such as set forth in United States Patent to Roderick H. Weiny, No. 578,156, dated March 2, 1897, in which the messages to be transmitted are first recorded at the sending-station by an apparatus operated by an ordinary key, which embosses the messages in Morse characters on a tape. This tape is then run through a suitable transmitter, by means of which the signals are sent over the line to a second embossing apparatus, by which the record is reproduced on a similar tape. This latter tape is then passed through a second instrument similar to the transmitter or divided into sections and used for operating a number of such instruments, which in their turn operate a sounder or sounders from which the messages may be read.

This system, designed to meet the requirements of the practical operation of long circuits, particularly those which are occasionally overcrowded, enables several Morse operators at a sending-station to record at a comparatively slow rate a large number of messages which may be transmitted and recorded with great rapidity and reproduced at any desired slower speed at the receiving-station, where they may be read by sound and transcribed by the ordinary operator. The most important consideration in such a system is evidently, therefore, the provision of means for the rapid transmission and accurate recording of the messages in Morse characters on a tape at the sending and receiving stations, but more especially at the latter, and to secure this result is the special object of my present invention.

The nature of the improvements which I have devised for carrying out the invention will be understood by reference to the accompanying drawings, in which—

Figure 1 is a plan view of my improved em-

bossing apparatus. Fig. 2 is an end view of the same. Fig. 3 is a central vertical section of an improved tape-holding spool or reel. Fig. 4 is a plan view of the instrument for transmitting the characters from an embossed tape to line or to a local sounder. Fig. 5 is a cross-section of Fig. 4 adjacent to the vibrating contact-tongue 37. Fig. 6 is a diagram of the circuit connections of the embossing or recording apparatus, and Fig. 7 is a view illustrating the manner of using the embossed matrix in the operation of the transmitter.

Referring to Fig. 1, 2 designates a spool, carrying a tape 1. The latter is led around an idler 3, to and around a grooved roller 4, under a presser-roller 5, and thence to a take-up spool or winding-reel 6. A spring-actuated presser-foot 7 maintains the traveling tape in close contact with the roller 4, and as it bears upon the paper at a point in close proximity to the embossing-stylus 8 it serves to disengage it from the latter when the impressions are being made.

The stylus 8 is mounted on the system of armatures 9 10 of the electromagnets 11 12, by the alternate energization of which it is advanced and retracted, and so caused to emboss the Morse characters in the tape along the central line of the latter immediately over the circular groove in roller 4.

The armatures 9 10, facing the opposite ends of the cores of magnets 11 12, are rigidly connected by a bar 13 and supported by flat springs 14 15, which are preferably slightly bowed toward the magnet-poles and adjustably mounted with respect to the magnets on side bars 16. By this means great sensitiveness and quick action are secured and exact and permanent adjustment readily and easily effected.

The two magnets 11 12 are adapted to be alternately energized by a local battery 17, controlled by a relay or line magnet 18 and a pivoted-contact armature lever 19, retracted from the magnet by a spring 20 and arranged to vibrate between contact-stops 21 and 22. Normally the lever 19 is held by its spring 20 in position to close the circuit of the battery 17 through the upper magnet or coils 11, which when energized retracts the stylus 8, so that its end lies just above the surface of the tape 1. When the circuit of the magnet 18 is closed, the lever 19 is drawn over into contact with the stop 22, and this interrupts

the circuit of magnets 11 and closes the circuit through magnet 12, energizing the latter, and thus forcing the stylus upward, making in the tape an indentation the length of which depends upon the rate of movement of the paper and the duration of the activity of magnet 18.

While the embossed record at the sending-station may be produced by any suitable apparatus, I prefer to use at both the sending and receiving stations the special device above described. The tape which receives the impressions is continuously fed by a small motor 23, engaging with the roller 4, through suitable gears and also with the winding-reel 6, the latter connection being through friction devices which permit the reel to slip, so as not to put too great a strain on the tape.

The magnet 18 at the sending-station is operated by a Morse key, but at the receiving-station it is operated by the impulses of current transmitted over the line.

It will be observed that a movement of the armatures 9 10 in either direction beyond very narrow limits subjects the springs 14 15 to a tension which acts to return the armatures to a position of symmetry with respect to the two magnets, so that the attractive effect of either magnet in overcoming the inertia of the armature system will be aided by the springs. To still further assist this action and render the operation of the magnets themselves quicker than they would otherwise be if the energizing effect of the current from the battery 17 alone were depended upon, I combine with the magnets 11 12 a reactance coil or coils constituting what is commonly known as a "booster," which on the separation of the lever from either of its contacts 21 or 22 will instantly discharge through the magnets, the direction of the discharge being such as to neutralize the residual magnetism of the previously active magnet and to impart to the other a polarity the same as that which will be imparted by the battery-current when the circuit through the opposite stop is completed. This device consists of a coil or pair of coils 24 25, connected in series preferably surrounding a laminated iron core 26 and having its terminals connected, respectively, to the terminals of the magnets 11 and 12 and also with the two contact-points 21 and 22. A local battery 27, with its poles opposing those of battery 17, is connected by one pole to the contact-lever 19 and by the other pole to the middle point of the reactance-coil or to the wire connecting the coils 24 and 25 when two of the latter are used.

When the lever 19 is in contact with the stop 21, the upper magnet 11, as has been explained, will be energized; but by the same connections the battery 27 will be closed, through the reactance-coil 24, and will charge

the latter. The instant that lever 19 leaves the stop 21 the coil 24 will discharge back through the magnets 11 and 12, neutralizing the residual magnetism in 11 and energizing magnet 12 with the same polarity as that which it will subsequently receive by the current from battery 17 when the contact-lever 19 engages stop 22. In this way the action of battery 17 is assisted, and a quicker and more certain action of the armature system and stylus secured.

As batteries 17 and 27 are in opposition, the currents from neither can follow any other paths than those indicated above. It will be understood that the magnets 11 and 12, which are shown as having their respective coils connected in multiple, may have these coils in series.

When the desired number of messages have been recorded in the manner above described, the matrix or embossed tape is removed from the recording apparatus and run through a transmitter. The instrument which I employ for this purpose is shown in Figs. 4 and 5.

The roll of tape removed from the receiving-spool of the embossing apparatus is placed upon the spool 29 and its end carried around rollers 30 and 31 and thence to any suitable device or receptacle for receiving it. The roller 30 is carried by a lever 32, which is pivoted at 34 and held in proper position against a stud 35 by a spring 33. An adjusting-screw 36 is employed to regulate the distance of the roller 30 from the end of the contact-tongue 37, which is vibrated by the embossed characters on the tape. A presser-roll 38, also connected with spring 33, bears upon the tape and keeps it firmly in contact with roller 31.

To facilitate the insertion of the tape, a lever 39, with a cam 40 at its end, is pivoted to the frame of the instrument and arranged when turned, as shown in dotted lines, to force the roller 38 away from roller 31 and roller 30 away from the end of the tongue 37.

The relations of the embossed tape and the contact-tongue are more fully illustrated in Fig. 6. Normally the end of the tongue 37 extends slightly beyond the flat surface of the tape, so that as the latter is drawn through the instrument the depressed portions corresponding to the dots and dashes will leave the tongue free to move over into contact with a stop 41, while the flat portions, corresponding to the spaces between letters, will engage the tongue and force it over into contact with stop 42. In this way current impulses of opposite directions may be sent to line from a battery, which is often an advantage, as it enables the transmitter to operate polarized relays.

To facilitate the removal of the tape from the instrument after it has been wound up, I employ a series of pins 43, which are set in

the plate 44. The latter turns loosely on the spindle 45, but is held in frictional engagement therewith by an arm 46, carrying a screw 47, that bears upon the edge of the plate 44.

Over the pins is placed a thin plate 48, carrying a hollow standard 49, that fits over the spindle 45 and serves as a handle to lift the plate 48. The tape is wound around the pins 43, and when the roll is completed or of sufficient size it is lifted off from the pins by raising the plate 48.

It will be understood that when the desired number of messages have been recorded at the sending-station the roll of tape is transferred to the transmitter and run through the latter. The tape may be run through backward or rewound before it is passed through; but in either event the record is exactly reproduced at the receiving-station, where it may be run through a transmitter or divided up and run through several transmitters and read from a sounder or sounders and transcribed in the usual way. In this way a very much larger volume of business can be carried on over a circuit, whether single or multiplex, by ordinary Morse operators than would be possible under ordinary working conditions.

Having now described my invention, what I claim is—

1. A telegraphic recording instrument comprising in combination, two oppositely-acting magnets, armatures facing the poles of said magnets and rigidly connected together, a recording device carried by the armatures, flat springs supporting said armatures and adjustable supports for the opposite ends of the same, whereby said springs tend to maintain the armatures in a position of symmetry with respect to the magnets, as set forth.

2. A telegraphic instrument comprising in combination two oppositely-acting magnets, an armature adapted to be reciprocated thereby, a reactance-coil connected with said magnets, a source of current for energizing the magnets and for charging the reactance-coil, and circuit-controlling devices for alternately energizing the magnets and directing the discharge of the reactance-coil through the same, as and for the purpose set forth.

3. A telegraphic instrument comprising in combination two oppositely-acting magnets, an armature adapted to be reciprocated thereby, a reactance-coil connected with said magnets, a source of current for energizing the magnets, a source of current for charging the reactance-coil, and circuit-controlling devices for directing the current from the first-named source through the two magnets alternately, and discharging the reactance-coil

through the magnets at the instant of the interruption of the current through either, as and for the purpose set forth.

4. In a telegraphic instrument the combination with two oppositely-acting magnets and an armature system reciprocated thereby, of a reactance-coil in series with the magnets; a source of current for energizing the magnets, a source of current for charging the reactance-coil, a circuit-controller and connections through the same from the sources of current to the magnets and reactance-coil, respectively, whereby the reactance-coil will discharge through the magnets at the instant of the interruption through either of the currents from the energizing source, as set forth.

5. The combination with the oppositely-acting magnets of a telegraphic instrument, of a source of current, a circuit-controller for directing the current through the magnets alternately, a reactance-coil in series with the two magnets, a source of current for charging the same, one pole being connected to the middle point of the reactance-coil, and the other to the contact-lever of the circuit-controller, but in opposition to the other source, whereby one-half of the reactance-coil will be in circuit with its source while either magnet is energized, but permitted to discharge through the magnets when the energizing-current is interrupted, as set forth.

6. In a telegraphic recording instrument the combination with two oppositely-acting magnets, rigidly-connected armatures, and flat springs supporting the same in a position of symmetry with respect to the poles of the magnets, of means for alternately energizing said magnets, a reactance-coil in series therewith, means for charging the same, and directing the discharge through the magnets at the instant of the interruption of current through either in a direction to neutralize the residual magnetism of the one and impart the proper polarity to the other for the reciprocation of the armatures, as set forth.

7. A telegraphic recording instrument comprising in combination two oppositely-directed magnet-poles, armatures facing said poles and adapted to be reciprocated by the alternate attractive action thereof, a recording device carried by the armatures, flat springs supporting said armatures and adjustable supports for the opposite ends of the same, whereby said springs tend to maintain the armatures in a position of symmetry, with respect to the poles, as set forth.

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Witnesses:

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