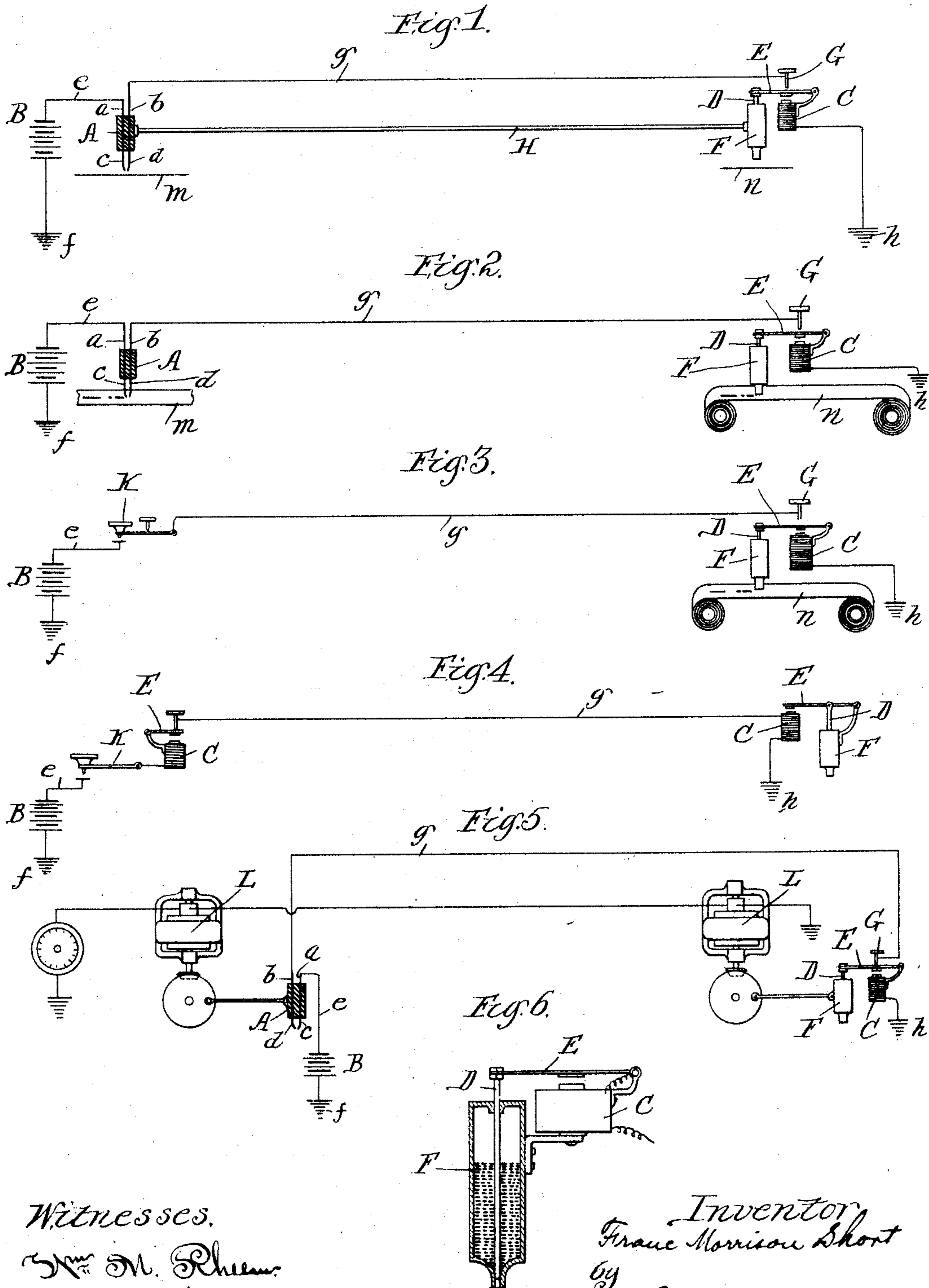


(No Model.)

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TELEGRAPHY.

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Patented Aug. 3, 1897.



Witnesses.

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# UNITED STATES PATENT OFFICE.

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## TELEGRAPHY.

SPECIFICATION forming part of Letters Patent No. 587,336, dated August 3, 1897.

Application filed April 9, 1896. Serial No. 586,890. (No model.)

*To all whom it may concern:*

Be it known that I, FRANC MORRISON SHORT, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful Improvement in a System of Telegraphy, of which the following is a specification.

This invention relates to a system of telegraphy.

10 The object of the invention is to provide a system of telegraphy of simple and improved construction and arrangement of parts whereby any desired message or design may be reproduced at the receiving end of the line.

15 The invention consists, substantially, in the combination, construction, location, relative arrangement, and operation of parts, all as will be more fully hereinafter set forth, as shown in the accompanying drawings, and finally pointed out in the appended claims.

Referring to the accompanying drawings and to the various views and reference-signs appearing thereon, Figure 1 is a view illustrating an arrangement of apparatus embodying the principles of my invention. Fig. 2 is a view illustrating an arrangement of apparatus in accordance with the principles of my invention as adapted to the transmission of the ordinary Morse alphabet. Fig. 3 is a view illustrating an arrangement of apparatus in accordance with the principles of my invention wherein an ordinary Morse transmitter may be employed as the sending instrument. Fig. 4 is a view illustrating an arrangement of apparatus in accordance with the principles of my invention wherein a vibrator is employed at the sending end of the line. Fig. 5 is a view illustrating an arrangement of apparatus in accordance with the principles of my invention and showing an arrangement for synchronizing the movements of the sending and receiving apparatus. Fig. 6 is an enlarged detail view, partly in section, illustrating a form of recording apparatus at the receiving end of the line embodying in its construction, arrangement, and principle of operation the principles of my invention.

The same part is designated by the same reference-sign wherever it occurs throughout the several views.

In carrying out my invention I provide at the sending end of the line a piece or block

A, of suitable insulating material, through which and parallel to each other I pass the wires or conductors *a b*, having their projecting ends *c d* on either side of said insulating material arranged in close proximity to each other and preferably, though not necessarily, pointed toward each other after the manner of a double-pointed pen, said ends, however, being out of contact with each other. The other end of the wire or conductor *a* is in circuit through a suitable connection or conductor *e* and battery or other form of generator B to ground, as at *f*. The other end of wire or conductor *b* is included in circuit with a suitable connection or conductor *g*, which may constitute the line-wire over which the message or design is transmitted, and which line-wire is arranged at the receiving-station to be included in circuit with the coils of an electromagnet C, and thence to the ground, as at *h*. To the armature of the electromagnet C is suitably connected the style D of a fountain-pen F or other suitable arrangement of fountain or receptacle containing ink or other writing or recording material, whereby when the said style is reciprocated or projected endwise by the movement of the armature of the electromagnet it carries upon or in advance of the point thereof a tiny drop of ink, while at the same time it closes up the orifice in the fountain F while so projected and prevents the flow of ink therethrough from the fountain, the next movement of the style in the opposite direction again permitting a tiny drop of ink or other writing or recording material to flow out of the fountain or receptacle F in advance of the style to be again deposited upon the receiving-blank upon the next succeeding projection of the style.

If desired, and preferable, I impart to the style D a rapid reciprocation during the operation of the apparatus, and to this end I attach said style D to an arm or spring E, which carries or forms part of the armature of the electromagnet C, and which is included electrically in circuit with the coils of the electromagnet C in a well-known manner, whereby when said arm or reed E moves or vibrates in one direction it contacts with a point G, included in circuit with the line-wire *g*, thereby energizing the coils of the electromagnet when

current is flowing through said line-wire and causing the armature to be attracted, thus projecting the style D, but at the same time breaking the circuit of the electromagnet, thus removing the attracting force and permitting the reed to again vibrate in the opposite direction to again make contact with point G, and so on, as long as current is flowing through the line-wire.

From the above description it will be seen that when circuit is made between the ends or points *c d* a current will flow through line wire or conductor *g* and the armature of the electromagnet C will be attracted, thereby projecting style D and causing a tiny drop of ink to be deposited upon the receiving-blank, or, in case the vibrator arrangement is employed, as above explained, a number of tiny drops of ink are deposited upon the receiving-blank. The message or design to be transmitted is first produced upon any suitable material, as *m*, in any suitable way, preferably a metallic or electrically-conducting ink, adapted when the points *c d* are brought in contact therewith to close the circuit therebetween. Now suppose the receiving-blank *n* and the transmitting or message blank *m* are suitably connected by a synchronizing apparatus, whereby they are moved in unison, or suppose the transmitting or sending points *c d* are connected through suitable synchronizing apparatus with the fountain F, so that the movements of the one are transmitted to and reproduced in the other, then it will be seen that as often as the points *c d* are brought into contact with the ink or other material forming the design or message on the sending-blank *m* circuit is closed therethrough and the style is operated to reproduce the same at the receiving end.

In Fig. 1 I have shown as merely a conventional arrangement illustrative of the principle involved the transmitting-points *c d*, connected to the fountain F through a rigid rod H. Therefore as the points *c d* are moved over the message or design on the sending-blank *m*, prepared as above explained, and as said points come in contact with the various portions of the letter or design to be transmitted the same movements are transmitted to the fountain F, while at the same time the style G is projected, or, in case a vibrator is used, is given a rapid reciprocation, thereby reproducing by a series of dots the outline of the letters forming the message or of the design. By suitably regulating the rapidity of the reciprocation of the style D the series of dots made thereby on the receiving-blank will form practically a continuous line, thereby reproducing the message or design at the receiving-station.

In Fig. 5 I have shown a different embodiment of the idea of synchronizing the apparatus at the receiving and sending stations, wherein the sending-points *c d* and the fountain F are synchronously moved by means of suitable synchronizing motors L L. It is evi-

dent, however, that the said motors may be arranged to synchronously move the sending and receiving blanks instead of the sending and receiving instruments.

In Fig. 2 I have shown an arrangement wherein the ordinary Morse alphabet is transmitted and reproduced, the sending-blank *m* containing the message previously printed or written thereon in metallic ink, as above explained, the Morse alphabet being employed, and the reciprocations of the style D at the opposite end of the line accurately reproducing the same upon the receiving-blank *n*, it being understood that the receiving-blank *n* is meanwhile fed or reeled off synchronously with the feed of the sending-blank *m*, as above explained.

In Fig. 3 I have shown the sending instrument in the form of an ordinary Morse instrument K. In this case it will be readily seen that the Morse characters will be accurately reproduced and recorded at the receiving-station upon a suitably-fed receiving-blank *n*.

If desired, the vibrator C E may be arranged at the transmitting end of the line, as indicated in Fig. 4, and which will operate to send an intermittent current over the line. It will be seen that this arrangement may be employed to secure synchronous action of the apparatus at the sending and receiving ends of the line.

From the foregoing description it will be readily seen and understood with my system of telegraphy, as above explained, that the services of an expert sender or receiver are not required, but that any one however unskilled may send or receive a message. It will also be seen that the system is thoroughly practical for transmitting the Morse alphabet or facsimile telegrams or the transmission and reproduction of any design which may be drawn or written on the sending-blank. The number of words per space of time which may be transmitted in accordance with the principles of my invention is unlimited. Several sending or receiving stations may be operated over the same line by using the sender and receiver in connection with the ordinary multiple synchronizers in the same manner that the ordinary Morse instruments are at present used. It will also be seen that as the style moves or reciprocates very rapidly when a vibrator is used, making several hundred reciprocations or vibrations per second, and by suitably regulating the relative speed of movement of the fountain and receiving blank the dots overlap each other and form practically a continuous line during the flow of current over the line-wire. By suitably regulating the amount of ink or recording material deposited with each reciprocation or vibration of the style or by employing a suitable absorbent material for the receiving-blank the ink or other material employed is prevented from drawing along the receiving material during the relative movements of

the receiving instrument and the receiving-blank, thereby reproducing the message or design in clear, sharply-defined lines.

Having now set forth the objects and nature of my invention and various illustrative forms and arrangements of apparatus embodying the same and having explained the function, construction, and mode of operation thereof, I desire it to be distinctly understood that I do not limit or restrict myself to the particular form or arrangement of apparatus disclosed, as the principles of my invention may be embodied in a wide variety of specifically different forms and arrangements of apparatus and still fall within the spirit and scope of my invention; but

What I do claim as new and useful and of my own invention, and desire to secure by Letters Patent of the United States, is—

1. In a system of telegraphy, and as a means for transmitting facsimile messages, designs and the like, prepared in conducting material, a transmitting instrument, comprising insulated points, one of said points included in circuit with a source of current and the other included in circuit with the line-wire, the circuit between said points adapted to be closed by the conducting material composing the message design or the like to be transmitted, a receiving instrument comprising a vibrating recording-style, and means energized by the current of the line-circuit for vibrating said style; as and for the purpose set forth.

2. In a system of telegraphy, and as a means for transmitting facsimile messages, designs and the like prepared in conducting material, a transmitting instrument comprising a pair of relatively insulated conducting-points freely movable with respect to the message, design, or the like arranged to complete the electrical circuit through the conducting material of the message, design or the like to the main line, a receiving instrument comprising a recording-style, and means actuated by the current of the main line for imparting to said style a rapid vibration while the circuit through said transmitting instrument remains completed and means for synchronizing the relative movements of the transmitting instrument, message, or design with respect to the corresponding movements of the receiver and its record-surface; as and for the purpose set forth.

3. In a system of telegraphy, a transmitting instrument for transmitting facsimile messages, designs and the like prepared in conducting material and arranged to make and break the circuit through the conducting material of the message, design and the like to the main line, a receiving instrument comprising a recording-style, means actuated by the transmitted current for imparting to the recording-style a rapid vibration so long as the main-line circuit remains closed, and means for freely moving the receiving instrument and receiving-blank relatively to each

other, and means for synchronizing such relative movements and the corresponding movements of the transmitter and message or design to be transmitted; as and for the purpose set forth.

4. In a system of telegraphy, a transmitting instrument, for transmitting facsimile messages, designs, and the like prepared in conducting material and having a free relative movement with respect to the facsimile message or design to be transmitted and adapted to complete the main-line circuit through the conducting material of the message or design, a receiving instrument comprising a style, means arranged in circuit with the main line adapted to impart a rapid vibration to said style, means for relatively moving said style and the receiving-blank synchronously with the corresponding relative movements of the transmitting instrument and message or design to be transmitted; as and for the purpose set forth.

5. In a system of telegraphy, a transmitting instrument for transmitting facsimile messages, designs or the like prepared in conducting material comprising relatively insulated conducting-points between which the main-line circuit is completed through such message or design, means for moving said receiving instrument and message or design freely with respect to each other, a receiving instrument, comprising a recording-style, means arranged in the main-line circuit and energized by the transmitting-current for imparting to said style a rapid vibration, means for relatively moving said receiving instrument and the receiving-blank and means for synchronizing the movements of the transmitting instrument and blank, relative to the movements of the receiving instrument and blank; as and for the purpose set forth.

6. In a system of telegraphy, a transmitting instrument, for transmitting facsimile messages, designs and the like prepared in conducting material, and arranged to make and break the circuit through the conducting material of the message, design or the like to the main line, a receiving instrument comprising a fountain, a style arranged to operate therein and adapted to take up and transfer a tiny drop of ink from said fountain to the receiving-blank upon each vibration of such style, and means energized by the transmitting-current for rapidly vibrating said style; as and for the purpose set forth.

7. In a system of telegraphy, a receiving instrument comprising a fountain, adapted to contain the recording material, a style arranged to reciprocate in said fountain and at each reciprocation thereof adapted to take up and deposit said material upon the receiving-blank, and means for imparting a rapid reciprocation to said style by the transmitting-current; as and for the purpose set forth.

8. In a system of telegraphy, a receiving instrument comprising a fountain adapted to contain the recording material, a style

arranged to deposit said material upon the  
receiving-blank, a magnet arranged in the  
main-line circuit, an arm carrying the arma-  
ture for said magnet and adapted to rapidly  
5 make and break the circuit through said mag-  
net, said arm connected to said style; as and  
for the purpose set forth.

In witness whereof I have hereunto set my  
hand this 1st day of April, 1896.

FRANC MORRISON SHORT.

Witnesses:

LA Q. RAWSON,

FRANK A. BEECHER.