

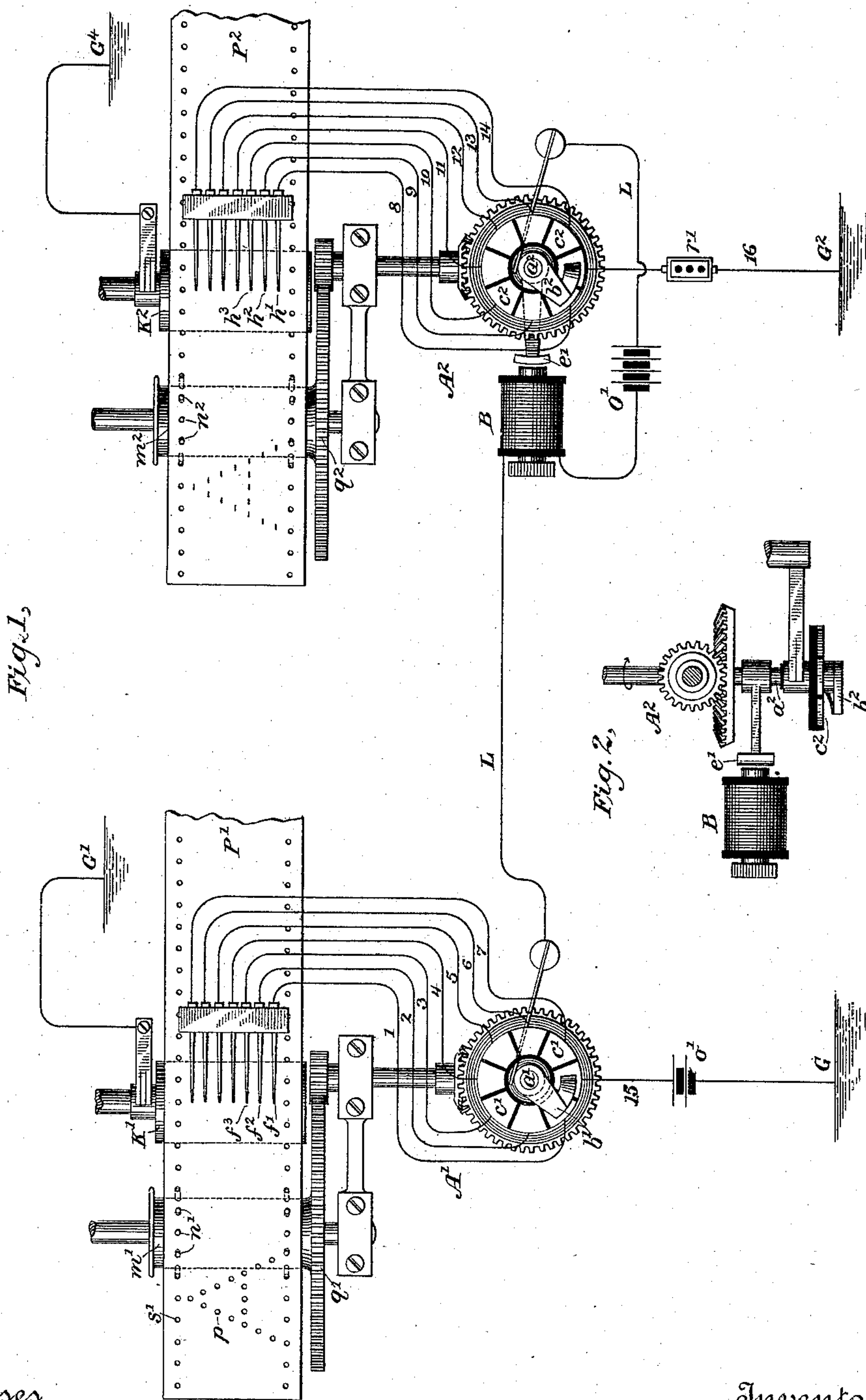
(No Model.)

H. VAN HOEVENBERGH.

CHEMICAL OR FAC SIMILE PRINTING TELEGRAPH.

No. 316,693.

Patented Apr. 28, 1885.



Witnesses

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# UNITED STATES PATENT OFFICE.

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## CHEMICAL OR FAC-SIMILE PRINTING-TELEGRAPH.

SPECIFICATION forming part of Letters Patent No. 316,693, dated April 28, 1885.

Application filed August 7, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY VAN HOEVENBERGH, a citizen of the United States, residing in Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Automatic Telegraphs, of which the following is a specification.

My invention relates, generally, to the class of telegraphic apparatus employed for automatically transmitting messages over a single electric conductor; and it relates especially to that class in which a transmitting-slip is prepared with the characters embodying the message formed by groups of perforations, the record of which is made at the receiving-station upon chemically-prepared paper.

The object of the invention is to provide means for causing one terminal of the main line to be electrically connected with a series of transmitting-points in succession, and to cause the remaining terminal to be simultaneously connected with a series of receiving-styluses in succession; and, also, to provide means for moving the transmitting and receiving slips with the proper relative speeds.

The invention consists in employing in connection with two regulated motors, preferably of the general character known as the "Lancour" motor, a series of transmitting-points, and a corresponding series of receiving-styluses, which are respectively located at the transmitting and receiving stations. The transmitting-motor is provided with a circuit-closing arm, which is connected with the main line and passes over a series of circuit-closing plates in succession. One of these plates is connected with an auxiliary battery having the same polarity as the main battery, which is included in the main line for the purpose of effecting impressions upon the chemically-prepared paper. The remaining contact-plates are respectively connected with the series of transmitting-points. The prepared transmitting-slip is moved beneath the circuit-closing points and over a conducting-surface, which is connected with the earth at a regulated speed by means of a motor. At the receiving-station there is provided a circuit-closing arm and a series of contact-plates corresponding to the similar parts at the transmit-

ting-station. One of these contact-plates is connected with the earth, while the remaining plates are respectively connected with the series of receiving-styluses. The circuit-closing arm which is applied to this series of contact-plates is also connected with the main line, and it is actuated by the motor at the receiving-station. An arm moving with the shaft of this motor is applied to an electro-magnet which is included in the circuit of the main line, and the periodic vitalizations of this magnet serve to maintain the motor in unison with the transmitting-motor.

Suitable means are provided for advancing the chemically-prepared paper at the proper speed relatively to the transmitting-slip over a conducting-surface which is connected with the earth. So long as the motors move in unison, the circuit of the battery included in the main line will be completed through the successive transmitting-points simultaneously with the completions through the corresponding receiving-styluses. At one point in the revolution of the transmitting circuit-closing arm, however, the additional battery will be connected with the main-line, and at the same moment the ground-connection of the main line will be established at the receiving-station. If, therefore, the armature at that moment confronts its electro-magnet, the motors being in unison, no effect will be produced. If, however, the receiving-motor be slightly in advance, the electro-magnet, by acting upon the armature, will tend to retard the receiving-motor, and if the receiving-motor be slow the electro-magnet will tend in like manner to accelerate the movement of the receiving-motor. In this manner the two motors will be maintained in unison. The transmitting-slip is prepared with perforations grouped in such a manner as to represent the characters embodying the message. A circuit will be completed through the main line and the corresponding receiving-styluses each time any one of the transmitting-points is placed in electrical connection with the main line through one of these perforations, provided the two motors are in unison, and that transmitting-point and the corresponding receiving-stylus will be simultaneously connected with the main line. The impressions will therefore be formed



upon the chemical paper, the positions of which correspond to the positions of the perforations in the transmitting-slip.

It is designed that for each revolution of the transmitting circuit-closing arm the transmitting-slip shall be advanced a distance equal to the width of one perforation. If, for instance, there be a vertical line of perforations in the transmitting-slip, the circuit will be completed through each of the transmitting-points in succession before that line of perforations has been moved from beneath the points. The slip will then be advanced, and a succeeding line of perforations will be brought into position to cause the circuit to be completed through the corresponding points, when the circuit-closing arm connects the same with the main line through the corresponding contact-plates.

In the accompanying drawings, Figure 1 is a diagram illustrating the general organization of the apparatus employed for carrying out my invention, and Fig. 2 illustrates certain details in the construction of the same.

Referring to the drawings,  $A'$  and  $A^2$  represent two motors. These motors are designed to be driven by means of a weight or a spring at approximately the same rates. For the purpose, however, of rendering the rate of revolution of the two motors entirely synchronous, it is designed to employ an electro-magnet,  $B$ , for modifying the speed of the motor  $A^2$ , to correspond to the movements of the motor  $A'$ . For this purpose it is designed that once in each revolution of the motors the electro-magnet  $B$  shall be vitalized by a current of greater strength than is employed for acting upon the chemically-prepared paper, and that this circuit shall tend to either retard or to accelerate the movements of the motor  $A^2$ , as may be necessary. The shaft  $a'$  of the motor  $A'$  carries a circuit-closing arm,  $b'$ , which is connected with the main line. Applied to this circuit-closing arm are a series of contact-plates,  $c'$ , one of which is connected through a conductor,  $l^5$ , including a battery,  $o'$ , with the earth at  $G$ . In the main line  $L$  there is a main battery,  $O'$ , having the same polarity as the battery  $o'$ . At the receiving-station the shaft  $a^2$  of the motor  $A^2$  carries a contact-arm,  $b^2$ , which is connected in like manner with the main line  $L$ . Applied to this circuit-closing arm is a corresponding series of contact-plates,  $c^2$ , one of which is connected with the earth at  $G^2$ , through a conductor,  $l^6$ , including an artificial resistance,  $r'$ . The electro-magnet  $B$  is included in the circuit of the main line, between the circuit-closing arm  $b^2$  and the main line. When, therefore, the circuit-closing arms  $b'$  and  $b^2$  make simultaneous contact with the particular plates  $c'$  and  $c^2$ , which are connected with the earth, the electro-magnet will be vitalized by a current due to both batteries  $o'$  and  $O'$ .

Applied to the shaft  $a^2$  is an armature,  $e'$ , which passes, once in each revolution of the shaft, before the poles of the electro-magnet  $B$ . The parts are so adjusted that this arma-

ture will confront the poles of the magnet at the moment it is vitalized by the combined action of the batteries  $O'$  and  $o'$ . Should, however, one motor be slightly in advance of the other, the electro-magnet will be vitalized while the armature is either slightly beyond or before it has reached the central point of the electro-magnet, and the motor  $A^2$  will thereby be either retarded or accelerated, as may be necessary to bring it into unison with the transmitting-motor. In this manner the ultimate rate of revolution of the two motors, and thus of the two circuit-closing arms, will be rendered synchronous. The remaining series of circuit-closing points  $c'$  at the transmitting-station are respectively connected with a series of transmitting-points,  $f' f^2 f^3$ , &c., through conductors 1 2 3, &c. Likewise the remaining contact-plates of the series  $c^2$  at the receiving-station are connected, respectively, with a series of receiving-styluses,  $h' h^2 h^3$ , &c., through the conductors 8 9 10, &c. The points  $f' f^2 f^3$ , &c., rest upon or are pressed toward the transmitting plate or cylinder  $K'$ , which is of conducting material, and is connected with the earth at  $G'$ .

The slip  $P'$ , which is employed for transmitting the message, consists of a strip of paper or other suitable non-conducting material, and it is prepared with perforations, as shown at  $p$ , grouped in such manner as to represent the letters and characters embodying the message which it is desired to transmit. This strip is designed to be moved across the plate  $K'$  by means of a suitable toothed wheel,  $m'$ . These wheels carry points  $n'$ , which enter apertures  $s'$ , formed in the respective edges of the strip of paper. The wheels  $m'$  are actuated by means of a wheel,  $q'$ , which is geared to the shaft of the motor  $A'$ , and is thus revolved at the speed required for moving the paper strip beneath the transmitting-points  $f$ . At the receiving-station the series of receiving-styluses  $h' h^2 h^3$ , &c., rest upon a strip of chemically-prepared paper,  $P^2$ . The paper  $P^2$  is moved over the surface of a conducting-cylinder,  $K^2$ , by means of a feeding-roller,  $m^2$ , which are actuated by means of the motor  $A^2$  at the proper speed relatively to the transmitting-strip  $P'$ . The styluses are successively placed in connection with the main line through the action of the circuit-closing arm  $b^2$ , and since the moments when they are so placed in circuit coincide with the moments when the transmitting-points  $f$  are connected with the main line, the records produced by the points upon the chemically-prepared paper will coincide in position to the perforations through the instrumentality of which the circuit is closed at the transmitting-station, it being understood that the polarity of the battery  $O'$  is such that currents therefrom act upon the paper in a manner well understood. The resistance  $r'$ , included in the conductor  $l^6$ , is designed to equal the resistance offered to the current by the chemical paper  $P^2$  and the receiving-styluses.



I claim as my invention—

1. The combination, substantially as here-  
inbefore set forth, of two regulated motors and  
a main line, two circuit-closing arms, respect-  
5 ively actuated by said motors and connected  
with the respective terminals of said main  
line, two series of contact-plates, respectively  
applied to said arms, a series of transmitting-  
points, respectively connected with the con-  
10 tact-plates applied to one of said arms, a se-  
ries of receiving-styluses, respectively con-  
nected with contact-plates applied to the other  
of said arms, a battery and an electro-magnet  
included in the main line, two conductors, re-  
15 spectively connecting one of said contact-plates  
applied to each motor with the earth, and a  
battery included in one of said conductors.

2. The combination, substantially as here-  
inbefore set forth, of two regulated motors and  
20 a main line, a battery included in said main  
line, an electro-magnet, also included in said  
main line, an armature moving with one of  
said motors and applied to said electro-mag-  
net, a second battery, one pole of which is

placed in connection with the main line 25  
through the action of the other of said motors,  
and a connection with the other pole of said  
battery, which is simultaneously established  
through the action of the first-named motor.

3. The combination, substantially as here- 30  
inbefore set forth, with a main line, a series  
of transmitting-points, and a circuit-controller  
for placing the same in connection with said  
main line in succession, of a paper-feeding de-  
vice for causing a strip of paper to be moved 35  
beneath said points, two toothed wheels con-  
stituting a portion of said paper-feeding de-  
vice, the teeth of which wheels enter perfora-  
tions formed in the edge of said paper, and  
means for controlling the movements of said 40  
paper by the action of said circuit-controller.

In testimony whereof I have hereunto sub-  
scribed my name this 26th day of June, A. D.  
1884.

HENRY VAN HOEVENBERGH. [L. S.]

Witnesses:

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