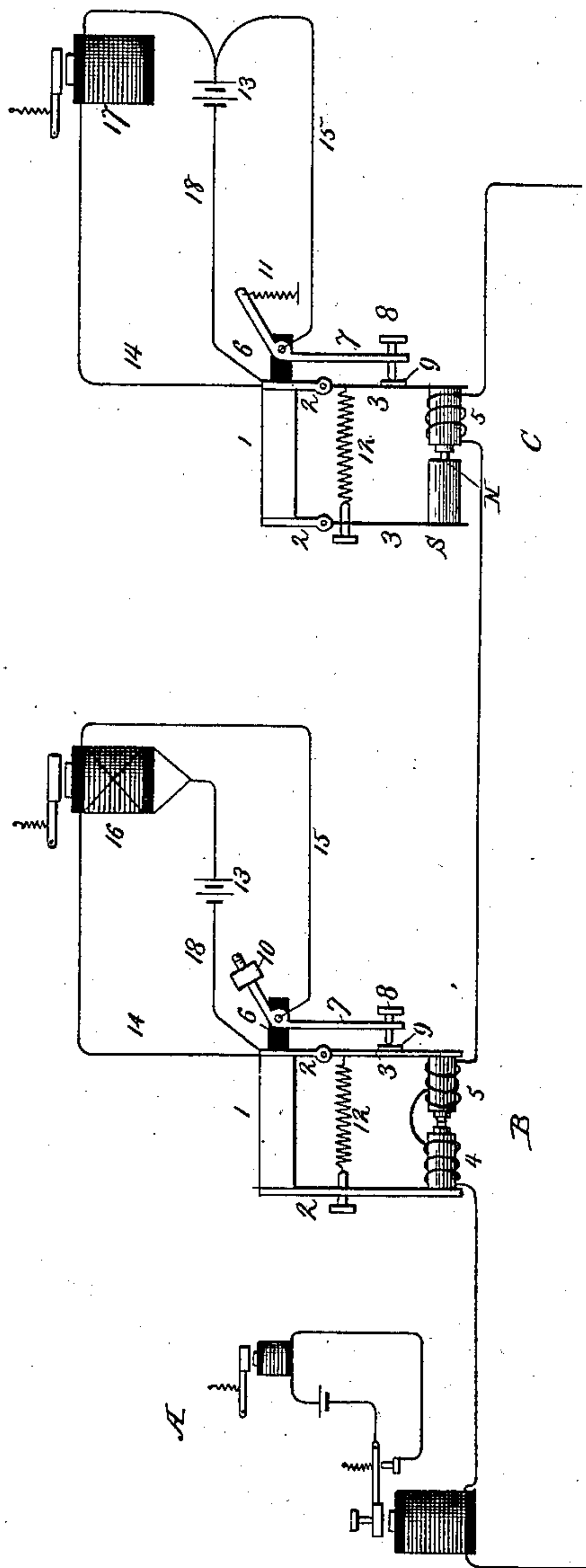


(No Model.)

C. SELDEN.
TELEGRAPH RECEIVER.

No. 370,898.

Patented Oct. 4, 1887.



Attests:

Geo. G. Hinkley Jr.
Wm. A. Harris

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Inventor:

by *Foster Freeman*
Att'y

UNITED STATES PATENT OFFICE.

CHARLES SELDEN, OF BALTIMORE, MARYLAND, ASSIGNOR TO HIMSELF,
WILLIAM T. BARNARD, OF SAME PLACE, AND FRANÇOIS RYSSELBERGHE,
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TELEGRAPH-RECEIVER.

SPECIFICATION forming part of Letters Patent No. 370,898, dated October 4, 1887.

Application filed June 15, 1886. Serial No. 205,250. (No model.)

To all whom it may concern:

Be it known that I, CHARLES SELDEN, a citizen of the United States, and a resident of the city of Baltimore, Maryland, have invented a new and useful Improvement in Telegraph-
Receivers, of which the following is a specification.

My invention relates to telegraphic receiving apparatus operated by rapidly-recurring electric impulses of short duration; and it also relates to the simultaneous arrangement of such instruments upon the same circuit in which telegraphic receivers operated by graduated or undulatory telegraphic currents are used.

It is well known that electro-magnets may be constructed to respond very promptly to telegraphic currents of exceedingly short duration, while others may be constructed which will be sluggish in their action. In my improved apparatus I make use of the first kind of magnets, as will hereinafter appear, and in my improved arrangement, above referred to, I make use of both kinds of magnets.

In the drawing hereto annexed I have shown at B and C two forms of my improved apparatus, and at A an old style of telegraphic receiver, the three apparatus being connected in series in the same line.

In the form of apparatus shown at B there is a bar, 1, which supports the essential parts of my invention. To this bar, which is preferably horizontally arranged, are fixed two pendent arms, 2 2, one of which is longer than the other. To the shorter arm is pivoted a pendulum, 3, and the length of the two together is equal to the length of the longer arm alone. Electro-magnets 4 5 are mounted one upon the lower end of long arm 2 and the other upon the free end of the pendulum. These electro-magnets are axially in line with their poles facing each other, and may be wound so as to attract or repel each other when energized. A bracket, 6, of insulating material projects from the upper end of the shorter arm 2, and to this bracket is pivoted a lever, 7, which in the drawings is shown angular, but which may be made of any suitable shape. One leg of said lever 7 extends parallel with pendulum 3, and is provided at its

lower end with a contact-screw, 8, which makes contact with a plate, 9, upon the outer face of lever 3. The other leg of lever 7 may be screw-threaded and weighted with a nut, 10, as shown, or it may be provided with other means for establishing contact between screw 8 and plate. A spring, 12, the tension of which is adjustable, connects the lever 3 with the longer pendent arm 2. If the magnets are so wound as to attract each other when energized, spring 12 must be constructed to push pendulum 3 away from longer arm 2, and if the magnets when energized repel each other spring 12 must be constructed to draw the lever toward the opposite pendent arm. The dimensions of the parts and the resiliency of spring 12 are such that the natural rate of vibration of the pendulum is greater, and therefore the duration of such vibration shorter, than that of lever 7.

It will now be seen that if a gradually increasing and decreasing current is passed through magnets 4 5, and if the latter are wound to repel each other, the pendulum 3 will perform, first, a slow outward movement, carrying lever 7 along with it, and then a slow return movement, allowing the lever to follow it up and to preserve the contact at 8 9; but if an accentuated electric impulse of very short duration, such as will not affect the sluggish magnet of the ordinary relay, A, is passed through magnets 4 5, these magnets will repel each other as before, and lever 3 will perform a quick outward movement, carrying with it lever 7. During a portion of this outward movement contact at 8 9 will be preserved; but the same will be ultimately broken for two reasons: first, because by the quick outward movement of the pendulum the latter imparts a blow to lever 7, causing the same by its momentum to move through a greater angle than the pendulum, and, second, because the point of contact upon lever 7 is at a greater distance from its pivot than the point of contact upon the pendulum is from its own pivot. The same angular movement of lever 7 will therefore bring screw 8 at a greater distance from its position of rest than the point of contact 9 upon the pendulum.

It will thus be seen that an accentuated cur-

rent of short duration will break the contact at 8 9, even if the rates of vibration of the pendulum and of the lever be equal. It is, however, preferable in some cases to adjust these rates as above indicated, in order to prolong the break during a portion of the return movement of the pendulum and lever. The latter, having a quicker rate of vibration, will leave the former behind and maintain the break. I make use of this action of my improved apparatus for operating a sounder in a local circuit, as shown in the drawing. One form of connections and circuits that may be used I have shown in connection with the form of instrument just described; but it will be understood that this is only one of many that may be used, and that I do not confine myself to the same.

In one branch of a local battery, 13, is one coil of a differential sounder-magnet, 16, which branch is completed by wires 14 and 18, both of which join at the short pendent arm 2. In the other branch, which is completed by wires 15 and 18, lever 7, screw 8, pendulum 3, and arm 2, is the other coil of the sounder-magnet. Normally, the magnet of the sounder is neutral; but when the circuit at 8 9 is broken it becomes energized.

In the form of instrument shown at C both pendent arms 2 are made short, and there are two pendulums, 3 3. One of these—the one which is substituted for the long arm 2—carries a permanent magnet, S N, in place of electro-magnet 4, and for the nut 10 in the first form described I substitute a spring, 11. In all other respects the two forms are identical. In this connection I have also shown a common sounder, 17, which is in circuit 14 18 of local battery 13. This battery is normally short-circuited by wire 15, lever 7, screw 8, contact 9, pendulum 3, and arm 2. When the short-circuit is broken at 8 9, the sounder is energized and responds. It will be seen that this form of apparatus will preferably operate by currents of one direction—viz., such as will cause a repulsion between permanent magnet S N and electro-magnet 5.

The three instruments A B C being arranged in series in the line-circuit, they may be operated as follows: A gradually increasing and decreasing electric impulse will operate instrument A alone; neither B nor C will be operated by such currents, as has been explained. Suppose, now, that the magnets of instrument B are so constructed as to respond to currents of either direction and of the strength 2 by attraction, while magnet 5 of instrument C will respond to currents of the direction + and of the strength 1 by repulsion. It is now clear that current of the direction — will not affect instrument C, but if of proper strength will affect and operate instrument B, while plus currents of the strength between 1 and 2 (but not quite reaching 2) will operate C alone. These currents, as has been explained above, must be of short duration, in order that

they may not affect the sluggish magnet of instrument A. Such currents may be obtained in various ways, as by a rheotome, an inductorium, &c., at the transmitter, as is well known to those skilled in the art.

While I have shown and described only two specific forms of my improved apparatus and only one specific arrangement of these apparatus upon the same line with an ordinary telegraphic receiver, it is evident that the fundamental idea of my invention may be embodied in numerous other forms and arrangements, and I do not confine myself to the exact details herein set forth.

I claim as my invention—

1. In a telegraphic receiving-instrument, the combination of a pendulously-suspended magnet actuated by the line-current with an independent circuit-breaker controlled by said magnet and a local circuit controlled by said circuit-breaker, substantially as described.

2. In a telegraphic receiver, the combination of a vibratory magnet actuated by the line-current with an independent pendulous circuit-breaker in a local circuit controlled by said magnet, substantially as described.

3. A telegraphic receiver consisting of two pendulous magnets susceptible to accentuated electric impulses of short duration in a line-circuit, an independent vibratory circuit-breaker controlled by said magnets, and a local circuit controlled by said circuit-breaker, substantially as described.

4. In a telegraphic receiver, the combination of a pendulous electro-magnet susceptible to accentuated electric impulses of short duration, a vibratory circuit-breaker having a slower rate of vibration than the magnet and controlled by the same, and a local sounder-circuit controlled by the circuit-breaker, substantially as described.

5. In a telegraphic receiver, the combination, with a pendulum carrying a magnet sensitive to accentuated currents of short duration in the line-circuit, of a contact-point located a short distance from the fulcrum upon said pendulum, and a vibratory circuit-breaker carrying a contact at a greater distance from the fulcrum, substantially as described.

6. In a telegraphic receiver, a pendulum carrying a magnet responsive to accentuated currents of short duration in the line-circuit, a contact-point upon the lever located a short distance from the fulcrum, and a pivoted lever carrying a contact at a greater distance from its pivot and having a slower rate of vibration than the pendulum, substantially as described.

7. In a telegraphic receiver, a pendulum carrying a magnet responsive to accentuated currents of short duration in the line-circuit, a vibratory circuit-breaker to which momentum is imparted by the lever when the same operates under the effects of an accentuated current, and a local sounder-circuit controlled by the circuit-breaker, whereby the local circuit remains intact when graduated

currents are sent over the line and is broken when accentuated currents are used, substantially as described.

5 8. In a telegraphic receiver, a pendulum carrying a magnet responsive to accentuated currents of short duration in the line-circuit, a vibratory circuit-breaker normally in contact with the lever and thrown off by the quick motions of the same, and a weight or its equivalent upon the circuit for maintaining contact during the slow movements of the lever, whereby the receiver will be operative by accentuated line-currents of short duration, but
10 will be inoperative by graduated currents, substantially as described.

15 9. The combination, upon a single undivided

line-circuit over which currents of gradually increasing and decreasing strength and accentuated currents of short duration are sent, of a telegraphic receiver operative by currents of gradually increasing and decreasing strength and one or more telegraphic receivers operative by accentuated currents of short duration in the same undivided line, substantially as described. 20 25

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES SELDEN.

Witnesses:

MURRAY HANSON,
F. L. FREEMAN.

Corrections in Letters Patent No. 370,898.

It is hereby certified that the name of one of the assignees in Letters Patent No. 370,898, granted October 4, 1887, upon the application of Charles Selden, of Baltimore, Maryland, for an improvement in "Telegraph-Receivers," was erroneously written in the grant "François Rysselberghe" and "François Rysselberghe," and printed in the specification "François Rysselberghe," whereas said name should have been written and printed *François Van Rysselberghe*; and that the Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 11th day of October, A. D. 1887.

[SEAL.]

D. L. HAWKINS,
Acting Secretary of the Interior.

Countersigned:

BENTON J. HALL,
Commissioner of Patents.