

T. M. FOOTE & CHARLES A. RANDALL.

Improvement in Printing-Telegraph Apparatus.

No. 114,792.

Patented May 16, 1871.

Fig. 1

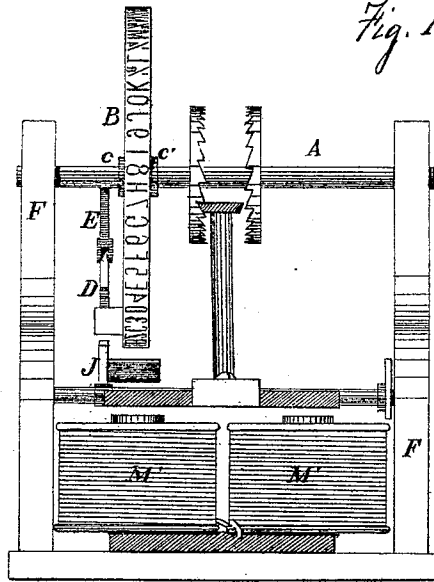
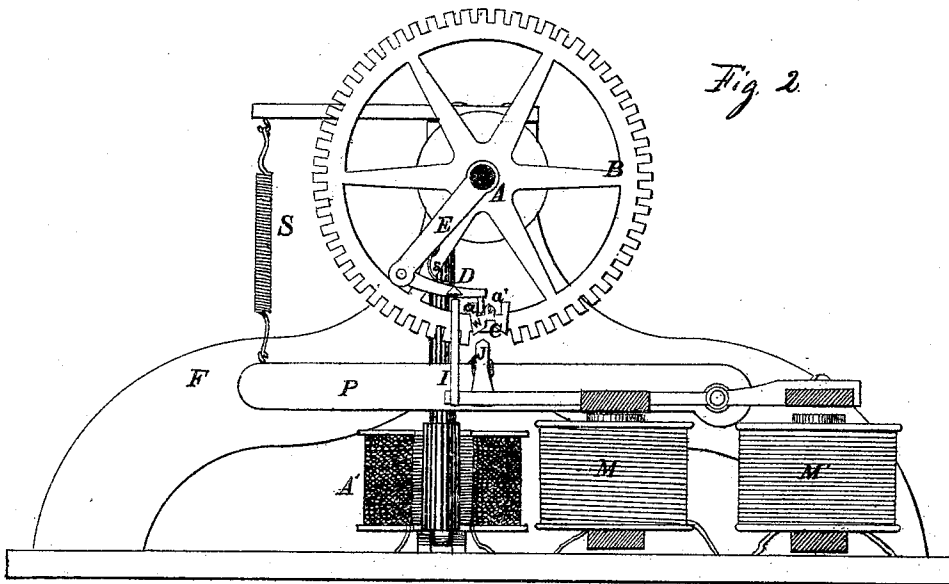


Fig. 2



Witnesses-

*Walter H. Tenney*

*M. J. VanderWeyer*

Inventors.

*Theodore M. Foote*

*Charles A. Randall*

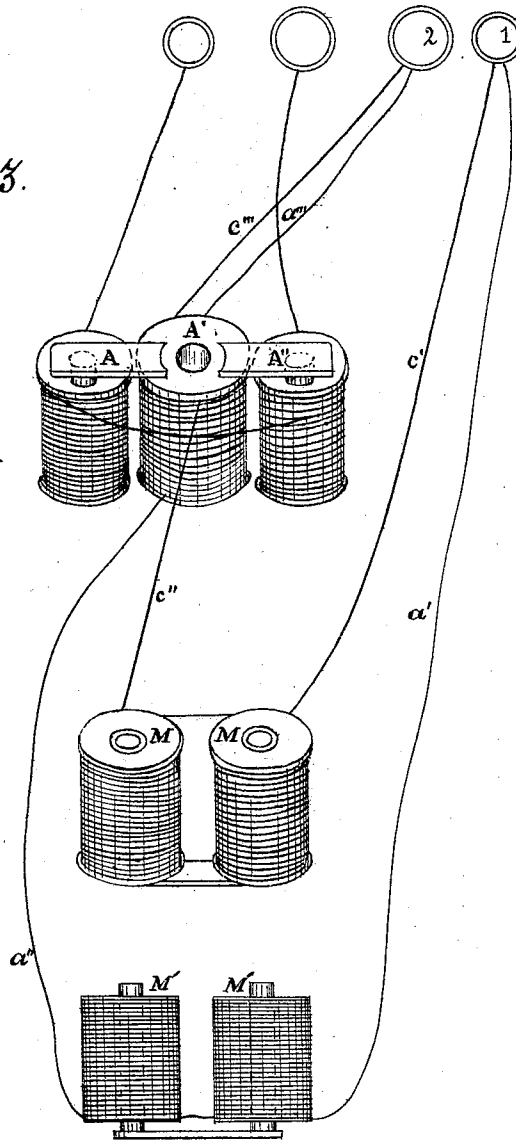
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Fig. 3.



# United States Patent Office.

THEODORE M. FOOTE AND CHARLES A. RANDALL, OF BROOKLYN, E. D.,  
NEW YORK.

Letters Patent No. 114,792, dated May 16, 1871.

## IMPROVEMENT IN PRINTING-TELEGRAPH APPARATUS.

The Schedule referred to in these Letters Patent and making part of the same.

### *To all whom it may concern :*

Be it known that we, THEODORE M. FOOTE and CHARLES A. RANDALL, of Brooklyn, E. D., in the county of Kings and State of New York, have invented new and useful Improvements in Printing-Telegraph Apparatus; and we do hereby declare the following to be a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification.

The principal features of these improvements relate to the substituting of a type-wheel that shall and may be used in place of the two type-wheels it has ever been necessary to use in single-wired printing-telegraph instruments where letters, figures, fractions, and signs have been used.

Second, to the taking of the impressions from the type-wheel by means of or by the use of a spring, instead of using an electro-magnet, as has ever been the practice. By reference to the drawing, plate 2 and figs. 2 and 3, it is shown that we substitute an electro-magnet, M, in place of a spring, in combination with the paper-feeding apparatus, and do the printing by the use of a spring, in contradistinction to the usual method, and an improvement over it for various reasons. We also show and may use an electro-magnet, M', in circuit with the type-wheel magnet, the said magnet operating the printing-lever, to print by means of an extra current being sent over the magnet M', when the type-wheel has been brought to a desired position.

Third, the arranging of electro-magnets in a circuit in such a manner that no local battery shall be required upon the printing apparatus.

The arrangement of the various parts of these improvements will be better understood by reference to the accompanying drawing, in which—

Figure 1 is an end view.

Figure 2 is a side elevation of the same.

Figure 3 are the arrangements of the magnets and circuits.

Similar letters and marks of reference indicate like parts.

F, figs. 1 and 2, designates a metallic frame, which forms the bearings for the working parts of our apparatus.

In the upper part of this frame F is secured the type-wheel shaft A, on which is secured the type-wheel B, the said type-wheel being movable upon its axis A, and held in place by the collets c c' and a dog, D, acting in a catch or space, a or a'.

Secured to wheel B is a piece, w, which may be metal or otherwise, having upon its lower edge or sur-

face two beveled sides or faces, forming a triangular-shaped space, C, and upon its upper surface is a tooth, e, and two corresponding spaces, a a'.

Secured upon the shaft A is an arm, E, upon which works or swings the dog or detent D, which plays in the spaces a or a', and is held in place by the spring s.

Upon the periphery of the type-wheel B, fig. 1, are the letters, figures, fractions, and signs, the letters being cut upon every second tooth from a given point, and the figures, fractions, signs, &c., being cut upon the teeth between the letters.

Having, then, half as many teeth or movements in an escapement (where a step-by-step motion is imparted to a type-wheel, as is shown in our patents of July 5 and December 16, 1870) as there are teeth in the type-wheel, or letters, figures, fractions, &c., upon the periphery of the type-wheel, we complete the whole revolution of the type-wheel in the same time it would require to revolve a type-wheel having only the same number of teeth or letters, &c., as there are teeth in the escapement.

It is evident, however, that if we can get only half of the characters on a type-wheel at one and each revolution, there must be some way arranged by which we may obtain impressions from the other half of the characters. Having then used our letter-wheel, we stop our wheel B at some given point.

By means of a spring, S, on an electro-magnet, the printing-lever P is moved suddenly toward the wheel B, and the stud i, acting upon the dog D, displaces it from the space a, and the stud j, acting upon one of the faces of the triangular-shaped space C, causes the type-wheel B to turn on its axis A the distance of one tooth, and the dog D, being pressed into the space a' by the spring S, the wheel B is again secured, and by the movement the type-wheel B has been placed in position to be used as a figure, fraction, and sign-wheel, converting it, therefore, alternately, and at will, into a letter or a figure and fraction-wheel; we dispense with the second wheel which it has been necessary to use, and at the same time work our double wheel as rapidly as though it had only half the number of characters upon its periphery; so that instead of loss of time in transmission from having a large wheel, which is necessary to have where so many characters are used, we gain in speed and can do more work with our double wheel and one wire than is done with two wheels and one or more wires in other printing-telegraphs.

We do not confine ourselves to the use of one wheel of this construction, neither to a type-wheel with any especial number of characters upon it.

In operating our printing-telegraph we employ a

compound magnet, having a soft-iron bar or vibrating armature passing through the helix A', fig. 3. The said compound magnet, together with the escapement used, having been described and secured by Letters Patent bearing date July 5 and December 16, 1870, further detail is unnecessary.

We do also use, for a purpose we believe to be new and advantageous, an electro-magnet, M, figs. 2 and 3, in the circuit with our compound magnet A' A'', in such a manner that when the type-wheel is being rotated the magnet M in the same circuit with the type-wheel magnet prevents the printing-lever, or any part connected therewith, from coming in contact with or striking against the type-wheel B, and when the type-wheel is brought to a desired position, the current over magnet M being broken, the impression is taken from the wheel by the use of a spring, S, instead of using an electro-magnet, as is the practice.

The circuit may be closed or broken or changed by or with any of the well-known circuit closers or pole-changers, and especially by the pole-changer described and secured to us in Letters Patent bearing date or granted December 16.

We also show and may use an electro-magnet, M', figs. 2 and 3, in the circuit with the type-wheel magnet in such a manner that the currents operating the type-wheel magnet will have no effect upon the magnet M', and when the type-wheel is brought to a desired position an extra current over magnet M', which may be quantity or intensity, will so affect and operate the magnet M' that the printing is effected. By reference to fig. 3 the currents will be more fully understood.

The current coming in at post 1 passes over wire c' and magnet M, over wire c'' and helix A' and wire c''' to post 2, and from there to line, and to other instruments in same circuit or to ground.

In the second method the circuit passes from post 1 over wire a' to magnet M', over wire a' and helix A' and wire a'' to post 2, and then as before.

We are aware that it is not new to construct and operate one or more printing-telegraph instruments in one or more circuits without the aid of local batteries,

and an electro-magnet has been used for the printing in the same line circuit with the type-wheel magnets, and we do not claim simply an electro-magnet for giving the impressions in the circuit with the type-wheel magnets.

We are also well aware that the use of an increased second current over the line to effect the printing is not new, as it is shown in the patent of J. Selden, March 23, 1869, No. 91,527; but he describes and claims only "one magnet in a line circuit, operating two armatures, one worked by a weak current, and the other by a strong current, and they may be so connected that they shall throw in locals for working type-wheel and for printing."

Disclaiming, therefore, any part or parts of this combination or improvements, we are aware that it is not new to operate the printing-lever by the direct action of the spring, as such a device, in combination with a relay and local battery, is shown in the English patent of M. Theiler, 1861, No. 2,429.

What we believe to be new, and claim and desire to secure by Letters Patent, is—

1. The combination, with the type-wheel magnets, of an electro-magnet, M', placed in the line circuit, and the printing-lever operated directly thereby, as shown and described.

2. The combination of the type-wheel magnets and an electro-magnet, M, placed in the line circuit, the printing-lever P, and the spring S, when the retractive force of the said spring causes the impression to be effected on the interruption of the circuit, as set forth.

3. The combination of the type-wheel B, printing-lever P, studs i and j, arm B, dog D, spring S, and catch w, provided with the depressions a and a', constructed and operating as set forth.

4. The method of feeding or spacing the paper after each impression by the direct action of an electro-magnet, as set forth.

THEODORE M. FOOTE.  
CHARLES A. RANDALL.

Witnesses:

CHARLES G. COE,  
JAMES L. NORRIS.