

C. A. RANDALL.
PRINTING-TELEGRAPH.

No. 177,661.

Patented May 23, 1876.

Fig 1.

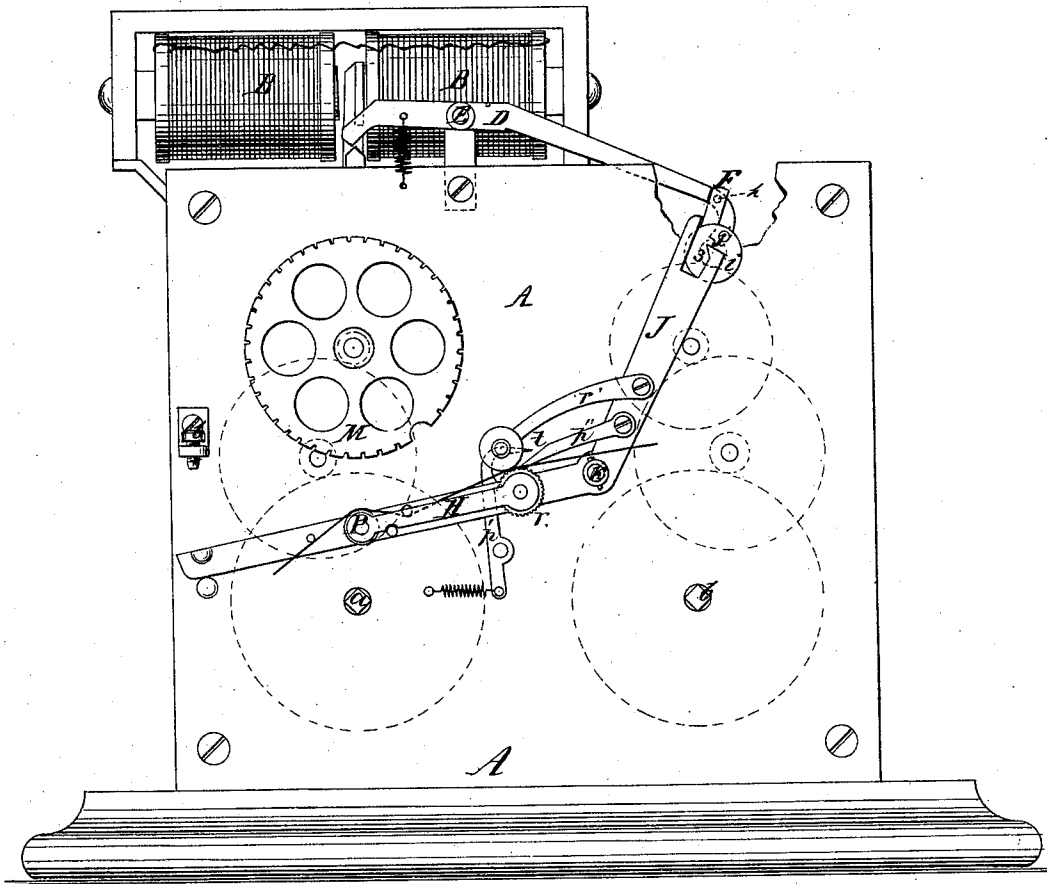
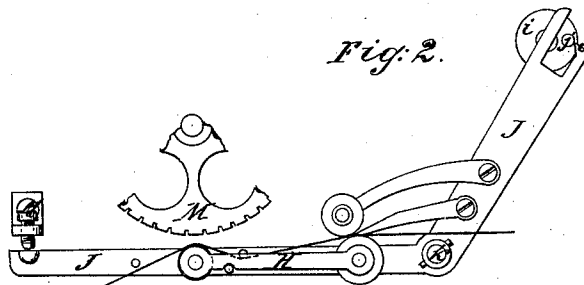


Fig 2.



Witnesses:

Ernst Bilhuber
A. Faber du Faur

Inventor

Charles A. Randall

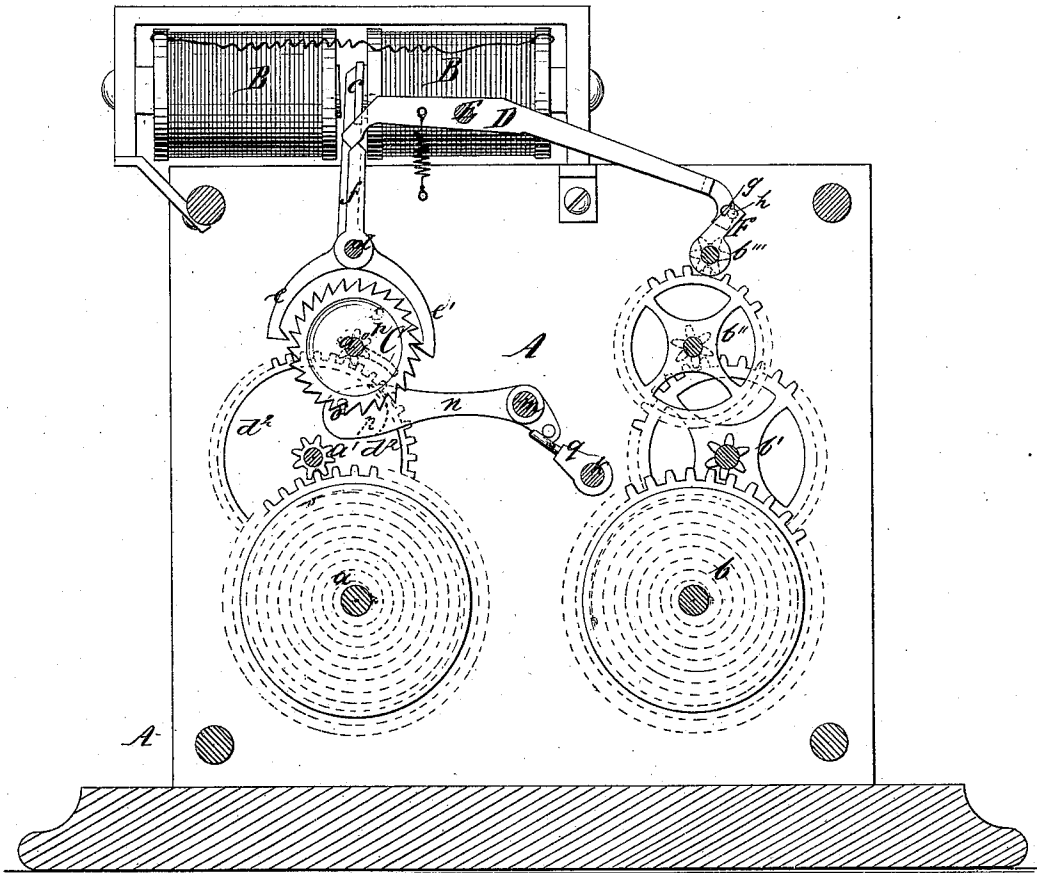
By James L. Norris
Atty.

C. A. RANDALL.
PRINTING-TELEGRAPH.

No. 177,661.

Patented May 23, 1876.

Fig 3.



Witnesses:

Ernst Billhuter
A. Peter du Faure

Inventor:

Charles A. Randall
By James L. Norris.
Atty.

C. A. RANDALL.
PRINTING-TELEGRAPH.

No. 177,661.

Patented May 23, 1876.

Fig:4.

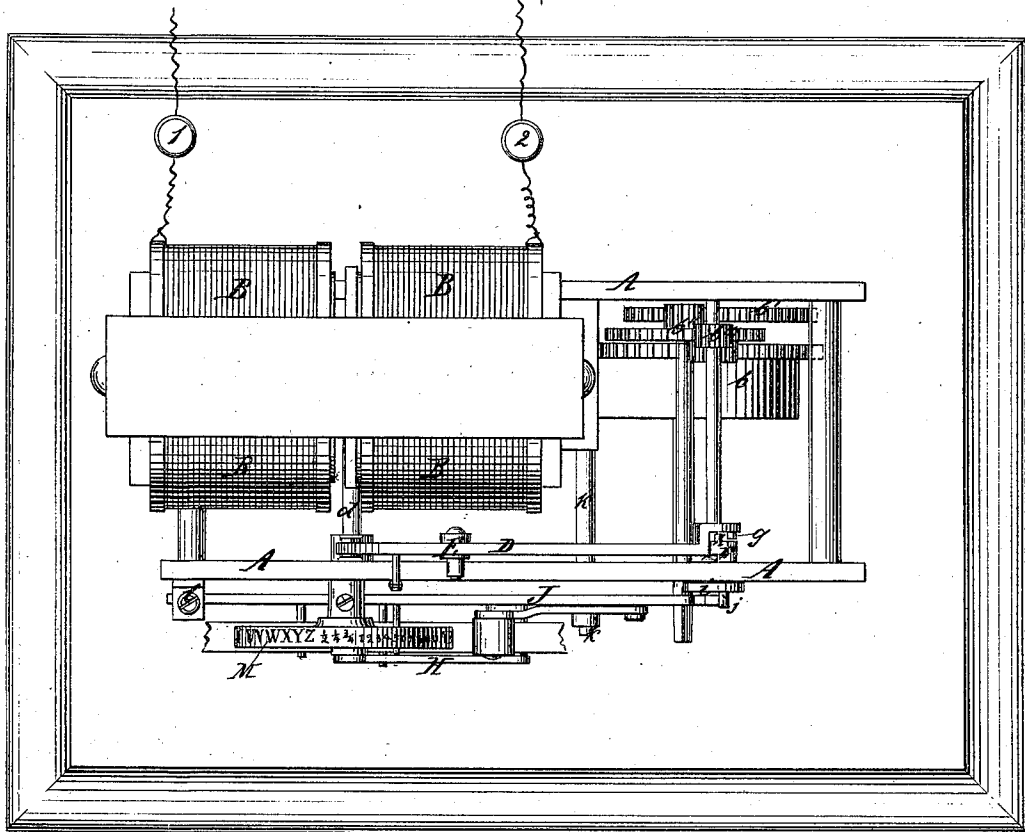


Fig: 5^u

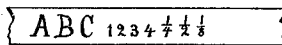


Fig: 6.

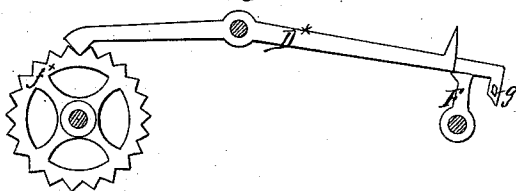
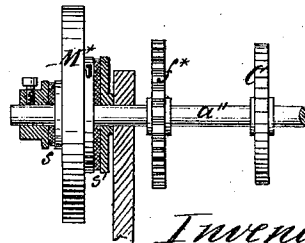


Fig: 7



Witnesses:

Ernst Bilhuber
A. Faber der Fauer

Inventor:

Charles A. Randall
By James L. Norris.
attys.

UNITED STATES PATENT OFFICE.

CHARLES A. RANDALL, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN PRINTING-TELEGRAPHS.

Specification forming part of Letters Patent No. **177,661**, dated May 23, 1876; application filed November 3, 1875.

To all whom it may concern:

Be it known that I, CHARLES A. RANDALL, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Printing-Telegraphs, of which the following is a specification:

This invention relates to certain improvements in printing-telegraphs, its object being to provide an instrument of such character that a greater number of the same may be worked simultaneously in the same electric circuit than with the instruments heretofore in use, and by which the communications may be recorded at one or more points, in printed characters, in a rapid and reliable manner by mechanical power, instead of being done directly by a printing-magnet, as heretofore.

The invention consists, first, in the combination, with the printing-wheel of a telegraph-instrument and clock-gearing for rotating it, of a magnetic escapement operated by magnets in circuit with the transmitting-instrument, for controlling the movement of the printing-wheel, as hereinafter more fully set forth; second, in the combination, with the printing-wheel and magnetic escapement, of certain devices operated by clock-gearing, and controlled by the magnetic escapement, for the purpose of accomplishing the printing by mechanical power, and dispensing with the printing-magnet heretofore used for the purpose; third, in the combination, with the printing-wheel and magnetic escapement, of a unison device controlled by the magnetic escapement, as more fully hereinafter described; fourth, in the combination of the printing-wheel and its gearing, the magnetic escapement, the printing devices and gearing for operating the same, and the unison device, as more fully hereinafter set forth; and, fifth, in certain improvements in the construction of the type-wheel.

The arrangement of the various parts of this invention will be more fully understood by reference to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation; Fig. 2, detached views of the printing device; Fig. 3, longitudinal vertical sectional view; Fig. 4, a plan view. Fig. 5 shows printed paper slip; Fig.

6, modification of mechanism controlling the printing mechanism; Fig. 7, modification of type wheel and shaft.

Like figures indicate like parts in all the figures.

In the drawings, A represents the frames carrying the trains of wheels a a' a'' and b b' b'' . Attached to the frames are the electromagnets B B, having their armature c attached to the rock-shaft d , which also carries the pallets e e' , which work in the escape-wheel c on the shaft a'' . On the rock-shaft d is carried a fixed piece, f , having a V-shaped end. Playing upon the piece f is the double lever D, hinged at E, upon the longer end of which is a right-angled projecting piece, which carries a pin, g , Fig. 4. This lever D extends across the machine to the shaft b''' , which carries rigidly attached thereto a dog or arm, F, which carries a pin, h , Figs. 3 and 4, the said dog normally coming in contact with the right-angled end of the lever D, and playing thereon as the lever D is kept in motion, and when released therefrom by the lever D ceasing to vibrate, said dog being revolved by means of the clock-work and its motor until the pin h comes in contact with the pin g . Upon the outer end of the shaft b''' is a disk, i , carrying a pin, j , Fig. 1. Upon a rock-shaft, k , is fixed the main printing-lever J, upon which is fixed the paper-feeding rollers and an auxiliary lever, H, which carries the printing-pad P, and which moves independently of the lever J, and which is thrown against the type-wheel by momentum after the main lever J is stopped by the adjusting-screw l , or its equivalent.

The main printing-lever is provided with a fork-like end, one limb of which is provided with a V-shaped projection, 3, which is in the path of the pin j as it revolves. Motion is imparted to the lever J by the pin j when it is allowed to revolve, riding upon and over the V-shaped projection on the lever J, which acts to throw it to and from the type-wheel with a rapid movement.

Fig. 2 shows a detail view of the printing mechanism, with the pin j just passing the V-shaped projection 3, and the lever J carried up to the adjusting-screw l .

The paper-feeding device consists of the

roller r and its ratchet-wheel, and the friction-roller r' . Motion is imparted to these rollers by a tooth on the pawl p' engaging the ratchet-wheel, and rotating the same until a finger, t , on the pawl p' arrests the same, and at the same time holds the pawl p'' into the teeth of the ratchet-wheel, which prevents a backward movement of the roller r .

The unison device is shown in Fig. 3, and is constructed as follows: Upon the side of the wheel a' is fixed a disk, a^2 , or the wheel may be solid. Pivoted at m is a lever, n , carrying at one end a friction-pad, R , and a pin, O , the opposite end of the lever extending over the projecting arm q on the rock-shaft k .

Fig. 4 shows a plan view of the apparatus and the circuit-connections, the current passing from battery, over wire w , to binding-post 1, through magnets $B B$ to post 2 and wire w' , back to battery or line.

The type-wheel M is provided with letters, figures, and fractions upon its periphery. In telegraph-instruments of this class it is found desirable that the impressions from the letters, figures, and fractions shall be readily distinguished each from the other, and for that reason some instruments are provided with two type-wheels, so that the impressions may be made in different lines. There are various objections to the use of two wheels, and in this apparatus I have arranged the letters, figures, and fractions on one wheel, so that they may be printed in one line, and yet be readily distinguished each from the other by making the letters and fractions of the same length, and the figures about half as long, so that impressions taken therefrom will appear as shown in Fig. 5.

In Figs. 6 and 7 are shown modifications. The type-wheel M^* is fitted loosely on the shaft a'' , and carried by the friction-pads $s s'$ as the shaft a'' is revolved. The type-wheel is unisoned, as before, except that the pin v is attached to the wheel M^* instead of the shaft a'' . The shaft a'' carries a wheel, f^* , having V-shaped teeth, which, when rotating, vibrates the lever D^* , Fig. 6.

In practice, the electro-magnets $B B$ are in one circuit, and, alternate negative and positive currents of electricity being passed over the same, the armature c is rapidly vibrated between the magnets, which actuates the escapement and allows the type-wheel to revolve by means of the train $a a' a''$ and its motor. As the armature vibrates the fixed piece f is moved rapidly to and fro, which, acting upon the V-shaped end of the lever D , causes it to move upward. It is returned by its own weight, or a spring may be used. The movement, however, of the piece f is so rapid that, practically, the lever D is kept in motion, and not allowed to fall all the way down until the armature is at rest.

While the lever D is vibrating the dog or arm F , Fig. 1, upon the shaft b''' , is in contact therewith, and, upon the lever being stopped, the dog is released therefrom and

makes a part of a revolution, when it is again arrested by the pin h coming in contact with the pin g , Fig. 3.

In this movement the main printing-lever has been actuated by the pin j in the disk i , in its revolution passing over the V-shaped projection 3 on the printing-lever, the impression taken from the wheel, and the paper moved away from the same.

The pulsations can now be repeated to set the type-wheel for the next letter, and upon the armature c moving, the lever D is vibrated and the dog F is released from the pin g , and returns to its normal position preparatory to printing another letter.

By this device, the printing being done mechanically, it is much more rapid and reliable than when an electro-magnet is used, whether for direct printing by an armature-lever or for releasing the printing mechanism; also, by dispensing with the printing-magnet used in this class of apparatus, I diminish the resistance in each instrument, so that a greater number of instruments can be worked in the same electric circuit, and also simplify the connections and apparatus.

If desirable, one electro-magnet, with an armature and retractile spring, may be used with exactly the same results; but in that event the pulsations will not require to be of opposite polarity.

The unisoning is effected as follows: As the wheel a' is revolved, the lever n , swinging at m , and provided with a friction-pad, p , which bears on the surface of a' , is carried upward until the pin o in the lever n comes in contact with the pin p^3 in the shaft a'' , when the type-wheel is arrested at unison with the transmitting apparatus. The type-wheel is released by a projecting arm, q , on the rock-shaft k striking against the lever n at each revolution of the shaft b''' , which depresses the opposite end of n , and releases the same from the pin p' .

I am well aware that the employment of mechanical powers in printing-telegraph instruments, to effect the printing, is not new, and I make no claim to the same.

I am also well aware that printing by momentum is not new, as the same was accomplished by M. G. Farmer as early as 1856 or 1858, and I make no claim thereto.

I am also well aware that effecting an automatic unisoning is not new, the same being shown in English Patent No. 2,373, of 1858, in which the type-wheel, after having been arrested by the movement of the same, is released by the action of the mechanically-printing mechanism. In this apparatus, however, there is no step-by-step movement of the type-wheel, and the printing mechanism is controlled by an electro-magnet.

I am also well aware that a printing-telegraph instrument has been constructed in which the type-wheel is rigidly secured to its shaft, and controlled by an escapement or step-by-step motion, in combination with a

unison-stop that is disconnected by the printing mechanism, as shown in the Patent No. 105,060, July 5, 1870, reissued May 18, 1875, No. 6,434. In this invention the printing is effected by the direct action of an electro-magnet actuating an armature-lever, to which I make no claim.

I am also aware that a type-wheel having letters, figures, and fractions upon its periphery is not new.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a printing-telegraph instrument, the combination of a type-wheel, an electro-magnetic escapement, a mechanical power to effect the printing, and a unison device, when the movement of the type-wheel, the unisoning of the same, and the printing mechanism are controlled by the electro-magnetic escapement.

2. In a printing-telegraph instrument, the printing device J H k, cam or eccentric i, dog F, and gearing for operating the same, in combination with the lever D, the vibrating arm

f, or equivalent, a type-wheel, and its actuating-gearing, substantially as set forth.

3. In a printing-telegraph instrument, a type-wheel and its operating-gearing, an electro-magnetic escapement, and printing devices, controlled by the electro-magnetic escapement, in combination with a unisoning mechanism.

4. The unison mechanism *a'' n p o p³ q*, substantially as shown.

5. The improved type-wheel, constructed with letters and fractions of equal length upon the same, and figures of a different length than the letters or fractions, as and for the purpose set forth.

In testimony that I claim the foregoing I have hereunto set my hand in the presence of the subscribing witnesses.

CHAS. A. RANDALL.

Witnesses:

JAS. H. MATTHAEI,
THOS. J. FARRELL.