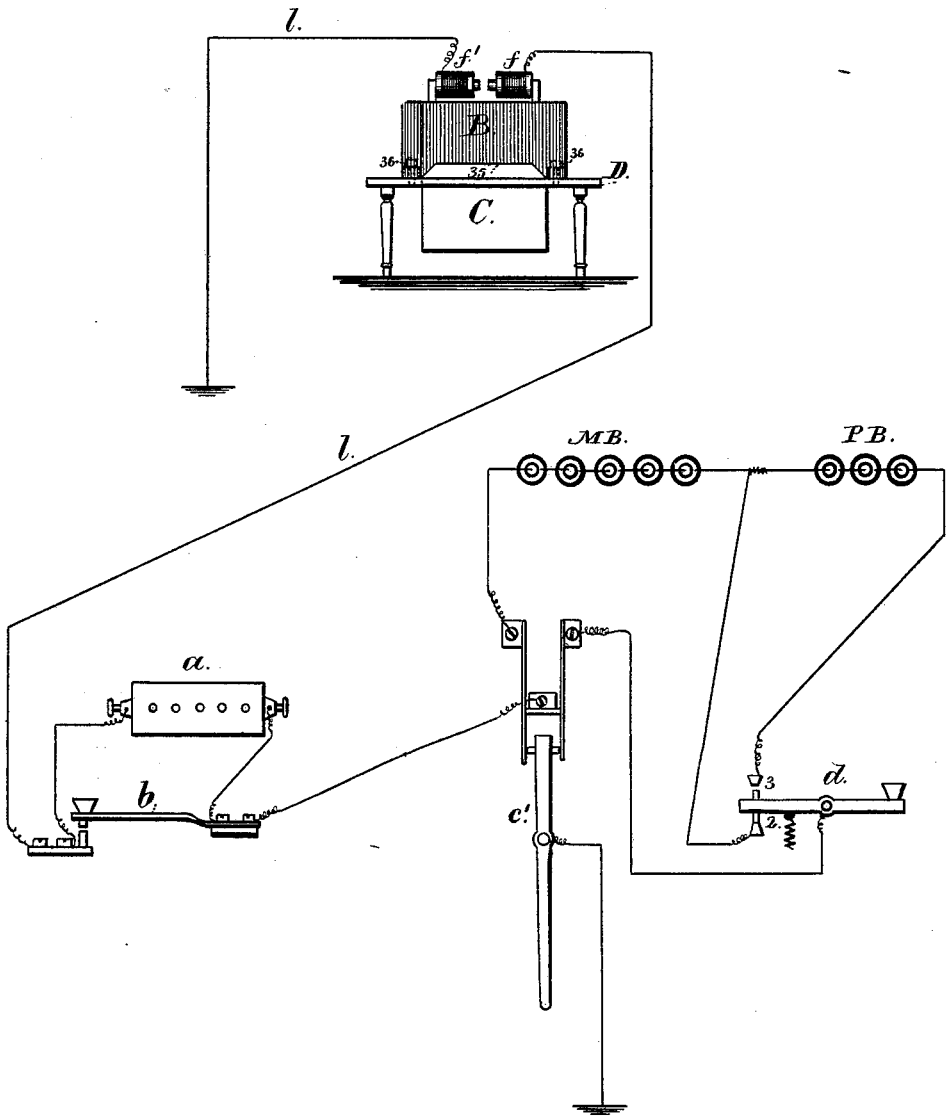
2 Sheets—Sheet 1.

H. VAN HOEVENBERGH.

Printing-Telegraph.

No. 204,516. Patented June 4, 1878.

Fig. 1.



Witnesses

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2 Sheets—Sheet 2.

H. VAN HOEVENBERGH.

Printing-Telegraph.

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Fig. 2.

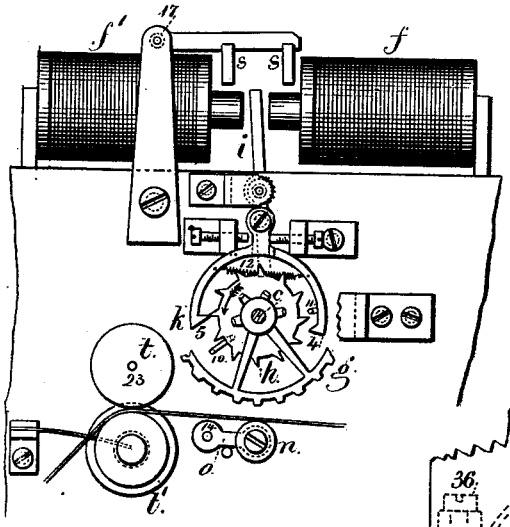


Fig. 3.

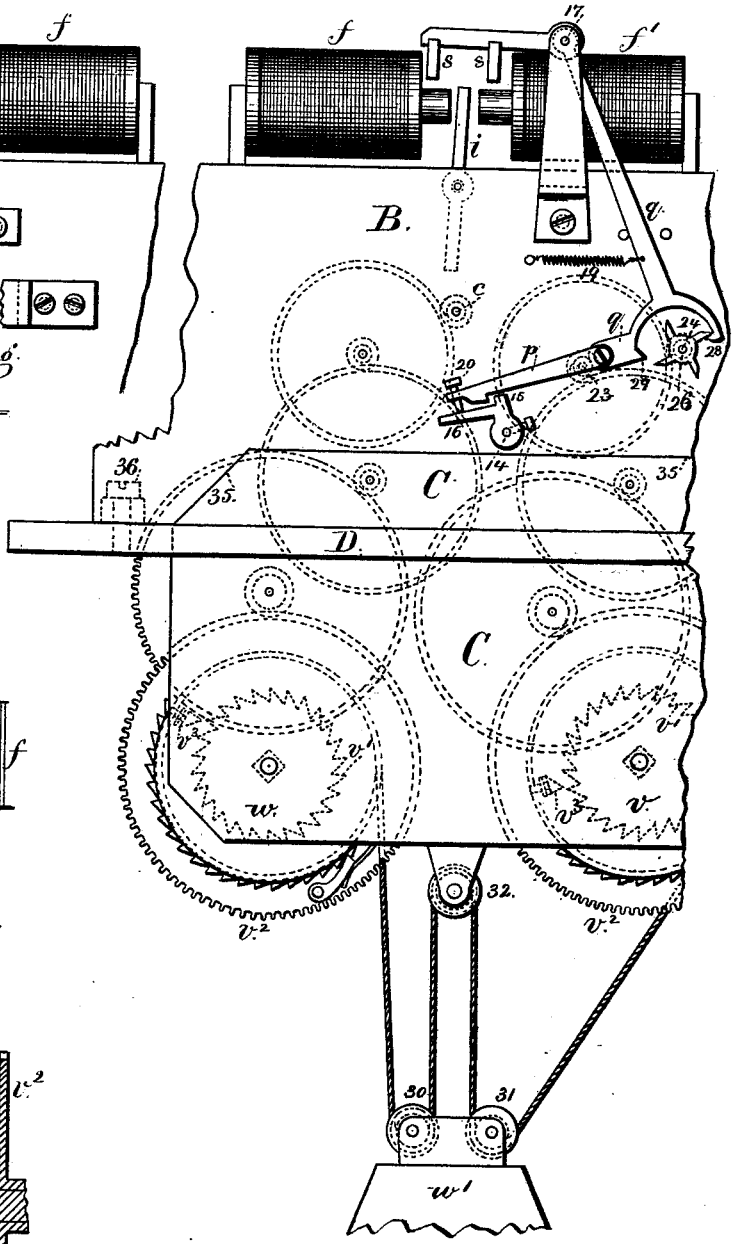


Fig. 4.

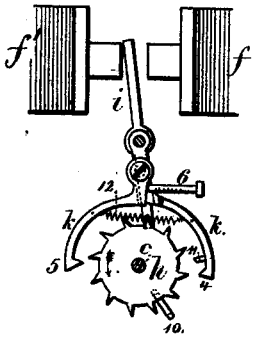
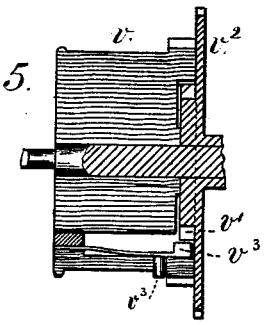


Fig. 5.



Witnesses

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UNITED STATES PATENT OFFICE.

HENRY VAN HOEVENBERGH, OF ELIZABETH, NEW JERSEY.

IMPROVEMENT IN PRINTING-TELEGRAPHS.

Specification forming part of Letters Patent No. **204,516**, dated June 4, 1878; application filed December 24, 1877.

To all whom it may concern:

Be it known that I, HENRY VAN HOEVENBERGH, of Elizabeth, in the county of Union and State of New Jersey, have invented an Improvement in Printing-Telegraphs, of which the following is a specification:

In this printing-telegraph instrument the escapement is expansible, and the unison is effected by an increase in electric tension on the line overcoming a spring and allowing a clock-movement to turn the type-wheel to unison. The printing is effected by a mechanical movement derived from increase of the magnetic force. The paper is fed by a clock-movement that is brought into action when the printing is effected.

The principal portions of the trains of gearing are separate from the type-wheel and printing devices, so that in case of any portions of the printing-instrument becoming disarranged the same can be removed without removing the trains of gearing, cord-barrels, or weights, and another instrument substituted, thus greatly facilitating repairs and adjustments.

In the line connections, illustrated by the diagram, Figure 1, there is included a rheostat, *a*, which intensifies the action of the current, rendering the instruments more prompt and reliable in operation; and the unison is effected by short-circuiting this resistance *a* by closing the key *b* in the shunt around this resistance, thus throwing upon the line the unresisted battery-power to operate in the instrument, as hereinafter described.

At the sending-station there is a transmitting-instrument of any suitable character. It is, however, to operate the printing-instruments in the line *l*, by changing the polarity of the current alternating the same + and — to the line.

The key or pole-changer *c'* alternately connects the copper or zinc of main battery M B to the earth and the opposite pole to the line. This key illustrates the pole-changer of any suitable transmitting-instrument.

The press-battery P B is not, in the main-line circuit, in the normal condition; but when the key *d* is moved, the connection 2 to M B is broken and the connection 3 closed, so that the additional battery-power is placed on the line to effect the printing, as hereinafter shown.

The two electro-magnets *f f'* of the printing-telegraph instrument have their cores facing each other, and between them is the polarized armature *i* of the escapement rock-shaft.

Fig. 2 is an elevation, with the type-wheel partially removed. Fig. 3 is an elevation of the feed-roller escapement, showing, also, by dotted lines the train of gearing. Fig. 4 is a detached view of the escapement; and Fig. 5 is a section of the cord-barrel stop.

The train of gearing to the shaft *c* of the type-wheel *g* is of ordinary character, and tends to revolve the same in the direction of the arrow. The escapement-wheel *h* is allowed to revolve gradually as the pallets 4 5 of the escapement *k* are moved by the rock-shaft and armature *i*, it being understood that this armature is polarized, and that the current is alternated in polarity. The type-wheel hence will be set as usual; but when the rheostat *a* is short-circuited by the key *b*, thereby allowing the whole force of main battery to act on the line, the magnet *f'* exerts increased power and carries the pallet 4 clear of the escapement-teeth at that side; and the hinged pallet 5 of the escapement having been arrested by the adjustable stop 6 before the magnetic energy is increased, that pallet 5 is also carried away from the escapement-teeth in consequence of the joint of the pallet above the stop 6 being carried farther toward that stop, so that the pallet itself is moved in the other direction away from the escapement-wheel. This liberates the escapement and allows the type-wheel to revolve instantly to unison, the stop-pin or hook 10 on the escapement-wheel being arrested by the pin 11 on the pallet 4.

As soon as the unison-key *b* is liberated and the shunt broken, the line-circuit passes through the resistance *a*, the power of the magnet *f'* is lessened and the spring 12 draws the pallets toward each other to their normal position, and the type-wheels can be set, as before. In this operation the polarity is not changed, and there is no risk of any false movement in the instrument.

The printing-pad *n* is upon an arm, *o*, and cross-shaft 14; and at the back of the instru-

ment are the toe-pieces 15 and 16; and *p* is a latch, hinged to the lever-arm *q* from the rock-shaft 17, and *s s* are armatures adjacent to the sides of the cores of the electro-magnets *f* and *f'*.

The tension of the spring 19 is such that the armatures *s s* are not moved until the press-lever *d* throws in the increased battery-power. When this occurs the latch *p* acts against the toe 15 and moves the same and the rock-shaft 14, and, by the arm *o*, gives a pressure of the paper upon the type. At this moment the toe 16, acting against the adjusting-screw 20, lifts the latch *p* and disengages it from the toe 15, so that the armatures *s*, lever *q*, and latch *p* may move still farther. By this means the printing is effected by pressure, and the power being disconnected the pressure falls away, even though the magnetism may still be operative on the armature and the paper is freed from the type-wheel.

The paper is fed by the clock-work. The roller *t* is upon the arbor 23 of the train of gearing from the barrel *v*, and the paper is pressed to this roller by the roller *t'* upon a spring-arm.

The arbor 23 is geared to the arbor 24, and this latter has at the back end the escapement-wheel 26, and upon the lever *q* are the escapement-pallets 28 29. As the lever *q* is moved, as aforesaid, the pallet 29 comes above the tooth of the escapement-wheel 26 before the tooth on the other side is separated from the pallet 28. Hence there is but a slight motion of the paper as the printing is performed; but as the armature and lever are brought back to their normal position the pallet 29, clearing the tooth of the escapement-wheel, allows the same to turn, and the pallet 28 arrests the movement.

The parts are proportioned so that the paper will be fed a proper distance each progressive movement of the escapement-wheel 26.

The trains of gearing receive motion from the barrels *v w*, and I am enabled to use one weight, *w'*, by employing a pulley on that weight and a cord passing from one barrel to the other, the ends being attached to the respective barrels, so that the weight is raised by winding either barrel.

The weight can be twice as heavy as usual without increasing the winding-power. I have shown two pulleys, 30 31, on the weight, and a central pulley, 32, so that the weight has to be heavier and its vertical movement less.

With this arrangement one barrel may be wound too much, not having cord enough for the other barrel. I make use of a ratchet-wheel, v^1, fixed to the first wheel v^2 of each train of gearing, and insert a spring-dog, v^3, within each barrel, with the head passing through the cord portion of the barrel, near the end thereof, so that when the revolution of the barrel brings the spring-dog beneath the cord, the pressure of the latter forces the dog toward the teeth upon the ratchet-wheel, and the contact therewith prevents the barrel being wound any farther.

The frame-work or plates of the train of gearing are separated at the line 35, the upper part B carrying the magnets, the type-wheel, the printing mechanism, unison, and other parts of the instrument that are the most subject to injury or derangement; and the lower part C carries the barrels and heavier wheels of the train.

By this construction the upper part of the instrument can be removed by simply taking out the screws 36, (see Figs. 1 and 3,) leaving the weight and connections intact. This effects considerable saving in time, and allows of another upper portion of the instrument being substituted, and the defective instrument taken to the shop for cleaning, adjustment, or repairs.

It is to be understood that the instruments are to be made to gage, so as to be interchangeable. Stops or catches may be applied to the portions of the trains of gearing remaining upon the table D, so as to prevent the weight running down when the upper part of the instrument is removed.

When the instrument is charged for effecting the unison, the polarized armature is drawn into contact with the cores of its electro-magnet, and thereby the polarity is increased and the risk of the armature becoming demagnetized is avoided. It is found in practice that the armature is liable to become demagnetized; but by contact with the cores, as aforesaid, I find that the magnetism is promoted; and, as the instruments are often brought to unison, the polarity of the armature is constantly renewed.

If an increase of battery-power alone is made use of to effect the printing, the magnets do not discharge to their normal condition with sufficient rapidity, and errors sometimes arise from this cause in printing-telegraphs. By my arrangement of circuits, the key *d* that brings the battery P B into circuit is not a circuit-preserving key; but the circuit of the main battery is broken in bringing in and throwing out the press-battery. Hence there is sufficient cessation of battery-power to reduce the magnetism of the electro-magnets to the proper condition.

I am aware that in Letters Patent No. 180,700 a spring-escapement is made use of to regulate the movement of the type-wheel, and the escapement-wheel is liberated to allow it to be turned by the clock-work to bring the type-wheel to unison; but a separate electro-magnet was required to operate the yielding pallet. In my instrument the additional magnet is dispensed with, and the instrument is rendered more simple and reliable.

I claim as my invention—

1. In a printing-telegraph driven by a train of gearing, the side plates or frames made in two parts, the upper part being removable, and carrying the magnets, type-wheel, and print-

ing mechanism, substantially as and for the purposes set forth.

2. In a printing-telegraph instrument, the combination, with the two trains of gearing, the type-wheel, and impression and paper-feeding devices, of one actuating cord and weight, acting upon the respective barrels of the trains, and a spring-dog and ratchet to determine the amount of cord wound upon each barrel, substantially as set forth.

3. In combination with the type-wheel, escapement-wheel, and pallets, the stop 6, that arrests the hinged pallet 5, and the electro-magnet f', and armature, the parts being arranged, substantially as specified, to liberate the escapement from the pallets by an increase of power in the electro-magnet f', substantially as set forth.

4. In combination with the printing-telegraph instrument in which the printing is effected by an increase of electric energy, a rheostat or resistance in the line, a key and shunt to short-circuit the said resistance, and a unison mechanism in the printing-instrument operated by a further increase of electric energy, substantially as set forth.

5. In a printing-telegraph instrument, the combination, with the electro-magnets and lateral armature, of a lever, q, latch p, and toes 15 16 to actuate the printing-pad, substantially as set forth.

Signed by me this 19th day of December, A. D. 1877.

HENRY VAN HOEVENBERGH.

Witnesses:
HAROLD SERRELL,
GEO. T. PINCKNEY.