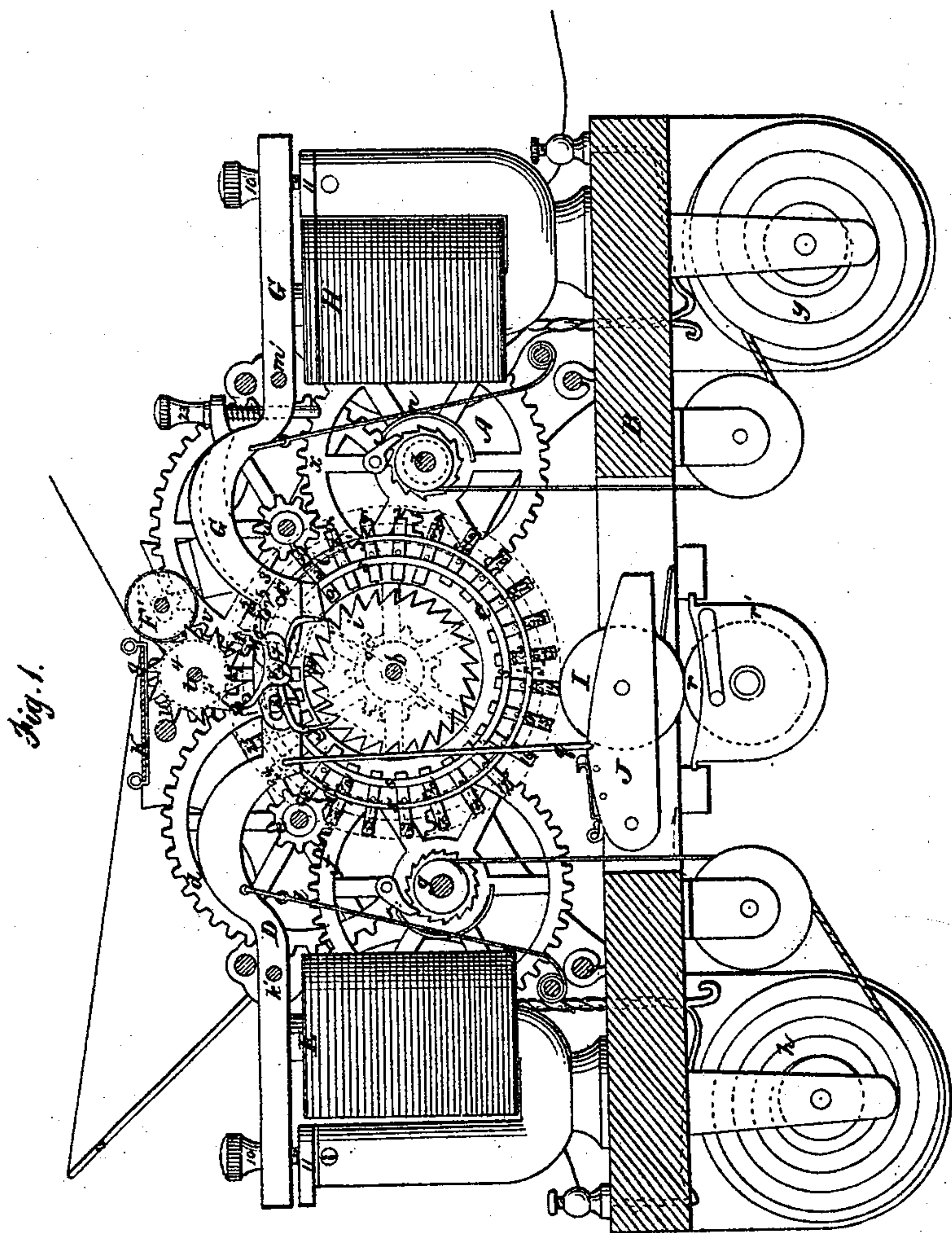


No. 14,759.

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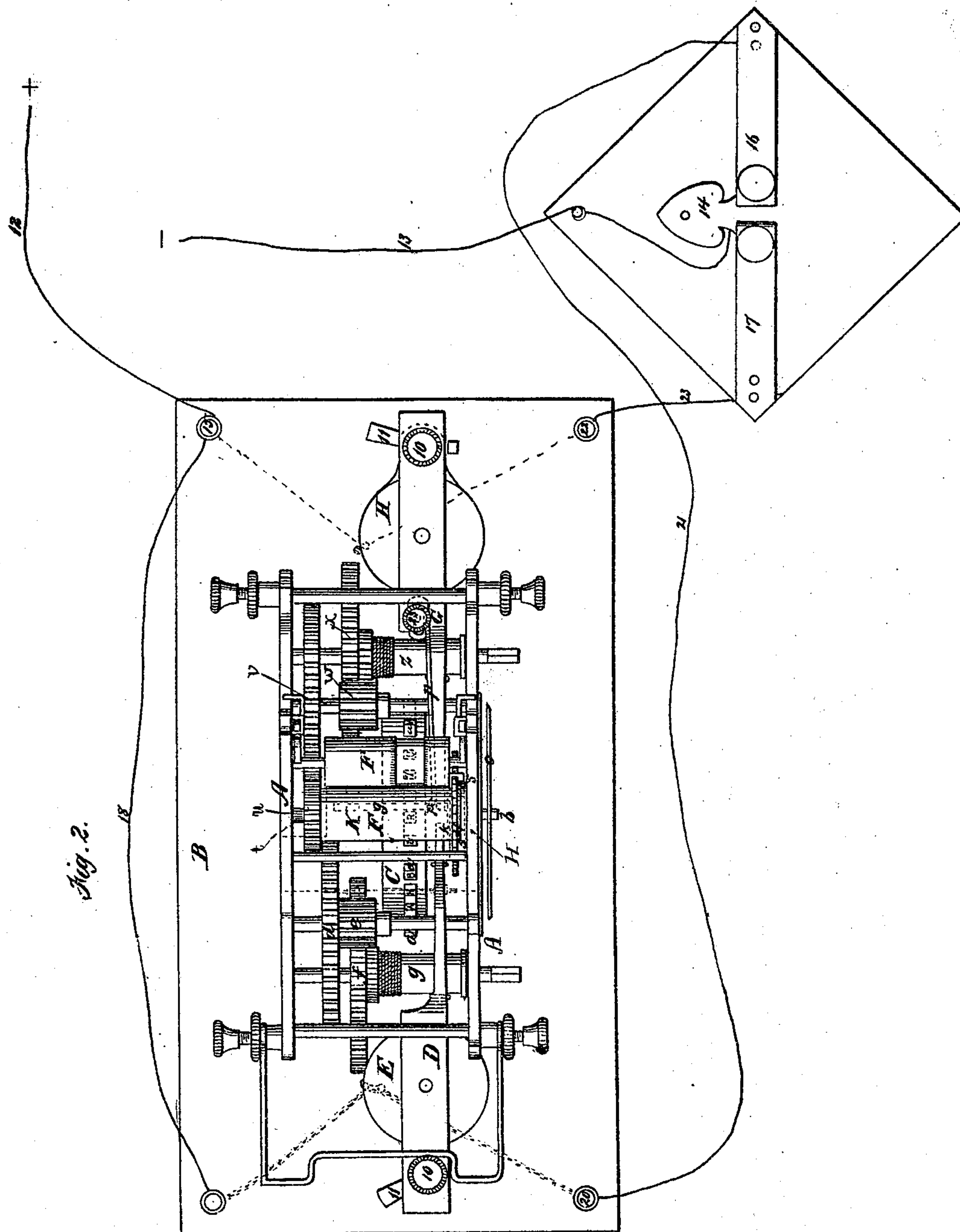
H. N. BAKER.
ELECTROMAGNETIC PRINTING TELEGRAPH.

2 SHEETS—SHEET 1.



H. N. BAKER.
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2 SHEETS—SHEET 2.



UNITED STATES PATENT OFFICE.

HENRY N. BAKER, OF UNION, NEW YORK.

IMPROVEMENT IN ELECTRO-MAGNETIC PRINTING-TELEGRAPHS.

Specification forming part of Letters Patent No. 14,759, dated April 29, 1856.

To all whom it may concern:

Be it known that I, HENRY N. BAKER, of Union, in the county of Broome and State of New York, have invented a new and Improved Electro-Magnetic Telegraph; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

This telegraph differs from other electro-magnetic printing-telegraphs principally in the apparatus which is employed for receiving and printing communications.

The accompanying drawings illustrate my invention, representing one of the instruments, Figure 1 being a front view, with the front part of the framing taken away to show the working parts, and Fig. 2 being a top view of the same, showing the circuit-connection.

Similar letters of reference indicate corresponding parts in both figures.

A A are two brass standards attached to a wooden base, B, to form a framing to support the principal working parts of the instrument. In Fig. 1, the front standard, A, is omitted and the base B shown in section. C is a type-wheel with a double rim, containing a complete alphabet and such other signs as may be thought proper in movable types, *a a*, which are fitted to the wheel at equal distances apart, so as to be capable of a movement radially thereto, said movement being limited both inward and outward by pins 3 3, inserted in the types between the rims *s s'* of the type-wheel. The axle *b* of this type-wheel is operated by a clock-movement or train of gearing, *c d e f*, the motive power of which may be a spring or weight, but in the drawing is supposed to be a spring attached to the fusee *h* and acting on the gearing through cords running to a barrel, *g*, on the axle of the wheel *f*. The axle *b* also carries the escapement-wheel *i* of the clock-movement, the said wheel having a number of teeth equal to the number of types in the type-wheel, and having applied to it a crutch, (or, perhaps, more properly speaking, a double detent,) *j j'*, which works on a fixed center, *j''*. This crutch is connected by a pin, *k*, working in a slot, with one arm of a lever, D, of the first order, which hangs on a fixed center, *k'*, and whose opposite arm forms the armature of

a helical magnet, E, which is in an electro-magnetic circuit. This lever has a spring, *l*, applied to the arm which connects with the clutch, to withdraw the armature from the magnet when the circuit is open. This spring brings the pulley *j* of the crutch into the escapement-wheel and stops it; but when the circuit is closed the power of this spring is overcome and the armature drawn toward the magnet, giving the lever a movement which draws out the pallet *j* of the crutch and allows the escapement to move till arrested by the pallet *j'*. The opening of the circuit again causes the spring to move the lever and withdraw the pallet *j'*, and causes the pallet *j* to fall into the next notch of the wheel to that which is last left, the escapement-wheel thus being allowed to move the distance of one tooth and the type-wheel the distance from one type to another every time the circuit through the magnet E is opened and closed.

On the front standard, A, is a graduated dial, which is shown in red outline in Fig. 1, having engraved or otherwise marked upon it the same letters, signs, &c., as the types *a a* of the type-wheel, the said letters and signs being similarly arranged; and to the axle *b* of the type-wheel is attached a pointer, *o*, which moves with the type-wheel and always points to a letter or sign on the said dial corresponding to the letter or sign of that type *a* which is at any time opposite to a roller, F, which is one of a pair of rollers, F F', employed to feed the strip of paper (represented by a blue outline in Fig. 1) on which the printing is to be performed, the said roller F also serving to confine the paper to enable it to receive the impression of the types.

The portion of the instrument above described does not effect the printing, but simply moves the type-wheel to bring any desired letter opposite the roller F.

In order to give an impression, the type has to be lifted up, as when it arrives opposite the roller its face is some distance therefrom, its weight causing it to fall in toward the center of the wheel.

The lifting of the type to give the impression is performed by an armature-lever, G, which is arranged in relation to a helical magnet, H, on the opposite side of the instrument;

in a similar manner to the arrangement of the lever D relatively to the magnet E, the magnet H being placed in another circuit and the lever being hung on a center, m' , and having a spring, n , applied to throw off the armature when the circuit is open. That extremity of this lever G which is on the opposite side of the center m' to the armature has a curved metal tongue, p , attached to it, which stands directly below any type which may happen to be under the roller F, and when the circuit through the magnet H is closed the armature is drawn down and the tongue p lifts up the type against the paper and makes the impression, the type falling again by its own weight as soon as the circuit is open and the armature raised by the spring n . The point of the tongue p is adjustable relatively to the lever by a screw, 24, which, as the tongue is pivoted to the lever at 25, will raise the point higher or lower.

The inking of the types is performed by an inking-roller, I, as they are severally brought to their lowest position by the revolution of the type-wheel. This roller is hung on a swinging frame, J, and is raised up to ink the type every time the circuit through the magnet E is closed by the connection of its frame by means of a rod, q , to the lever D, and when the circuit is broken it falls into contact with a doctor, r , in an ink-trough, r' , below the base B. The inking-roller is always in contact with some of the types, and receives the rotary motion which is necessary to supply it with ink from the doctor by the friction of the types as they pass it; but as the pressure of the types against it is only what is due to their weight until the roller is raised to bring the pin 3 of the type immediately over its center to a bearing against the inner rim, s , of the type-wheel, the force of the contact between the inking-roller and face of the type is not sufficient to ink the type until the pin 3 finds a bearing.

The movement of the rollers F F' to feed the paper or give it the movement necessary to produce proper spaces between the successive impressions of the type is effected by a clock-movement consisting of a train of wheels, $u v w x$, the motive power of which may be a spring or weight, but in the drawing is supposed to be a spring attached to the fusee y and acting on the gearing through cords running to a barrel, z , on the axle of the wheel x . The axle t of the roller F carries the escapement-wheel 4 of this clock-movement, the said escapement-wheel having applied to it a crutch or double detent, 5 6, which works on a fixed pivot, 8, and is connected by a pin, 7, working in a slot (see Fig. 1) with the lever G. This crutch is operated by the lever G as the circuit through the magnet H is opened and closed in a similar manner to that in which the crutch $j j'$ is operated upon by the opening and closing of the circuit through the magnet E, and the roller F is allowed to move just far

enough to carry the paper the proper distance to give the required space between the impressions of the types. The roller F' is kept in contact with the paper by springs, and the paper passing through a slot, q , in the guide-plate K is kept tight to the roller by the friction in the slot. The guide-plate K, with its slot q , is shown in red outline in Fig. 2, to avoid confusion of parts.

The range of the levers D and G is regulated by screws 10 10, screwed into the magnets and nuts 11 11, fitted thereto.

I will now proceed to explain the operation of the instrument, and in order to do this will first suppose the instrument to be placed in a merely local circuit, as is shown in Fig. 2. The explanation of its operation in this manner will enable the operation of the instruments on a telegraph-line to be readily understood.

12 represents a wire from the positive pole of a battery, and 13 a wire from the negative pole, the latter connecting with a metal plate, 14, secured to a wooden base, which is provided with two spring-keys, 16 17, and the former connecting with a screw, 15, on the base of the telegraph-instrument. From the screw 15 a wire, 18, goes to the screw 19, to which and to the screw 20 the helix of the magnet E is connected, and from the screw 20 a wire, 21, goes to the key 16. One end of the helix of the magnet H also connects with the screw 15, and the other with the screw 22, from which a wire, 23, goes to the key 17. To distinguish the branches of the circuit leading to the keys 16 and 17, the former is tinted red and the latter blue. By depressing the key 16 to bring its point in contact with the plate 14, and leaving the other key 17 out of contact, the circuit is caused to pass through the red wire and the helix of the type-wheel magnet E. By playing on the key with the finger to open and close the circuit the required number of times the type-wheel may be brought to such a position as to present any desired letter opposite the roller F. Then, by allowing the finger-key 16 to rise and depressing the key 17, the circuit passes through the blue wire and the printing and feeding magnet H, causing the paper to move along, and the type opposite the roller F to be lifted by the curved tongue p , and pressed against the paper under the said roller with sufficient force to produce the impression. By thus playing the key 16 and moving the type-wheel to bring the proper letters in succession opposite to the roller F, and then depressing the key 17, words are printed. To repeat two letters in the same word the key 17 must be depressed twice without closing the key 16. To make the spaces between the words the key 16 is first depressed to close the circuit through the type-wheel magnet E, and before the finger is taken off to allow the circuit to break the key 17 is depressed to close the circuit through the printing and feeding magnet H. The circuit through the type-wheel

magnet not having been opened when the movement of the lever *G* takes place, and the type-wheel consequently only having moved half the distance necessary to bring a new type between the tongue *p* of the lever and the roller *F*, causes the tongue to fall into a space between two types, and thus renders it inoperative, but yet allows the movement of the roller *F* to take place to feed the paper. By keeping the key 16 closed and closing and opening the key a space of any desired length may be produced; but for the spaces to separate the words the key 16 needs only to be kept closed during one closing and opening movement of the key 17, after which it may be played as before to move the type-wheel.

One of these instruments is, of course, employed at every station of a telegraph-line, and two separate wires are used running through all the stations, one communicating with the type-wheel magnets of all the instruments and the other with the printing and feeding magnets of all the instruments. I propose to employ a double-relay or receiving-magnet at each station, and to attach the two keys to operate the instrument to the two main wires. Before commencing operations it is necessary for the operator who is about to send a communication to see that the pointer *o* of his instrument corresponds with the type-wheel of the instrument at the station he is sending to. If it is arranged that the same position of the type-wheel shall always be adopted before com-

mencing operations the whole of the instruments are sure to be in order. The sending operator, spelling off his words by the aid of the pointer *b* and the dial, operates the two keys, as before described, and the printing of the communication may be performed at any or all of the stations on the line, as may be desired.

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

The arrangement of the type-wheel, the escapement-wheel attached thereto, the arrangement of the crutch or detent acting upon the said escapement-wheel relatively to the armature of the type-wheel magnet, and the arrangement of the whole relatively to the tongue *p*, by which the types are lifted up into contact with the paper, all in such a manner that when the circuit is closed through the type-wheel magnet the tongue *p* will be opposite a space between two letters, and when during the closing of said circuit the circuit by which the said tongue and the feed-rollers are acted upon is closed, the tongue will be inoperative, and the feed-rollers allowed to act without any impression being given, thereby producing a space between the printed letters or words, substantially as herein set forth.

HENRY N. BAKER.

Witnesses:

M. C. ROCKWELL,
JAMES PICKENS.