Sheet 1 - 2 Sheets.

C. Little.

Perforating Paper for Telegraphing.

No. 96331 Patented Nov. 2. 1869.

Fig: 1.

Plan

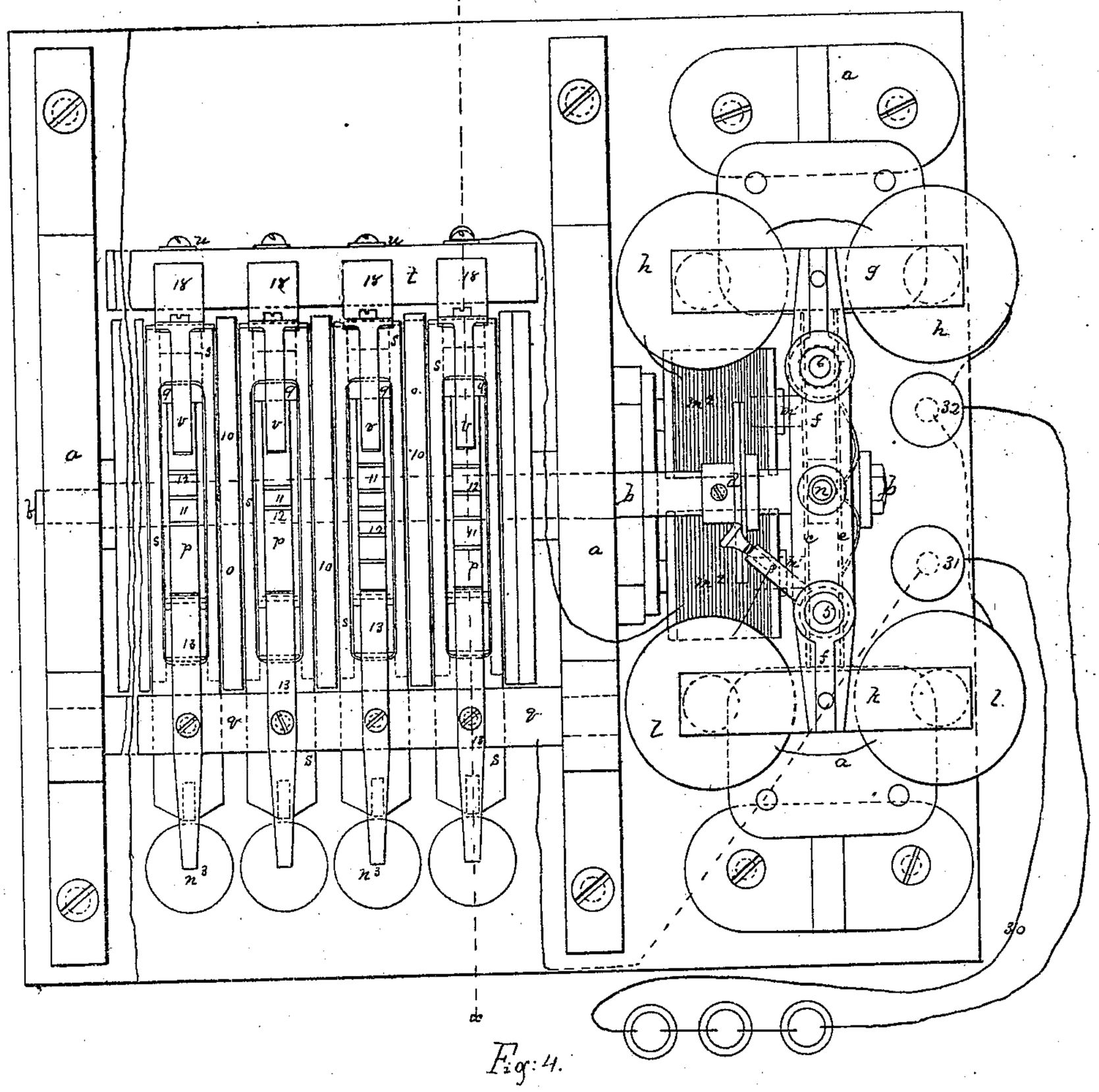
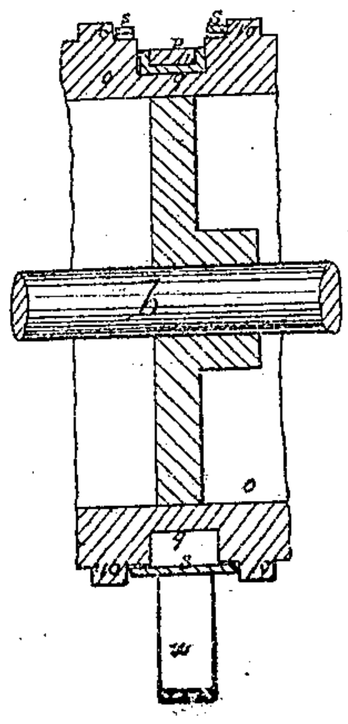


Fig: 4.



Witnesses
Chas. H. Smith.
Geo. D. Walker.

Inventor
George Little

G. Little

Sheet 2_2 Sheets.

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Fig: 2.
Elevation

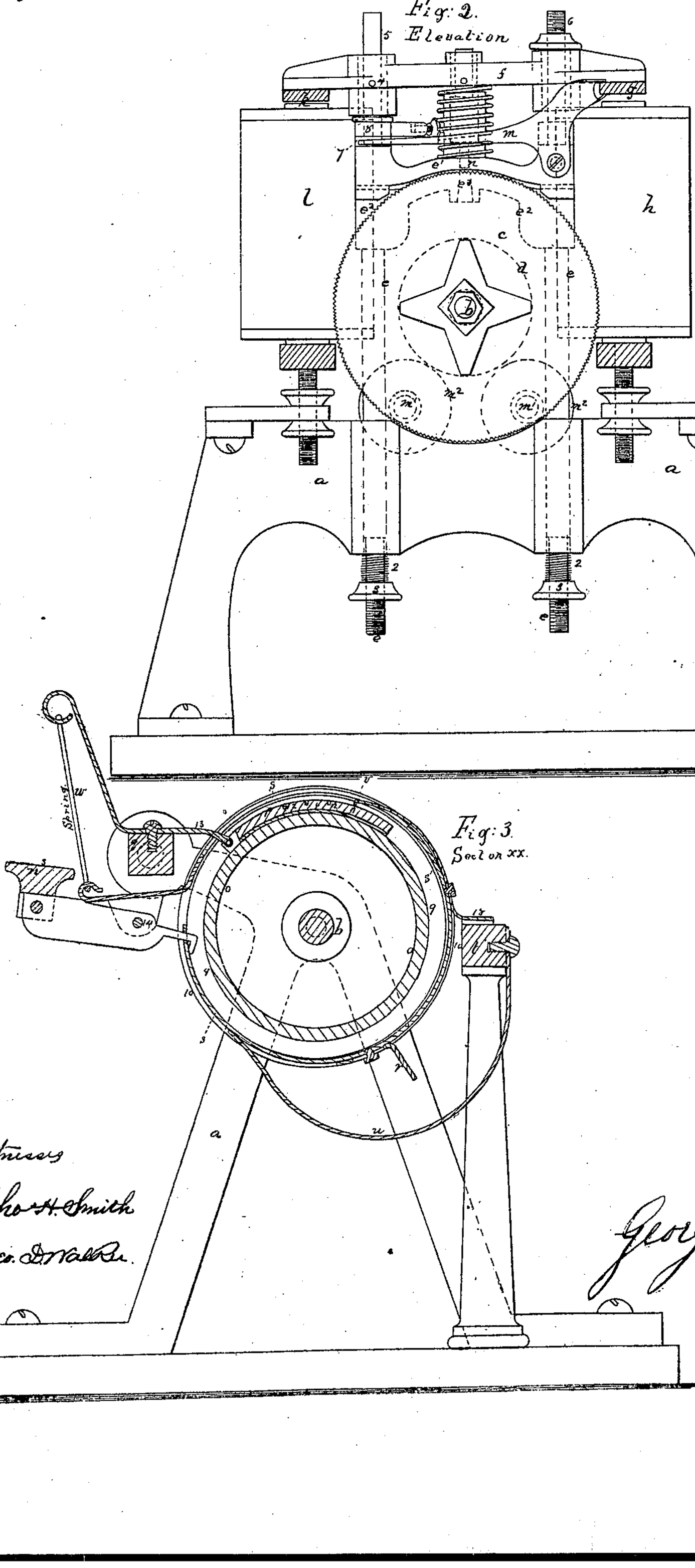

Fig: 3.
Section xx.

Witnesses

Chas. H. Smith

Jos. D. Walker.

Inventor

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UNITED STATES PATENT OFFICE.

GEORGE LITTLE, OF RUTHERFORD PARK, NEW JERSEY.

IMPROVEMENT IN APPARATUS FOR PERFORATING PAPER FOR TELEGRAPHING.

Specification forming part of Letters Patent No. **96,331**, dated November 2, 1869.

To all whom it may concern:

Be it known that I, GEORGE LITTLE, of Rutherford Park, in the county of Bergen and State of New Jersey, have invented and made a new and useful Improvement in Telegraphic Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the said invention, reference being had to the annexed drawing, making part of this specification, wherein—

Figure 1 is a plan, showing the magnets and a portion of the range of keys. Fig. 2 is an elevation of the feeding and punching mechanism, portions of the magnets being removed. Fig. 3 is a section at the line *x x*, Fig. 1; and Fig. 4 is a section, longitudinally, of the main cylinder, showing the parts thereof for one key.

Similar letters denote the same parts.

This invention is for perforating or embossing telegraphic communications in a strip of paper previous to and to be employed in transmitting said communication. I make use of an insulated circuit-closer, over which a spring is caused to move by the action of a key, that also turns the cylinder to give motion to the paper. The insulated circuit-closer is so formed, with metal bars and intervening non-conducting material, that the proper pulsations of electricity are given.

The electricity acts on one magnet to give the power necessary for moving the perforating-punch by means of a lever, and at the same time a second magnet clamps the feed to hold that still while the paper is being perforated. The movement of the armature and lever for punching the paper simultaneously operates a circuit-changer, that throws the currents from the first and second magnets through a third magnet, that acts to raise the punch, so that it cannot remain through the paper, and this last action again changes the switch so that another pulsation cannot pass through the third magnet until the electricity again passes through the first magnet. Thus, the rapidity of the perforating operation is only limited by the speed of the electrical current and the inertia of the parts.

In the drawing, *a* is the frame of the machine carrying the shaft *b*, on the end of which are the feeding-disks *c*, that are turned with the said shaft *b*, by spring friction-plates *d*. The vertical rods *e*, passing through the frame *a*, carry the cross-piece e^1, that presses the paper to the disks *c* by the action of the springs 2 2, the force being adjusted by the nuts 3. Openings are formed through the side portions of the cross-piece e^1, and the paper passes through them and between the cross-piece e^1 and the lower portion e^2, that carries, in the middle, the die e^3, for the punch. Above the cross-piece e^1 are the studs 5 and 6, one of which receives the fulcrum-pin 4 of the lever *f*; the other guides said lever, and, by a nut, limits the movement of said lever; and at one end of this lever is the armature *g* of the magnet *h*, and at the other end the armature *k* of the magnet *l*; and this lever *f* actuates the punch *n*, shown by dotted lines in Fig. 2. The die e^3 of the punch is supported by the portion e^2. The magnet *h* causes the punch *n* to perforate the paper, and it also moves the lever circuit-changer *m*, the end thereof moving from the non-conducting block 7 to the insulated conducting-block 8. This movement directs the electrical current from the frame of the machine through the magnet *l*, in order that the said magnet *l* may raise the punch instantly out of the paper. The pulsations of electricity are given through the key or mechanism hereafter described, and at the time the magnet *h* is changed, and the paper is being punched, the feed of the paper is momentarily arrested by the pins m^1 that are in the poles of the magnet m^2, and, being magnetized at the same time as the magnet *h*, attach themselves to the sides of the disk *c*, holding them, but the frictional connection *d* to the shaft *b* allows that shaft to continue to revolve. The means for giving the electrical pulsations consist of a range of keys, n^3 n^3, the same being extended to any desired length, and operating in connection with the shaft *b*. The arrangement of letters, figures, or signs, on the finger-keys, and the groups of conductors and non-conductors, to produce the proper pulsations and intervals for the various telegraphic characters, being of any usual or desired character, do not require to be described. I will proceed to describe one of the finger-keys, they being alike, except as to the arrangement of the alternate conducting and non-conducting surfaces and spaces. The cylinder *o*, on the shaft *b*, is

made of non-conducting material, having grooves 9 therein, between the ribs 10. The circuit-closer *p* is in the form of a segmental block occupying the groove 9, and formed with non-conducting portions 11 between the bars 12, that are united to the metal body of said circuit-closer, and, by the metal arm 13, connected with the bar *q*, which forms part of the frame of the machine. In shallow grooves in the cylinder *o*, at the sides of the groove 9, is a clamping-band, *s*, that is open on the upper side so as to give access freely to the circuit-closer *p*. This band *s* has, near one end, ears, receiving the fulcrum 14 of the key n^3, the end of which passes into the other end of the band *s*, so that the pressure on the finger-key n^3 first tightens the band *s*, clamping the cylinder *o*, and causing it to be rotated by the depression of the finger-key until arrested by a properly-placed stop, *r*, taking against the bar *t*, that is insulated from the rest of the frame of the machine, but put into connection with the band *s* by the flexible metallic strap *u*. The band *s* carries a spring-finger, *v*, that runs over the circuit-closer as the key n^3 and band *s* are moved, and causes the circuit to be opened and closed. And I remark that the shaft *b*, being turned with the cylinder *o*, and feeding the paper between the respective pulsations the distance between the end of the finger *v* and the first bar 12, determines the space that the paper is moved before being perforated. When the finger-key is released the contractile rubber-spring *w* draws the band *s* back to its normal position. The stop 18 arrests the further movement. The band *s* expands sufficiently to lift the end of the finger *v* clear of the circuit-closer, upon the return movement. The wire 30 leads from one pole of the battery to the binding-screw 31. The other screw, 32, is connected with the opposite pole of the battery. From 32 is a wire connecting with the magnet *h*, and a branch to the magnet *l*. From 31 a wire connects with the bar *q* and frame of the machine, so that pulsations of electricity can pass from any part of the frame *a* or *q*. When a finger-key is operated, such pulsations pass along the arm 13, circuit-closer *p*, and spring *v*, to the band *s*, (insulated by the cylinder *o*,) by the stop *r*, to the insulated bar *t*, thence through the magnets m^2 and *h* to the binding-screw 32. The pulsation of electricity only passing when one of the bars, 12, is in contact with the spring *v*, this circuit is therefore instantly broken by the movement; but the movement of the armature *g* and lever *f* has caused the punch to perforate the paper, and also thrown the lever *m* up, with its end in contact with the insulated connection 8, to the magnet *l*, so that the electricity, passing from the frame *a*, through *m*, 8, and *l*, back to the screw 32, causes the magnet *l* to draw down the armature *k*, lifting the punch and restoring the parts to their normal positions, and breaking the circuit through *l*, by bringing the lever *m* into the position shown in Fig. 2. The direction of the current may be changed by reversing the battery-wires, the operation being the same. The punch might be withdrawn by a spring or permanent magnet, but I prefer the electro-magnet shown.

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

1. The circuit-closer *p* in the groove of the cylinder *o*, in combination with the band *s*, key n^3, and finger *v*, substantially as and for the purposes set forth.

2. The feeding-disks *c* on the shaft *b* of the cylinder *o*, in combination with the frictional connection *d* and holding-magnet m^2, for moving the paper by the direct action of the cylinder *o*, and arresting the movement of the paper when the punch is acting, substantially as and for the purposes set forth.

3. The magnet *l*, in combination with the magnet *h*, lever *f*, punch *n*, and circuit-changer *m*, for perforating the paper, and then drawing back the punch by magnetism, substantially as set forth.

4. The circuit-changer *m*, in combination with the magnets *h* and *l* and lever *f*, to direct the electric current, substantially as set forth.

In witness whereof I have hereunto set my signature this 7th day of April, 1869.

GEORGE LITTLE.

Witnesses:

CHAS. H. SMITH,

GEO. T. PINCKNEY.