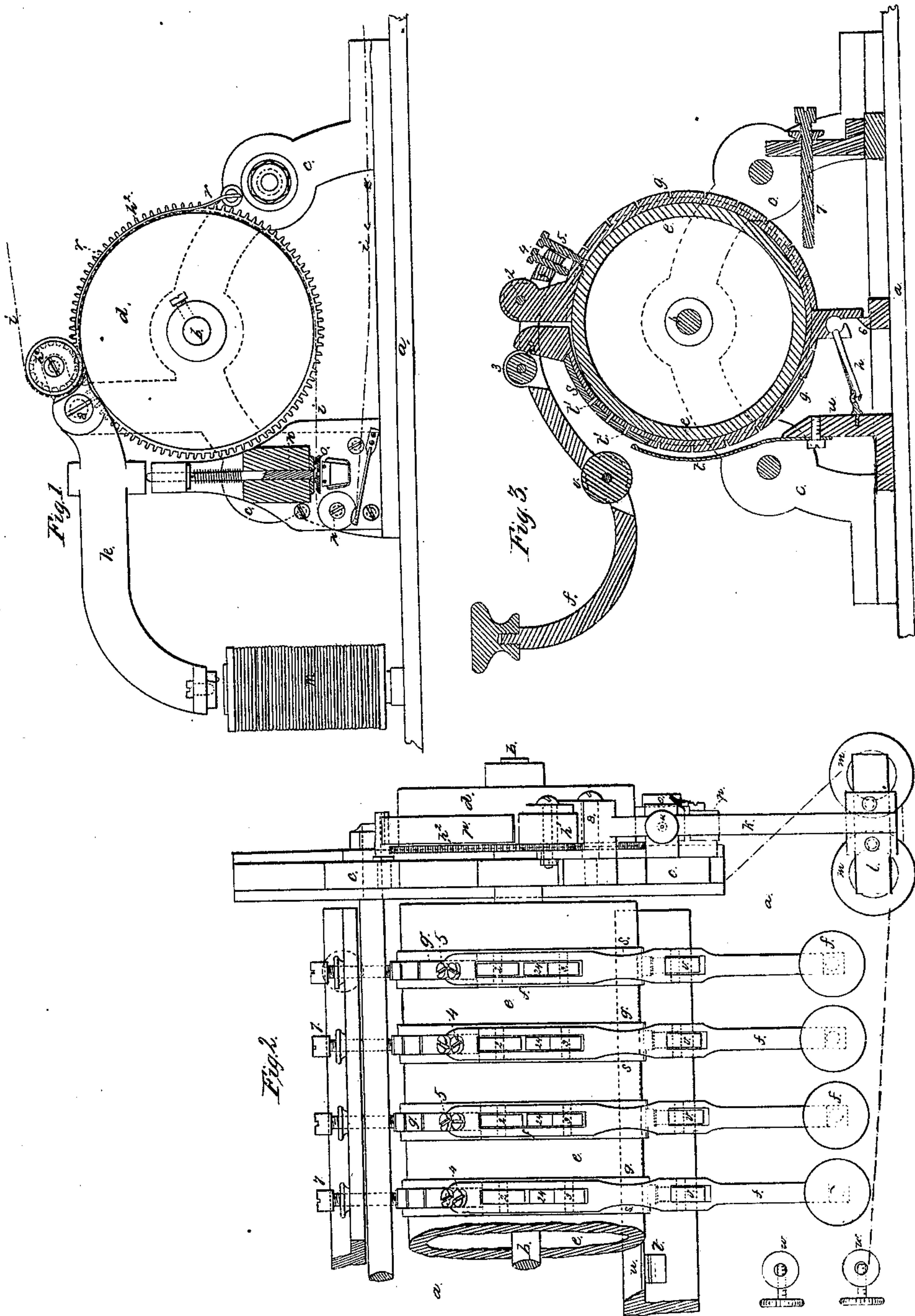


G. LITTLE.  
 APPARATUS FOR PERFORATING PAPER FOR AUTOMATIC TRANSMITTERS.  
 No. 91,241.      Patented June 15, 1869.



Witnesses.  
 Geo. D. Vanden  
 Chas. H. Smith

Invention  
 George Little  
 per L. W. Gerrell  
 atty.



# United States Patent Office.

GEORGE LITTLE, OF HUDSON CITY, NEW JERSEY, ASSIGNOR TO MARSHALL LEFFERTS, OF NEW YORK CITY, AND MARSHALL LEFFERTS ASSIGNOR TO HIMSELF AND GEORGE LITTLE.

Letters Patent No. 91,241, dated June 15, 1869.

## IMPROVEMENT IN APPARATUS FOR PERFORATING PAPER FOR AUTOMATIC TRANSMITTERS.

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

To all whom it may concern:

Be it known that I, GEORGE LITTLE, of Hudson city, in the county of Bergen, and State of New Jersey, have invented and made a certain new and useful Improvement in Means for Perforating or Embossing Paper for Telegraphic purposes; 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 an elevation at the end of the machine where the punch is located.

Figure 2 is a plan of the machine, showing a portion of the keys and cylinders; and

Figure 3 is a section through the clamping-ring and lever-key.

Similar marks of reference denote the same parts.

Machines have before been made for punching holes in or embossing strips of paper to be employed in transmitting telegraphic communications.

My invention relates to this class of machines, and consists—

First, in improved means for punching or embossing the paper by the action of magnetism.

Second, in means for giving pulsations of electricity to the magnet that actuates the punching-mechanism, so that said magnet may operate to produce the given perforations or groups of characters.

Third, in means for giving the necessary motion to the paper, to separate one letter or group of characters from another; and

Fourth, in means for stopping the motion of the paper while the perforation is being made.

In the drawing—

*a* represents a bed-plate or table, carrying the frames *c* and shaft *b*. These frames *c* may be any desired distance apart, so that the shaft *b* may be made longer or shorter, according to the number of clamping-rings and levers employed, one being provided for each letter or character to be produced in the machine.

At one end of the shaft *b* is the wheel *d*, that operates to move the paper, and upon the shaft *b* is a cylinder, *e*, or series of disks of metal, or other material, that receive mechanism for clamping and rotating them partially, so that the paper in contact with the wheel *d* may be properly moved for receiving the punctures or impressions forming the characters.

The levers or keys *f* are to be provided in numbers sufficient for the required number of characters. I will describe one, simply remarking that the others are made like it. The pins, however, that give the pulsations of electricity, as hereafter described, are varied in position and character according to the letter to be perforated or embossed.

The key *f* is jointed at 2 to the divided spring friction-ring or clamp *g*, and is provided with a roller, 3, that acts on the projection 24 of the ring *g*, to close the same sufficiently to cause the said ring to firmly grasp or clamp the disk or cylinder *e*, and turn the same when the lever or key *f* is depressed.

4 and 5 are screws that determine the amount of motion the key *f* has on the joint 2, so that only the necessary force will be applied to clamp and turn the cylinders *e* and shaft *b*.

The ring *g* is acted upon by the spring *h*, so as to draw it back to the normal position after each movement, by the depression of the key *f*, and 6 is a stop, against which the motion of the ring is arrested in one direction; and 7 is a screw-stop, that can be adjusted to regulate the extent of rotary motion that is given to the cylinder *e*, by the act of depressing the particular key or lever *f*.

As the paper is moved by the turning of the cylinder *e*, shaft *b*, and roller *d*, the amount necessary for receiving the perforations or impressions that form each character or letter, as hereafter shown, the screws 7 will be adjusted properly for the respective keys or levers *f*, according to the space required for the given letter or character.

The wheel *d* has a gear, *h*<sup>2</sup>, near one edge, acting on the roller *h*<sup>1</sup>, that is upon the armature lever *k*, having the screw 8 for its fulcrum.

*l* is the armature, and *m* an electro-magnet, that is charged in pulsations corresponding to the given character or letter to be punched or raised, as hereafter described; and *n* is a punch, that acts against a die, *o*, to perforate or raise the paper, by the action of the magnet drawing down the armature, and a spring around the punch *n* raises the same, and the lever *k* and armature *l*, when the electrical circuit is broken.

The strip of paper *i* passes around the guide-roller *p*, thence between the punch *n* and die *o* around the wheel *d*, and between that and the roller *h*<sup>1</sup>, and thence passes away to any suitable receptacle.

A spring, *r*, is employed to press the paper to the wheel *d*, but not sufficiently to cause any motion of the paper when the roller *h*<sup>1</sup> is raised at the time the punching of the paper is being performed, by the depression of the armature *l* and lever *k*; hence the operation of this part of the apparatus is, that when the wheel *d* is being turned, by the action of one of the levers or keys *f*, the paper is drawn along through between the die and punch the necessary distance, between the letters or the respective characters of the letters, and the moment the electricity is passed through the helix of the magnet, as hereafter described, the punch is actuated simultaneously with



the stopping of the motion of the paper, the roller *h'* being lifted by the lever *l* as the punch is depressed; hence the paper will not be torn against the punch, as would be the case if the feeding motion of the paper continued during the punching-operation, and as the armature rises, the roller *h'* causes the paper to be fed along again by the movement of the roller *d*; hence according to the rapidity, in succession, of the pulsations of electricity, or the greater or less pause between those pulsations, so the perforations or indentations will be separate dots, or two or more coming together to form a dash, and thus the letters, characters, or words will be composed.

The roller *h'* being geared to *d*, will continue to move, and slightly draw upon the paper, and prevent said paper slipping back and becoming slack while the indentation or perforation is being made, but the paper will not be moved until the armature rises and the paper is gripped by the roller *h'* and wheel *d*.

To give the pulsations of electricity, and operate the punch by the electro-magnet, I employ pins or metallic studs *t'* in the plate on non-conducting material *s*.

Upon the ring-clamps *g* and springs *t*, attached to the bar *u* and *v*, is a non-conducting roller upon the key or lever *f*, that rolls over the spring *t*, keeping the end thereof in contact with the surface of *s*, while the lever *f*, cylinder *e*, and wheel *d* are being moved by the depression of that key, and when the key is released, the spring *t* is liberated, so as not to be in contact with the surface of *s* upon the back or return movement.

The bar *u* and springs *t* are connected to one of the binding-screws *w*, and thence with one pole of the battery and the cylinder, through the frame *c*, or otherwise connected with the other pole of the battery, hence the electric circuit is closed, and the magnet made to operate in perforating or indenting the paper when one of the pins in the non-conducting material *s* comes into contact with the end of the spring *t*, and the circuit is broken when the non-conducting material intervenes; hence the perforations will correspond to the arrangement of pins or conducting-surfaces set in the non-conducting material *s*, in positions to denote given letters or characters.

The keys or levers *f* may be arranged in one or more rows, as most convenient, and operate direct or immediately upon the clamping-rings *g*.

The non-conducting surface *s*, with its pins or conductors *t'*, may be located on any desired part of the ring or clamp, and the spring may remain in contact with the same by its own power, while the paper is being moved and indented or punched, after which the spring will be lifted from contact upon the return

movement, by any desired mechanism, such as a latch or cam-switch.

It will be understood by the foregoing that in my machine the paper is moved along the distance necessary for receiving the perforations by the mechanism that determines those perforations themselves; hence the proper amount of paper is always supplied, whereas in the machines heretofore employed, the movement of the paper had to be controlled by one set of mechanism and the perforating effected by another set of mechanism, thus requiring much greater complication than in my machine.

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

1. The method herein specified of perforating or indenting paper, to be used in transmitting a telegraphic message, by a magnet acting upon a lever and punch combined with a die, substantially as set forth.

2. The aforesaid magnet, lever, punch, and die, in combination with conducting and non-conducting surfaces, acting to give the pulsations of electricity through the magnet, for composing a telegraphic message, substantially as set forth.

3. The lever *k*, actuated by the armature and magnet, in combination with the punch and feeding-mechanism, substantially as set forth, whereby the movement of the paper is checked when the punch is operating, substantially as specified.

4. The wheel *d* and roller *h'*, in combination with the lever *k* and punch *n*, substantially as set forth, for stopping the motion of the paper while being punched or embossed, and bringing the feeding-motion into operation as the punch is released.

5. The non-conducting surface *s* and its pins or conductors *t'*, in combination with the clamp *g*, lever or key *f*, and spring *s*, substantially as and for the purposes specified.

6. The lever or key *f*, jointed near one end of the divided ring-clamp *g*, and provided with a roller, 3, to act against the projection 24 upon the other end of the clamp, for closing the same around the cylinder or disk, in combination with the adjusting screws 4 and 5, substantially as and for the purposes set forth.

7. The punching-mechanism and the means for moving the paper, in combination with the key *f*, or its equivalent, that simultaneously controls the action of the punch and the movement of the paper.

In witness whereof, I have hereunto set my signature, this 17th day of July, A. D. 1868.

GEORGE LITTLE.

Witnesses:

CHAS. H. SMITH,  
GEO. T. PINCKNEY.