2 Sheets—Sheet 1.

R. T. SMITH.

PAPER PERFORATING MACHINE.

No. 189,144. Patented April 3, 1877.

Fig. 1.

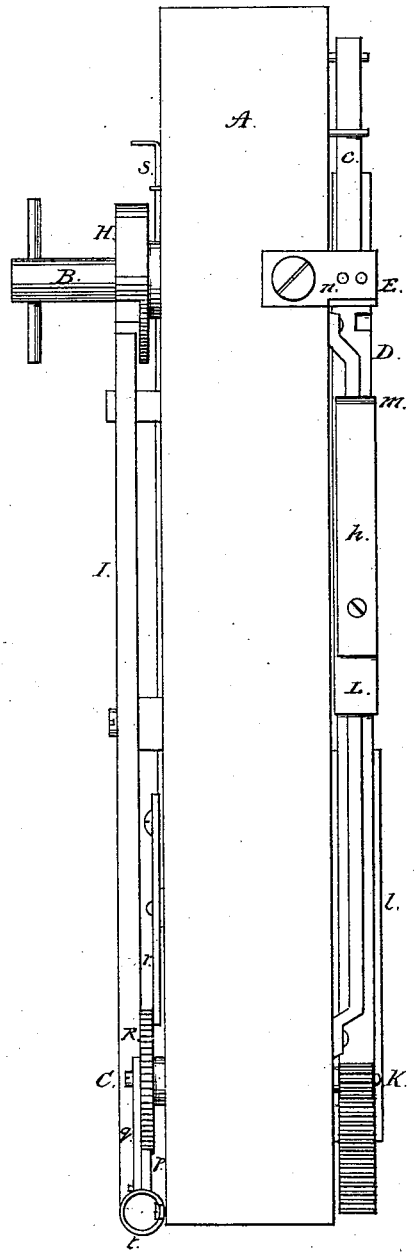
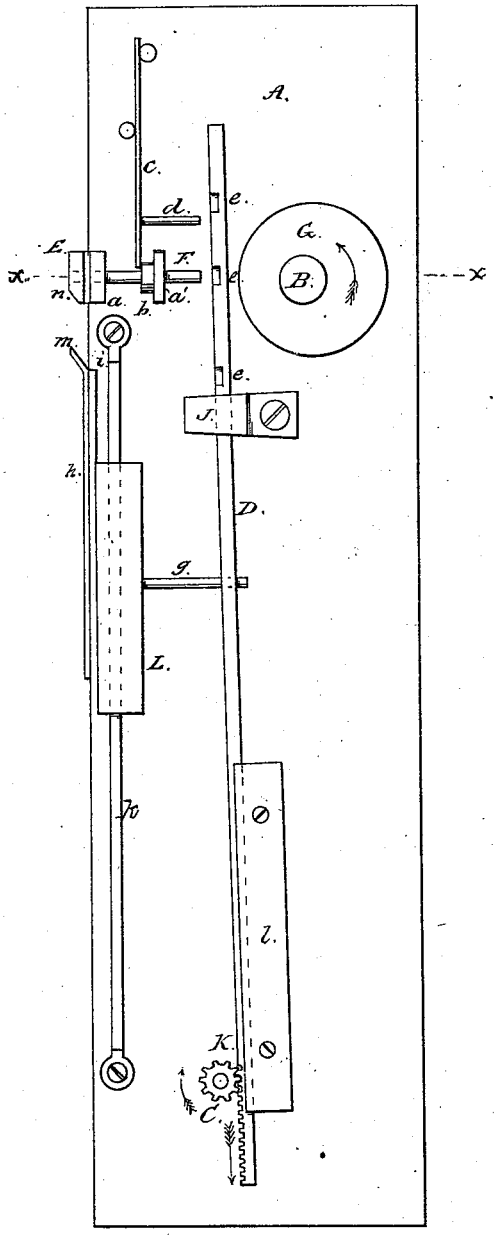


Fig. 2.



Witnesses,
J. M. Smith
J. E. Marshall.

Inventor,
Roswell T. Smith

2 Sheets—Sheet 2.

R. T. SMITH.

PAPER PERFORATING MACHINE.

No. 189,144. Patented April 3, 1877.

Fig. 3.

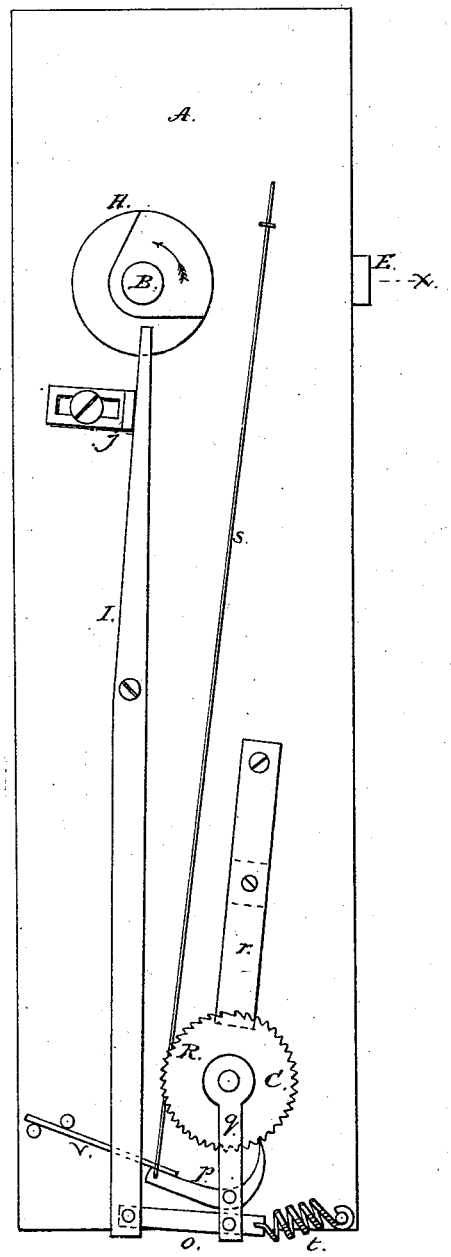
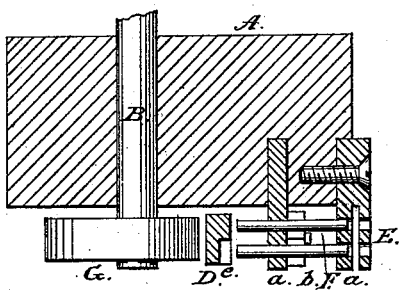


Fig. 4.



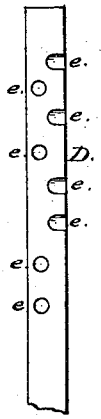


Fig. 5.

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UNITED STATES PATENT OFFICE.

ROSWELL T. SMITH, OF NASHUA, NEW HAMPSHIRE.

IMPROVEMENT IN PAPER-PERFORATING MACHINES.

Specification forming part of Letters Patent No. **189,144**, dated April 3, 1877; application filed October 6, 1876.

To all whom it may concern:

Be it known that I, ROSWELL T. SMITH, of Nashua, in the county of Hillsborough and State of New Hampshire, have invented a new and useful Improvement in Perforating-Machines, which improvement is fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure I, Plate 1, is a top view of the device. Fig. II, Plate 1, is a vertical view of the right side of Fig. I. Fig. III of Plate 2 is a vertical view of the left side of Fig. I. Fig. IV is a section of the same on line *x*. Fig. V is the sliding platform, which holds the design to be perforated.

Similar letters of reference indicate corresponding parts in the several figures.

The object of my invention is to perforate designs in card-board, like the ordinary perforated card-board of the market, while the surface not occupied by the design is not perforated.

The operation of the machine will be hereafter set forth.

The following description of my invention will enable others skilled in the art to understand it.

In the accompanying drawings, A represents the frame which supports the mechanism. This may be of any convenient form desired, having bearings for the shafts at one end, or at both, as the size and extent of the machine may require. B is the shaft through which power and motion is imparted to the machine. C is a shaft supporting and connecting the gear K and ratchet R. D is a platform, with a rack on one end, which engages the gear K, and with parts cut away at its other end, so as to form a design such as is desired to be cut in the card-board. F is the punch or punches that perforate the card-board in connection with the die E. G is an eccentric on shaft B, which, when it revolves, lifts the platform D, and causes the punches that it strikes to rise and perforate the card-board. H is a cam on the shaft B, which elevates the bar I, and thereby draws back the dog *p* on the ratchet R. L is a block, which slides on the bar *k*, moving with the platform D, through its connection with it by the part *g*. On the block are the forceps *h* and *i*, *h* being a spring, which bears on the rigid part *i*, and thereby clasps and firmly holds the edge of the card-board to be perforated. On the die E is an incline, on which the spring *k* is raised, and the forceps are opened for the reception of the card-board when the platform and block are drawn back. On the punch F is firmly secured the collar *b*, which prevents the punch from falling below its (the collar's) contact with the bracket *a'*, and it also serves as a part on which the presser *c* may act to withdraw the punch from the die and the card-board. *c* is a spring acting as a presser to withdraw the punch from the die. The pin *d* projects from *c*, and its function is to raise the spring by contact with the rising platform D, thereby taking the pressure of *c* from the punch F when perforating the card-board. *f* is a guard, open at top, keeping the platform D in place. *l* is another guard for the same purpose as *f*.

In Fig. III, Plate 2, *j* is a stop which prevents the bar I from falling lower than is wanted, and by being adjusted higher or lower it regulates, through the ratchet R, gear K, platform D, and block *l*, the distance the card-board shall move between the acts of perforation. *g* is a collar fitting loosely on the shaft C, with one side projecting as a lever or arm. It supports the dog *p*, which engages the ratchet R; it also supports the connecting-bar *o*, through which bar the lever *q* receives its downward or backward motion, while its upward or forward motion is given by the spring *t*. The dog *p* is held in connection with the ratchet by the spring *v*. *s* is a wire, secured at one end to an extended part of the dog *p*, and its use is to enable the operator to disconnect the dog and ratchet by pulling the wire, thereby enabling the platform to be drawn back to receive a new card for perforation. *r* is a brake, by which friction may be put on the ratchet R to keep it from moving back with the dog *p*.

Having described the various parts of my invention and their functions, I will now proceed to describe its operation. First pull on the wire *s* until the ratchet R is free from the dog *p;* then draw the platform back until the spring *h* strikes the incline on the die E, and is raised by contact with it; then pass the card-board between the die E and the upper

bracket *a* until it projects between the parts of the forceps *h* and *i* so far as to be firmly held by them when *h* is removed from the incline *n*. The machine is now in position for work. Revolve the shaft B, and the platform D is raised by the eccentric G until the punches that strike the elevated parts of the platform perforate the card-board. In doing this the force of the spring *c* is first relieved from the punches by the part *d* striking the platform as soon as or before it reaches the punch. The further revolution of the shaft permits the platform D to return to its place, and the punches to be withdrawn from the die and card-board by means of the presser *c*. At the same time, and by motion of the shaft B, through the action of the cam H and the bar I, the dog *p* is drawn back, and when the bar I is relieved by its progress from connection with the cam H, the ratchet R is, through power received from the spring *t*, moved forward until the motion of the ratchet is stopped by the bar I striking the stop-bracket *y*. The gear K and platform D are moved forward by the motion of the ratchet R, through its connections with it by means of the shaft C, and the card-board is at the same time drawn between the die and punch the desired distance, the platform and card-board moving simultaneously by the connection of the slide-block L with the platform through the part *g*, thus bringing the machine into position for other perforations, when the same motions of the machine by repetition will give any desired number of perforations, the extent and positions of which will correspond to the progress of the design on the platform.

It is obvious that the die-plate E may be extended to any desired length, and the punches multiplied to any desired number, and that if the platform is extended so as to force all the punches into the dies, the surface of the card-board will be at regular intervals covered with perforations, and also that the platform may be cut away so as to form any design wished for, raised in relief upon the surface of the platform; or the designs may be cut and secured upon the platform, making it a part of the same, and that the punches only which strike the raised design will be forced through the card-board into the die, and where the platform is cut away the punches are not forced through the card-board, and it is left plain, thus enabling the operator, by changing the raised designs on the platform, to make any wished-for pattern.

I would remark that the gear may be below the platform D, the platform being raised and lowered the same in all its surface; also, that the ratchet may be driven forward instead of drawn back by the action of the cam H and bar I, the dog being driven back by the spring; also, that the presser *c* may perform its functions by means of a weight, or by power imparted from the shaft B by a cam or other device.

I would remark that by "perforations" I do not mean holes broken through card-board, leaving a rough or broken edge, as card-board so perforated would be useless for embroidering. What I mean is the removing a small portion of the card-board by a clean, sharp cut, which leaves the card-board and the edges of the holes smooth. This can best be done by a punch and die.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination of the die E, the punch F, the collar *b*, the presser *c*, and the sliding platform D, or their equivalent, substantially as described.

2. The combination of the die E, the punches F, the sliding platform D, the collar *b*, the presser *c*, and the part *d*, or their equivalents, substantially as described.

3. The combination of the die E, the punch F, the sliding platform D, the gear K, the ratchet R, the dog *p*, the bar I, and the cam H, or their equivalent, substantially as described.

4. The combination of the die E, the punch F, the sliding platform D, the gear K, the ratchet R, the dog *p*, the bar I, the cam H, and the stop *j*, or their equivalents, substantially as described.

5. The combination of the dies E, the punch F, the sliding platform D, the gear K, the ratchet R, the dog *p*, the bar I, the cam H, the block L, and pinchers *h* and *i*, or their equivalents, substantially as described.

6. The combination of the dies E, the punches F, the sliding platform D, the gear K, the ratchet R, the dog *p*, the bar I, the cam H, and the wire *s*, or their equivalents, substantially as described.

ROSWELL T. SMITH.

Witnesses:
J. M. SMITH,
J. E. MARSHALL.