G. P. DRUMMOND.

Rotary Printing and Perforating Machines.

**No. 198,239.** **Patented Dec. 18, 1877.**

Fig. 2.

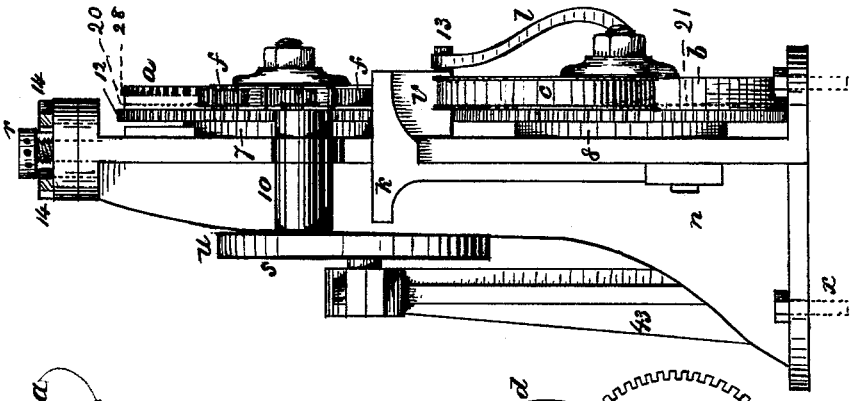


Fig. 3.

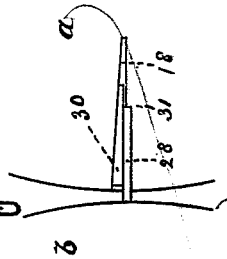
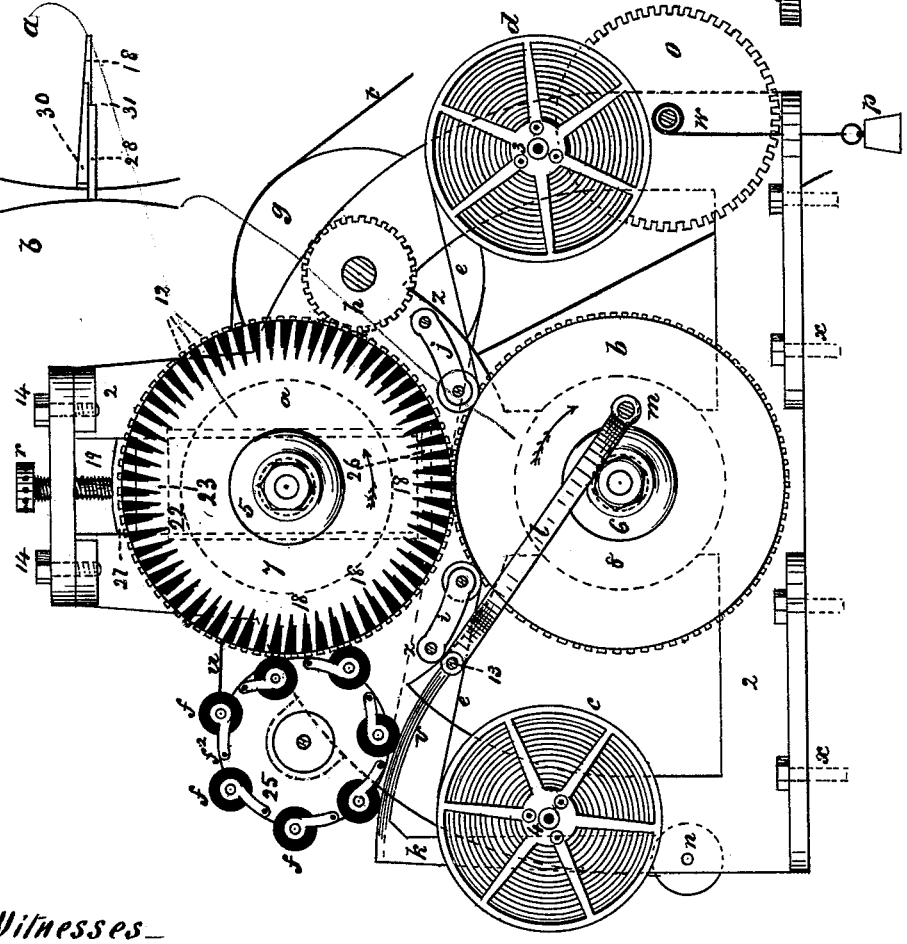


Fig. 1.



Witnesses—
John Frisch
Henry Frisch

Inventor—
Geo. P. Drummond

# UNITED STATES PATENT OFFICE.

GEORGE P. DRUMMOND, OF OTTAWA, ONTARIO, CANADA.

## IMPROVEMENT IN ROTARY PRINTING AND PERFORATING MACHINES.

Specification forming part of Letters Patent No. **198,239**, dated December 18, 1877; application filed December 27, 1876.

CASE No. 3.

*To all whom it may concern:*

Be it known that I, GEORGE PRINGLE DRUMMOND, of the city of Ottawa, in the county of Carleton, in the Province of Ontario and Dominion of Canada, have invented new and useful improvements in the art of printing and machinery for carrying out the same, which are fully set forth in the following specification, reference being had to the accompanying drawings, in all of which like figures or letters of reference indicate like parts.

The object of my invention is to print reels or quantities of ribboned paper, resembling that used in telegraph-offices, with the letters of the alphabet, figures, punctuation-points, &c., each in continued succession, and at the same time to punch or notch these ribbons with a small guiding hole or notch, associated with each letter, figure, or point, &c., and to produce in a quick and speedy manner, and in a suitable shape, ribboned paper, printed and punched in the manner required for the composing and attaching machine, which forms a portion of my machinery for obtaining surfaces for printing reading-matter from, and further and more particularly described in my specification therefor.

For the better and fuller understanding of this description, and the direct value and use of the ribboned paper, printed and punched as described, the following preliminary brief, extracted from the specification immediately hereinbefore referred to, is given here, and reads as follows:

In a machine having fingering-keys, representing the letters of the alphabet, punctuation-points, figures, &c., any required reading-matter is composed and attached to a movable rubber or other elastic surface (preferably in the shape of an endless india-rubber band) in the following manner: On the machine are a number of reels containing ribboned paper, each piece of which is printed throughout its extent with some letter of the alphabet, and all in sufficient number and variety to make up any reading-matter which may be required. Each ribbon of paper is operated by its distinctive key, and as each and every letter of any word is required, the corresponding keys, depressed in rotation, bring forward these letters under a pair of shears, which cuts them off and attaches them in an overlapping order, by any adhesive substance, to an elastic band. The letters are printed upon the ribbons a short space apart, and when attached to the elastic band the cut-off pieces overlap each other on this space only. This band, as it issues from the composing-machine, is passed before a photographic camera, and the reading-matter attached thereto, being first "justified" by straining or stretching to suitable lengths of lines, is photographed, line by line or lines, in succession on the sensitized surface in the camera by means of an opening, repeating, and self-adjusting exposure-slide. The photographed plate or surface thus produced is then transferred to metal or other printing-surfaces or lithographic stones by any known process of photo-mechanical printing. The overlapping manner in which the letters are attached to the band readily admits of stretching the band without exposing the open joints during the process of photographing.

The manner of printing these reels of ribboned paper may be briefly described thus: The machine has a revolving printing-wheel and an attendant pressure-wheel, both of the same diameter. Around the circumference of the former are receptacles for the type, and also the punches, one for each type. Around the circumference of the latter are the holes to receive the punches and carry out their droppings. Against the printing-wheel is a set of revolving inking-rollers. A reel of ribboned paper is placed upon a pin, facing the ingoing side of the printing-wheels, and, being guided in between the wheels, the ribboned paper is printed as it passes at their point of junction, and is at the same time punched. As it passes from the wheels, printed and punched, it is taken up on a winding-reel, operated by an unwinding cord and weight.

Figure No. 1 is a front or face view of the printing-machine, in which *a* is the printing-wheel. *b* is the pressure-wheel. *f f f* are the revolving inking-rollers, and *v* is a reciprocating inking-platen, attached by the connecting-rod *l* to the crank *m*. *c* is the unwinding-reel.

*e* is the ribboned paper, and *d* is the winding-reel, operated by a clock-work, *o*, a cord, *w*, and a weight *p*. 18 18 18 are the type-receptacles. *i* and *j* are two guiding and tightening pulleys. *g* is the driving-pulley, and *t* the belt. *h* is the driving-pinion wheel, meshing with the pinions 12 of the printing-wheel *a*.

Fig. 2 is a side view of Fig. 1—like letters or figures of reference in which indicate like parts with Fig. No. 1—and in addition, 20 is the line of punches in the wheel *a*, and 21 is the line of holes in the wheel *b* for the purpose of receiving those punches. *f f* are the inking-rollers, 10 their shaft-box, and *s* their driving-pulley, operated by the belt *u*. 7 and 8 are turned face-plate bearings, against which the wheels *a* and *b* firmly revolve, so as to insure perfect accuracy of movement. The face-plate 8 is firmly bolted to the frame of the machine; but face-plate 7 is attached to the edge-grooved block 22, Fig. 1, working in the slot 19. Pressure is given to the type by the screw *r*, bearing upon the metal block which covers the india-rubber block 23. The reels *c* and *d* are removable from the pins 4 and 3, when necessary, for refilling and emptying. The machine may be driven by treadle-power by attaching a crank, fly-wheel, and treadle.

Fig. 3 is a detail, showing the manner in which the type are keyed into the printing-wheel *a*. *b* is the pressure-wheel; 28, the type; 30, the wedge; 18, the type-receptacle. Any type may be keyed in, only the wedge drives in farther for thin type. 31 is their base-rest.

The ribboned paper to be printed and punched will be cut in coils in the shape usually adopted for telegraph-reel paper. When I proceed to print one of the coils, I key in the type for the letter I require after the manner shown in Fig. 3. I then remove the outside guard or flange of the reel *c* by unscrewing the three thumb-nuts shown in Fig. 1, and place upon the back section of the reel the coil of paper, and, when this is done, replace the outside section or flange, as before. I then pass the end of the ribboned paper under the guiding and pressure roller *i*, and into the mouth of the wheels *a* and *b*, moving, in the direction of the arrows, under the pressure-roller *j*, and finally onto the axle-box of the reel *d*. (This reel is shown full in the drawing, but should be empty.) I then start the machine, and, as the ribboned paper comes through printed and punched, the weight *p*, by its gravitation, unwinds the cord *w*, and, by aid of the pinion-wheel *o* meshing into the reel *d*, takes up the slack of the ribboned paper and winds it on the reel as it issues from the printing-wheel. The reel is then removed and replaced by an empty one. The reels so removed belong to and are kept to replace the reels of my composing and attaching machine, already referred to, as these become empty and require removal from its reel-frame.

The inking-rollers *f f f* swing from centers $f^2$, and by springs accommodate themselves to the face of the type and the reciprocating inking-platen *v*, centered at *n*. Wheels *a* and *b* are also pinion-wheels, and mesh one into the other. The arrangement of the face-plates 7 and 8, coupled with the turned washers 5 and 6, for the purpose of maintaining the proper meshing of the punches in their respective holes, will be readily understood, as also the pressure-screw *r*, the metal block 27, the india-rubber cushion 23, the grooved metal back block 22, (to which the face-plate 7 is solidly attached,) and the india-rubber cushion 26, all for the purpose of adjusting and maintaining a steady pressure of the printing-type against the passing ribboned paper.

All the moving portions of the machine are made and adapted to a single frame and single bearings, because, for the sake of adjusting and enabling the printer to examine the proper working of the machine, a single frame is preferable to a double one, since it displays an open front.

What I claim as my invention is as follows:

1. Fixed or movable type 28 28, in repeated succession of the same denomination, in combination around the circumference of the wheel *a*, each with an attendant equidistant and similarly-contiguous punch, 20 20, for the purpose of simultaneously printing and punching coils of ribboned paper, in the manner substantially as described, and for the accomplishment of the end specified.

2. The combination of a discharging-reel, *c*, and the ribboned paper *e* with the printing-wheel *a*, its type 28, and its punches 20, operating in and upon the wheel *b*, for the purpose of producing the result substantially as described and specified.

3. The combination of the type 28 and punches 20, in the printing-wheel, with the pressure-wheel *b*, having holes therein, for the several combined purposes of automatically and concurrently feeding, printing, and punching ribboned paper, in the manner described, and for the use specified.

In testimony that I claim the foregoing I have hereunto set my hand this 10th day of November, 1876.

GEORGE PRINGLE DRUMMOND.

Witnesses:
JOHN GRIST,
HENRY GRIST.