2 Sheets--Sheet 1.

J. C. MACDONALD & J. CALVERLEY.

Printing-Press.

No. 168,511. Patented Oct. 5, 1875.

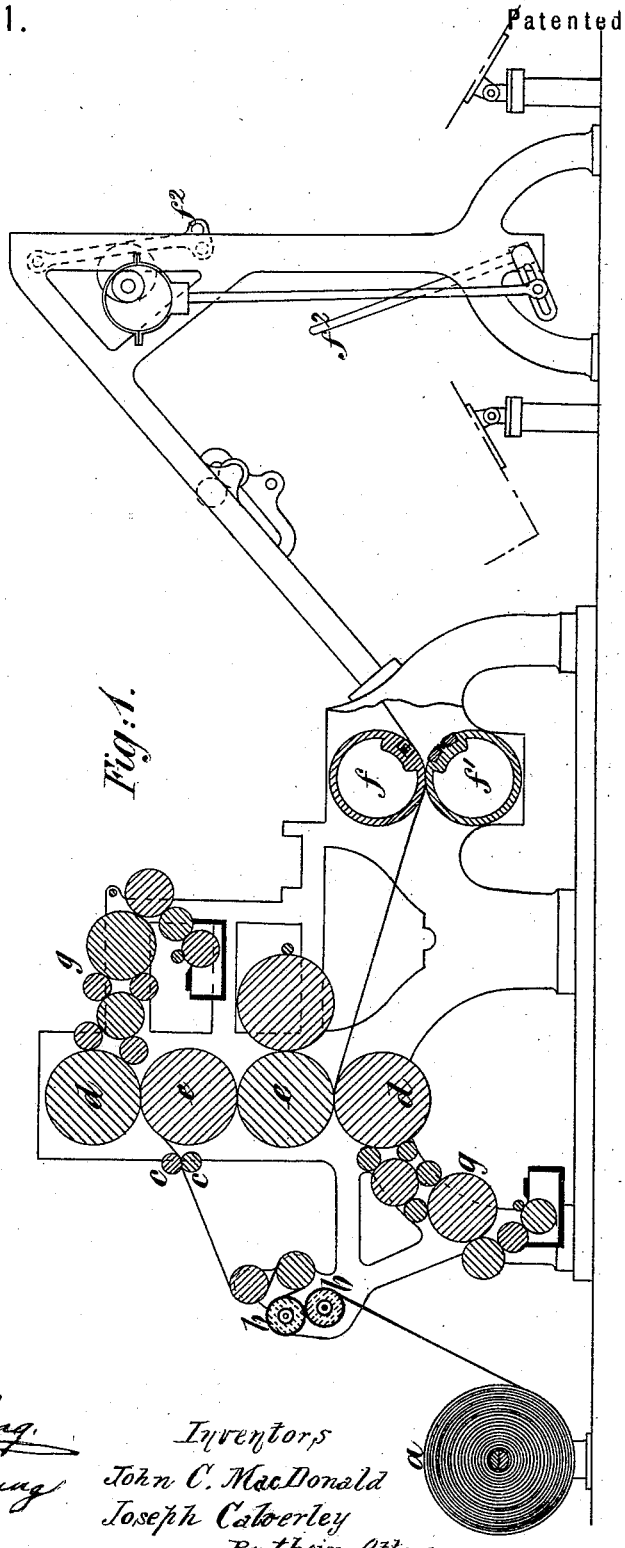

Fig. 1.

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2 Sheets--Sheet 2.

J. C. MACDONALD & J. CALVERLEY.

Printing-Press.

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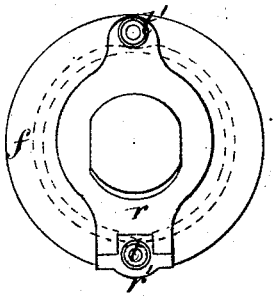
Fig: 5.



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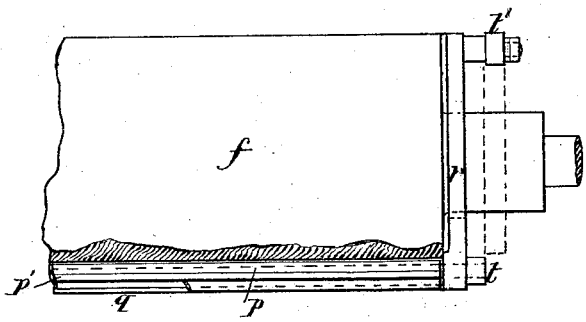


Fig: 7.

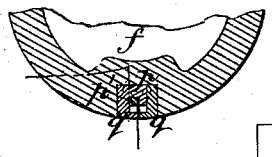


Fig: 10.

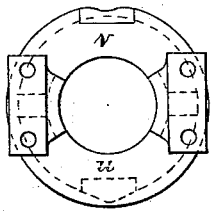


Fig: 11.

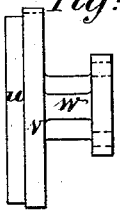


Fig: 9.

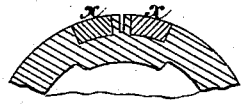


Fig: 8.

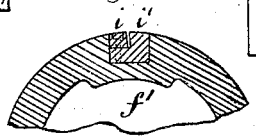


Fig: 2.

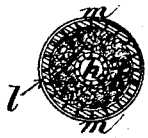


Fig: 3.

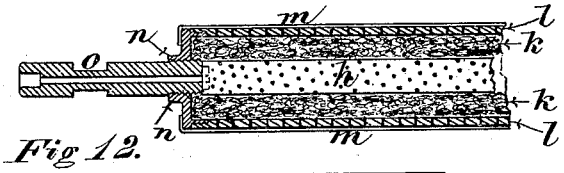


Fig: 4.

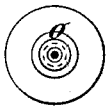
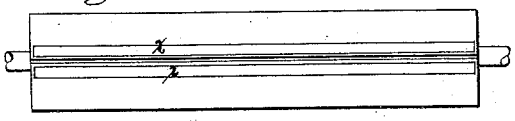


Fig 12.



Witnesses.

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Inventors.

John C. Mac Donald.
Joseph Calverley
By their Attorney,
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UNITED STATES PATENT OFFICE.

JOHN CAMERON MACDONALD, OF WADDON, AND JOSEPH CALVERLEY, OF SURREY COUNTY, ENGLAND.

IMPROVEMENT IN PRINTING-PRESSES.

Specification forming part of Letters Patent No. **168,511**, dated October 5, 1875; application filed December 29, 1874.

To all whom it may concern:

Be it known that we, JOHN CAMERON MACDONALD, of Waddon, in the county of Surrey, and JOSEPH CALVERLEY, of No. 101 Camberwell Road, in the county of Surrey, subjects of the Queen of Great Britain, have invented or discovered new and useful Improvements in Printing-Presses; and we, the said JOHN CAMERON MACDONALD and JOSEPH CALVERLEY, do hereby declare the nature of the said invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement thereof—that is to say:

The improvements relate to that class of printing-presses in which the paper is drawn continuously through the machine from a roll, and consist in a new construction of damping-roller for damping the surfaces of the paper as it passes from the roll into the machine, and in improved mechanism for cutting up the roll into sheets after it has been printed.

Figure 1 shows a vertical section of a printing-machine with our improvements applied to it. Figs. 2, 3, and 4 show views of one of the damping-rollers. Figs. 5, 6, 7, 8, and 9 show views of parts of the cutting mechanism, Fig. 6 being partly in section on the line *z z* of Fig. 7. Figs. 10 and 11 show views of the cams employed for actuating the cutting-knife. Fig. 12 shows a plan or longitudinal view, on a reduced scale, of Fig. 9.

In Fig. 1, *a* is the roll of paper; *b b*, the damping-rollers; *c c*, rollers for pulling the paper; *d d*, printing-cylinders; *e e*, impression-cylinders; *g g*, trains of inking-rollers; *f f*^{1}, cutting-cylinders; *f*^{2} *f*^{2}, apparatus for delivering the sheets into piles. The general arrangement of the machine is the same as that described in the specifications of former patents granted to us. Each of the damping-rollers is formed with a perforated metal cylinder, *h*, at the center, which can be filled, or partially filled, with water through its ends. Around this cylinder are several thicknesses of blanket, *k*, or it might be sponge or other absorbent material surrounded by another metal cylinder, *l*, with perforations arranged in spiral lines around it. Around the exterior of this cylinder are three or four thicknesses of blanket, *m*, sewed together longitudinally of the roller, and also bent down and sewed together over the ends. Into the ends of the perforated cylinder *l* are screwed the ends *n n*, and into each of these is screwed a hollow spindle, *o*, upon which the rollers are to be supported, and through which they are to be supplied with water. The inner ends of these spindles fit tightly into the ends of the inner perforated cylinder *h*, and their outer ends are closed by stoppers of any suitable construction. Water may either be supplied to the interior of the rollers from time to time, as may be required, or may be supplied to them continuously when in use by means of a pipe passing into the end of one of their spindles through a stuffing-box. In this case the amount of water admitted may be regulated by a tap on the pipe. The paper is led over the surface of the damping-rollers, as shown at Fig. 1, and as the paper is drawn through the machine the damping-rollers are driven round by it, and give off their moisture uniformly by centrifugal action. By this means the paper is evenly damped on both sides to any extent desired.

Fig. 5 shows an end view of the cylinder *f*, which carries the cutting-knife for dividing the paper into sheets. Fig. 6 is a side view, partly in section, and Fig. 7 a transverse section of part of the same. In these figures, *p* is a bar carrying the cutting-knife. This bar lies in a radial groove formed in the cylinder *f*, and is free to have a slight movement given to it to and from the axis of the cylinder. It is important that as thin a cutting-blade should be used as is practicable, and that the paper should be griped on either side of it at the time the knife is protruded. It is also important that the knife should be easily removed for examination or repair and readily adjusted.

In order to allow of a thin cutting-blade being thus used with advantage, we secure the blade to the bar by means of a clamp-bar, *p'*, in the manner shown at Fig. 7. The bar lies between two steel bars, *q q*, fixed in the groove, and the cutting-knife passes out through a narrow slit left between the bars, as shown at

Fig. 7, which serve to support the knife in its place, and also to form a griping-surface to hold the paper on either side of it at the time of cutting. The knife-bar *p* at each of its ends carries a roller, *t*. These rollers bear upon the surface of cams *u u*. As the cylinder revolves these cams cause the knife to be protruded a short distance from the groove in the cylinder just as it comes opposite to the second cylinder *f'*, with which the cylinder *f* works. Each end of the knife-bar *p* passes through a plate or frame, *r*. One of these is provided with a cap, *r'*, which can be removed to allow of the knife being drawn out endwise whenever required. The frames *r* carry rollers *t'*, which bear upon the surface of the cams *v*. These cams serve to limit the outward movement of the knife, and also to draw it back quickly after the cut has been made. The cams *u v* are carried by a hollow bearing, *w*, through which the spindle of the cylinder passes, and this bearing is fixed by screw-bolts to the side framing of the machine. The spindle is supported in bearings upon the side frames, and is driven by gearing as heretofore.

By employing cam-surfaces in the manner above described, both to protrude the knife from the cylinder, and also to withdraw it quickly after it has made its cut, the cutting is effected with greater regularity than when a fixed knife is used, or when the knife is moved by springs in combination with a cam.

Fig. 8 shows a transverse section of the cylinder *f'*, which works with the cylinder *f*, and has in it a narrow slit, as usual, for the knife to enter into when it is protruded from the cylinder *f*. It is essential that this slit should be as narrow as possible, so as to allow the paper to be griped closely on either side of it at the moment at which the knife is working. To effect this the slit or opening is formed between two bars, *i i'*, one, *i*, of which is adjustable to allow it to be set nearer to or farther from the other, and it is held by screws in the manner shown by the section, Fig. 8, or is otherwise held in its place. The inner sides of the bars are also made to incline slightly to allow the knife to slide upon one of them. The opening or slit is thus made narrower at the bottom than at the top. By forming the slit or opening in this manner it may be made much narrower than when saw-cut slits are used. Or in place of or in addition to forming the slit in this manner, grooves may be formed on either side of the slit, and in close proximity to it, to receive metal bars *x*, as shown at Figs. 9 and 12. Around these bars strips of vulcanized india-rubber or other elastic material may be wound, or they may be otherwise covered with elastic material. The bars are held down into the grooves either at their ends or by screws passed down through them. This affords a ready means of securing an elastic surface on either side of the slit, and this elastic surface acts to gripe and hold the paper while it is being cut by the knife.

By constructing the cutting apparatus in the manner hereinbefore described a knife, having a straight cutting-edge, may, if desired, be employed instead of a knife with a serrated edge, as heretofore usual.

The damping-rollers hereinbefore described are shown and described in English Letters Patent No. 1,644, of 1871, granted us.

We claim as our invention—

1. The damping-roller, constructed substantially as set forth, of a central perforated cylinder, *h*, blanket *k* or other absorbent material, perforated metal cylinder *l*, and outer covering of blanket *m*.

2. The combined arrangement for actuating the knife carried by cylinder *f* of the cutting apparatus, such arrangement consisting of bars or frames *r* fixed to the ends of the knife-bar *p*, and carrying rollers to bear upon the two opposite sides of fixed cams *u v*, substantially as set forth.

3. The combined arrangement for holding the cutting-knife, consisting of the carrying-bar *p*, clamp-bar *p'*, and bars *q q*, for supporting the knife where it passes out from the cylinder *f*.

4. The combination, with the cylinder *f'*, of the bar *i'*, and adjustable bar *i*, these members being constructed and operating substantially as set forth.

5. The cylinder *f'*, provided with a narrow-bottomed inclined slit or opening, as set forth, against the side of which the knife of the cylinder *f* works.

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