(No Model.)

J. P. BROWNE.

MACHINE FOR CUTTING PAPER.

No. 393,535. Patented Nov. 27, 1888.

FIG. 1.

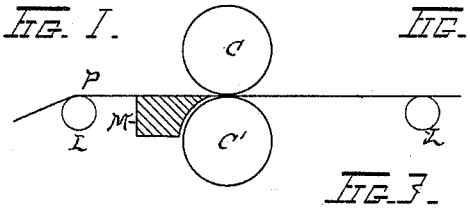


FIG. 2.

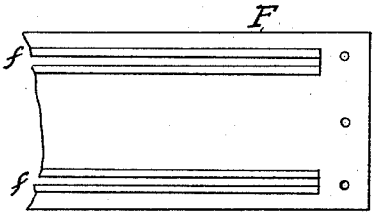


FIG. 3.

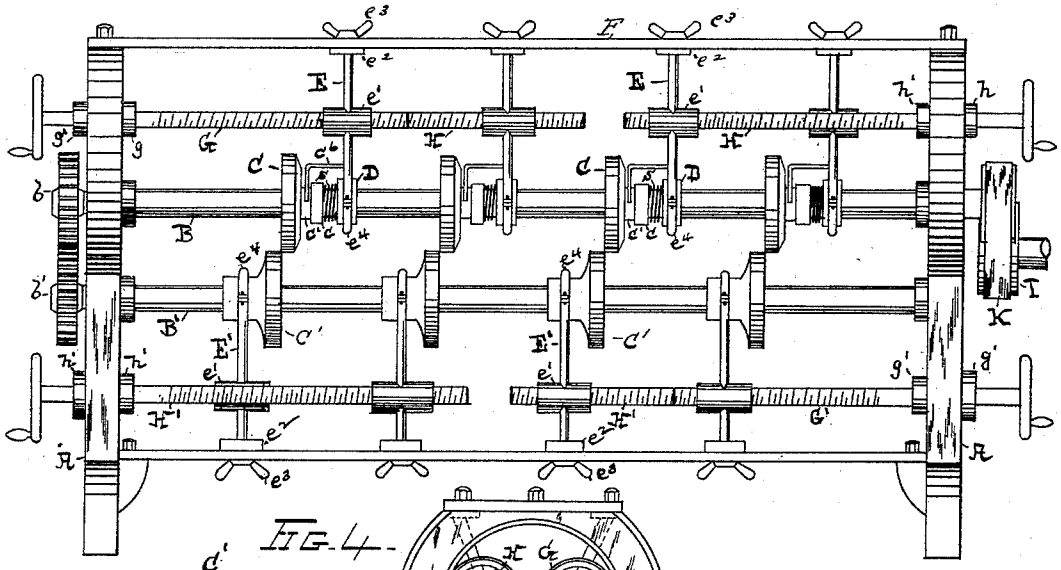


FIG. 4.

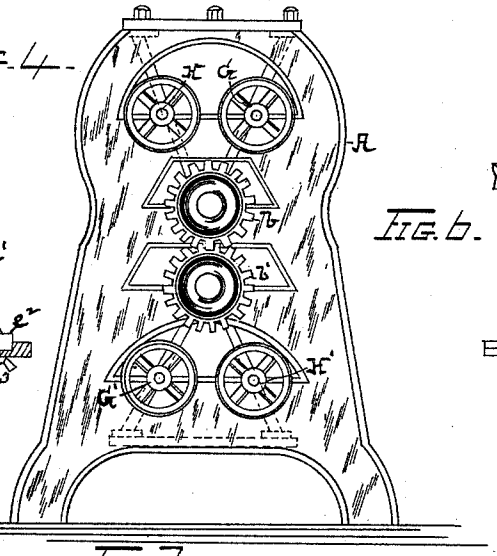


FIG. 5.

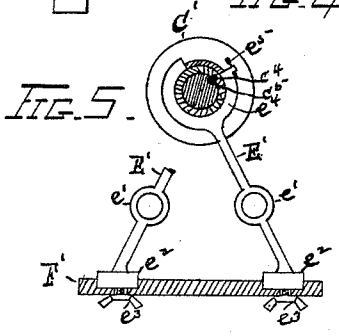


FIG. 6.

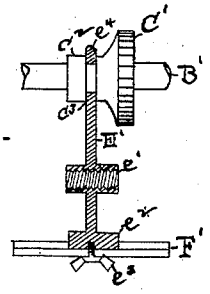
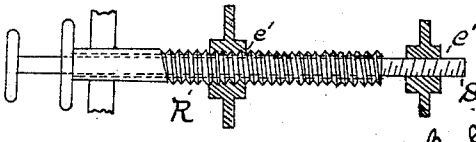


FIG. 7.



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UNITED STATES PATENT OFFICE.

JOSEPH P. BROWNE, OF HOLYOKE, MASSACHUSETTS.

MACHINE FOR CUTTING PAPER.

SPECIFICATION forming part of Letters Patent No. 393,535, dated November 27, 1888.

Application filed May 2, 1887. Serial No. 236,902. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH P. BROWNE, of Holyoke, in the county of Hampden and Commonwealth of Massachusetts, have invented a new and useful Improvement in Machines for Cutting Paper, of which the following is a specification, reference being had to the accompanying drawings, forming part thereof.

My invention relates to machines in which a series of upper and lower revolving cutters is employed for the purpose of cutting or slitting a web of paper passed between the cutters to form sheets of any desired width; and it has for its object to provide novel means for independently adjusting each of the revolving cutters from the ends of the machine for the purpose of regulating the width of the strips into which the paper is cut.

To this end my invention consists in the machine constructed and operating as hereinafter fully described, and particularly pointed out in the claims.

Referring to the drawings, in which like letters designate like parts in the several figures, Figure 1 is a diagram illustrating the manner of passing the web of paper between the cutters. Fig. 2 is a plan view of a portion of one of the guide-rails. Fig. 3 is a front elevation of the machine. Fig. 4 is an end view thereof. Figs. 5 and 6 are detail views of parts hereinafter described. Fig. 7 is a view, partly in section, of a modification of the adjusting means shown in the other figures.

In Figs. 3 and 4, the letter A designates the frame of the machine, in which are suitably mounted the upper shaft, B, and lower shaft, B′, carrying, respectively, the upper and lower cutters, C and C′. One of said shafts—as, for instance, the shaft B—receives motion from a shaft-pulley, I, through belt K, or is otherwise caused to revolve, and communicates motion to shaft B′ through the gears *b b′*. The cutters C C′ are thus caused to revolve with their cutting-edges abutting each other, whereby a web of paper, P, passed between them by means of the supporting and guiding rolls L and guide-block M, (see Fig. 1,) is cut in the direction of its length into strips of the width of the sheets of paper it is desired to make.

Each of the lower cutters, C′, has formed integral therewith, as shown, or rigidly secured thereto, a collar, c^2, within which is the peripheral groove c^3, (see Fig. 6,) said groove receiving the strap e^4 of an adjusting-bar, E′, there being an adjusting-bar for each of said cutters. The strap of each bar E′ is transversely divided like the ordinary eccentric-strap, and by means of screws c^5, connecting the two sections, the strap can be made to embrace the collar of the cutter in such manner as to permit free rotation of the latter, while, by reason of the location of the strap within the groove c^3, the collar and cutter are bound to follow any movement of the bar lengthwise of the shaft B′. The cutters are also provided with a feather, c^4, projecting within a longitudinal groove, c^5, in the shaft, whereby they are compelled to rotate with the shaft, but are free to move lengthwise thereof, said feather and groove being clearly shown in Fig. 5.

The upper cutters, C, differ from the lower cutters just described in that the collar designated by the letter D is made separate from the cutter, and in having a spiral spring, *s*, surrounding the shaft B, located between said collar and cutter, the function of which is to hold the cutting-edge of the upper cutter against that of the lower cutter with a yielding pressure. A forked arm, c^6, projecting from the upper adjusting-bar, E, has its outer ends located within a peripheral groove, *c′*, in the hub *c* of the cutter C, there being sufficient lost motion between the ends of said arm and the walls of said groove to enable the spring *s* to accomplish its function, while at the same time said arm compels the cutter to follow a movement of the collar D and adjusting-bar lengthwise of the shaft B. This construction is repeated with each cutter C, as shown in Fig. 3, said cutters and the collars D being also provided with the feather c^4, projecting within a groove in the shaft B, as previously described with reference to the lower cutters and shaft, B′.

The adjusting-bars E E′ are each provided between their ends with an interiorly screw-threaded hub, *c′*, and at their outer end with a shoe, c^2, fitted to and sliding in a groove, *f*, in the guide-rails F or F′, the latter being secured to the frame at the top and bottom thereof, respectively, by suitable bolts, as shown. The guide-rails are each provided with a groove, *f*, near each side, as shown in Fig. 2, and through slots in the bottom of said

grooves are inserted binding-screws e^3, entering the shoes e^2, as shown in Fig. 6, which screws by bearing loosely against the outer side of the rails assist in steadying the movement of the shoes within the grooves; or they can be utilized to lock the adjusting-bars in any given position when for any purpose it may be desirable to do so.

The means for moving the adjusting-bars longitudinally of the machine, and thereby adjusting the position of the cutters upon the shafts B B', consist of screw-rods G H and G' H'. These screw-rods are provided with hand-wheels at their outer ends, as shown, and are passed through bearings in the ends of the frame A, being supported therein in such manner as to have rotation without bodily progression by means of collars g g' and h h', located upon each side of the end pieces of the frame A. The inner screw-threaded end of each rod is screwed into and through one of the hubs e' of the adjusting-bars, and therefore by rotating either of said rods by means of its hand-wheel one of said adjusting-bars, with its connected cutter, can be caused to move in either direction longitudinally of its shaft.

It is obvious that if the adjusting-bars E E' were in exact alignment the screw-rods connecting with each bar would also be required to be in alignment, and this can be done by arranging one rod within the other telescopically, as shown in Fig. 7 and hereinafter described; but I prefer to mount said bars so that the first and third, counting from either end of the machine, will have their outer ends located within the groove f at one side of the rail F or F', while the second and fourth bars will occupy the groove f at the opposite side of the rail, so that adjoining bars will extend from the shaft at different angles, as indicated in Fig. 5 and in dotted lines in Fig. 4. By this arrangement a clear space for the independent adjustment of each bar is afforded.

The screw-rods G G operate the two upper adjusting-bars nearest the ends of the machine, the rods G' G' the corresponding lower bars, the rods H H the two intermediate upper bars, and the rods H' H' the intermediate lower bars, all as shown in Fig. 3. It follows from the alternate arrangement of the ends of the adjusting-bars in the front and rear grooves of the rails F F', previously described, that the screw-rods which operate said bars will be similarly arranged—that is to say, at one end of the machine the rod G will lie in front of rod H, while at the opposite end the rod H will lie in front of rod G, and the same is true of the rods G' H', all of which is clearly shown in Fig. 3.

It will be observed that by the use of the adjusting means as thus described any adjustment of the cutters within the limits of the machine itself can be quickly made by turning the hand-wheels at the ends of the frame and without interfering with the operation of the machine. As the cutters operate upon the paper only when the cutting-edges of an upper and lower cutter are in contact with each other, the adjustments can be made without tearing the web of paper passing through the machine. For the same reason either of the pairs of cutters can be rendered inoperative by slightly separating their cutting-edges from each other, the paper then passing between them uncut. By thus throwing out of operation the two intermediate pairs of cutters the outer cutters can be utilized to trim the edges of a web of paper of any width. The springs s provide for separating the upper cutters from the lower when starting a web of paper through the machine independently of the adjusting mechanism, and also serve to compensate for wear of the cutting-edges by forcing the upper against the lower cutters.

In Fig. 7, as hereinbefore stated, I have shown an arrangement of the screw-rods by means of which the adjusting-bars may be arranged in alignment with each other, their outer ends all moving in a single groove in the guide-rail F or F'. In this form of my invention the rod R, connecting with the first adjusting-bar, is made tubular, and the rod connecting with the second adjusting-bar is of less diameter and is inserted through the rod R telescopically, said interior rod being designated by the letter S. At their outer ends each of said rods will be mounted by means of collars or otherwise in such manner as to be capable of rotation without endwise movement and will be provided with hand-wheels, as shown. The difference between the diameters of the two rods necessitates a corresponding difference in the size of the hubs e' of the adjusting-bars, and as this increases the cost of manufacture I prefer to use the first-described form of the invention.

While I have shown and described the use of my invention in connection with a machine having four pairs of cutters, it will be understood that it is equally applicable to machines having either a greater or less number of cutters.

It is obvious that modifications other than that shown in the details of construction can be utilized without departing from the spirit of my invention.

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

1. In a paper-cutting machine in which two revolving shafts carrying upper and lower cutters are employed, an adjusting-bar connected with each of said cutters at one end and having its opposite end located in a suitable guide, and a rod or similar device operatively connected with each of said adjusting-bars at a point between the ends of the latter, each of said rods extending to and through one of the ends of the machine-frame, combined and operating substantially as and for the purpose described.

2. In a paper-cutting machine in which two revolving shafts carrying upper and lower cut-

ters are employed, the combination, with each of said cutters, of an adjusting-bar connected therewith and a screw-rod lying wholly without said shafts entering a screw-threaded hub in said adjusting-bar, the outer end of said screw-rod being mounted in the end frame of the machine and being provided with means whereby it can be revolved, substantially as described.

3. In a paper-cutting machine, the combination of the frame A, shafts B B′, and cutters C C′, keyed to said shafts, so as to revolve therewith while being movable endwise thereof, with adjusting-bars E E′, connected at their inner ends to said cutters and having their outer ends seated in suitable guides, and a screw-rod entering a hub in each of said adjusting-bars, said screw-rods being seated in suitable bearings at the ends of the machine and having at their outer ends means whereby they can be manually rotated to move the adjusting-bars lengthwise of the shafts, substantially as shown and described.

4. In a paper-cutting machine, the frame A, guide-rails F F′, having the grooves *f* near each side secured to said frame at the top and bottom thereof, shafts B B′, and cutters C C′, connected by a groove and feather to said shafts, in combination with the adjusting-bars E E′, having a collar-and-groove connection with said cutters at their inner ends and having their outer ends seated within the grooves *f* of the guide-rails, the arrangement of said adjusting-bars being such that adjacent bars occupy grooves *f* upon opposite sides of the guide-rails, and screw-rods G G′ and H H′, each of said rods being engaged with and operating one of said adjusting-bars, substantially in the manner and for the purpose set forth.

5. In a paper-cutting machine of the kind herein shown and described, the combination, with the guide rail F′, having the grooves *f*, and the cutters C′, having hubs c^2, containing a peripheral groove, c^3, of the adjusting-bars E′, having hubs e' and shoes e^2, each of said bars being connected to one of the cutters C′ by a strap, e^4, seated within the groove c^3 in said cutter and having its shoe e^2 located within the groove *f* of rail F′, opposite to the groove occupied by the shoe of the adjacent bar, and screw-rods G′ H′, entering the hubs c^2 of said bars, as and for the purpose set forth.

6. In a paper-cutting machine of the kind herein shown and described, the combination, with shaft B, cutters C, having hubs *c*, containing a peripheral groove, *c′*, collars D, also having a peripheral groove, said cutters and collars being provided with a feather projecting within a groove in the shaft, and springs *s*, interposed between said cutters and collars, of adjusting-bars E, having their inner ends connected to said collars D by means of a strap, e^4, located within the peripheral groove therein, and having their outer ends suitably guided by the guide-rail F, arms e^6, connected to said bars E and having their outer ends extending into the grooves *c′* in the cutters C, and screw-rods G H, engaging with and operating said bars E, substantially as shown and described.

7. In a paper-cutting machine, the combination, with the cutters C C′, adjusting-bars E E′, and grooved and slotted guide-rails F F′, of screws c^7, passing through the slots in said rails into said bars, substantially as and for the purpose set forth.

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H. K. HAWES.