(No Model.)

J. A. WHITE.

PAPER CUTTING MACHINE.

No. 303,903. Patented Aug. 19, 1884.

Fig. 1.

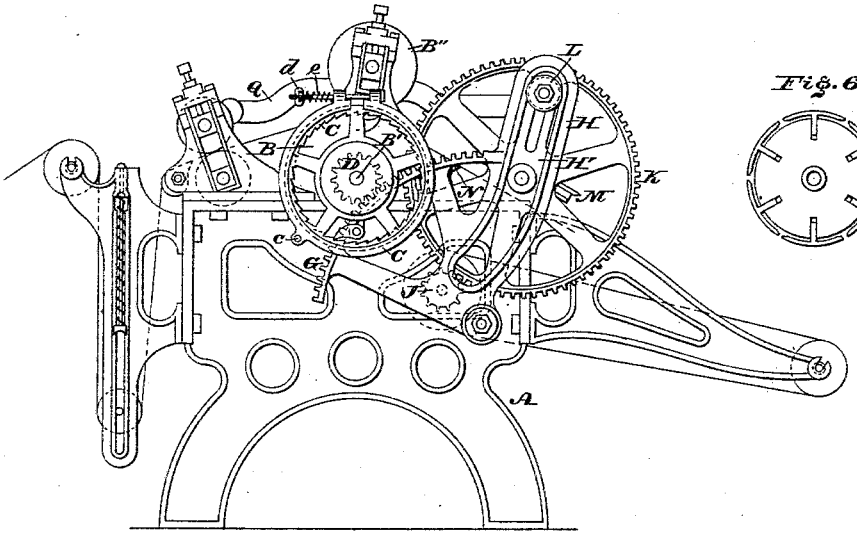


Fig. 6.

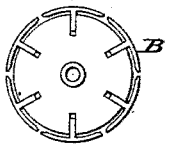


Fig. 2.

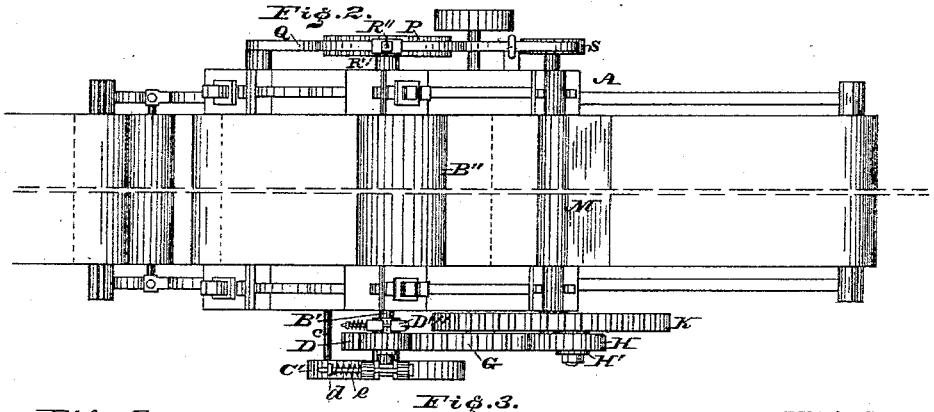


Fig. 4.

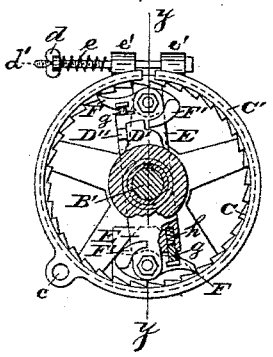


Fig. 3.

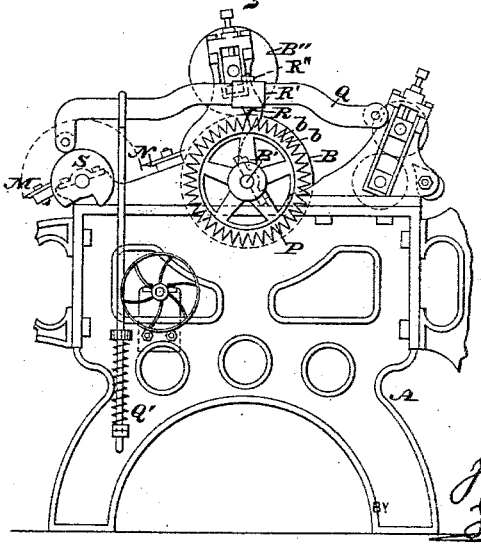
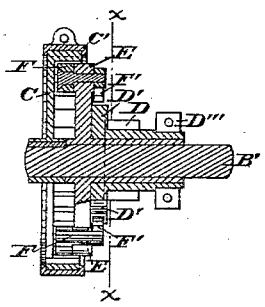


Fig. 5.



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PAPER-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 303,903, dated August 19, 1884.

Application filed August 31, 1883. (No model.)

To all whom it may concern:

Be it known that I, J. ATWOOD WHITE, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Paper-Cutting Machines, which improvement is fully set forth in the following specification and accompanying drawings, in which—

Figure 1 is a side elevation of the machine for cutting paper, &c., embodying my invention. Fig. 2 is a top or plan view thereof. Fig. 3 is a side elevation of a portion opposite to that shown in Fig. 1. Fig. 4 is a section of a detached portion, enlarged, in line *x x*, Fig. 5. Fig. 5 is a section of a detached portion, enlarged, in line *y y*, Fig. 4; and Fig. 6 is an end view of an expanding feed-roll.

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

My invention consists of certain improvements in paper-cutting machines, as will be hereinafter fully set forth, and specifically pointed out in the claims.

Referring to the drawings, A represents the frame of the machine, on which is mounted the feed-roll B, the shaft B′ whereof carries an internally-toothed ratchet-wheel, C.

D represents a pinion, which is loosely fitted on the hub of two arms, E, mounted on the shaft B′, said pinion having formed with or secured to it lugs D′, which are adapted to engage with lugs D″ on the arms E.

To the opposite ends of the arms E there are pivoted pawls F, so disposed that they engage with the teeth of the ratchet-wheel C, the operation whereof will be hereinafter more fully described.

To the frame A is pivoted a toothed segment, G, which is adapted to engage with the pinion D, and said segment is formed with an arm, H, having a curved slot, H′, which extends from a point near the pivot of the segment to the upper part thereof, starting at about a right angle with a radius drawn from the point of contact of the segment and the pinion when the parts are in position, as shown in Fig. 1, said slot curving slightly, so as to be brought somewhat toward the pinion D, as it is carried away from the pivot of the segment.

J represents a driving-pinion meshing with a gear-wheel, K, both mounted on the frame A of the machine, said gear-wheel K having adjustably connected with one of its arms a stud or roller, L, which moves in the slot H′ of the arm H. The shaft of the gear-wheel K has secured to it a cutter or knife, M, and the frame has connected with it the bed-knife N. (Both more clearly shown in Fig. 3.)

P is a toothed wheel mounted on the shaft B′ of the feed-roll B, and opposite to the ratchet-wheel C, the teeth *b* of said wheel being pointed.

Q represents an arm which is pivoted or hinged to the frame of the machine at the end opposite the revolving cutter, said arm Q having a detent or tooth, R, which is adapted to engage with the teeth *b* of the wheel P.

Mounted on the shaft of the revolving cutter, opposite to the gear-wheel K, is a cam, S, so disposed in relation to the arm Q that said arm is raised by the cam S for the purpose of disengaging the detent or tooth R from the wheel P at proper intervals. A spring, Q′, is attached to the arm Q, and serves to keep the same in firm and positive contact with the cam S, and insure the prompt action of the tooth R on the wheel P. The ratchet-wheel C is encircled by a friction strap or brake C′, which is attached to the frame A of the machine by a stud or pin, *e*, and the tension of which may be adjusted by the thumb-nut *d* and spring *e*, said nut engaging with a bolt, *d′*, which passes through lugs *e′* on the ends of the strap, and is encircled by the spring *e*. A friction-brake D‴, similar in construction to the brake C′, encircles the hub of the pinion D.

The construction of the ratchet mechanism is as follows: The pawls F have each at the heel end a lug or projection, F′, (see Figs. 4 and 5,) which is opposite to the lug D″, and so disposed that it may be struck by the lug D′ on the hub of the pinion D, and bolts *g* and springs *h*, fitted to the arm E, serve to keep the pawls F in contact with the teeth of the ratchet-wheel C, the heads of the bolts bearing against lugs on the sides of the pawls, thus forcing the pawls toward and against the ratchet-teeth.

The operation is as follows: Power is applied to the machine, and the sheet to be cut placed between the feed-roll B and the upper feed-roll, B″. The pinion J rotates the gear-wheel K, whereby the stud or roller L op-

erates the segment G, whose motion will be oscillating, as is evident. The segment G imparts motion to the pinion D, and the lugs D′ of the hub whereof strike against the lugs D″ on the arms E, which carry the pawls F. It will be seen that the arms E, and consequently the pawls F, are carried around with the pinion D, and thus the paper is fed, owing to the ratchet-wheel C being keyed to the shaft B′ of the feed-roll B, the paper being advanced over the bed-knife N the required length, the cut being then made by the revolving knife M. The slotted arm H is now in such position that, as the wheel K continues to rotate, the segment G, and consequently the pinion D, rotates in reverse direction to that previously described, thus causing the lugs D′ to strike the lugs F′ of the pawls F, and rock the pawls sufficiently to clear the teeth of the ratchet-wheel C, and returning the pawls to their first position, this operation being accomplished without clicking noise, as is evident. When the pinion is again operated by the segment, which is in reverse motion to that last stated, the lug D′ leaves the lug F′, and the springs *h* force the bolts *g* against the pawls F, and the latter are reliably thrown into engaging contact with the ratchet-wheel C, whereby the ratchet-wheel is again rotated, its motion being communicated to the feed-roll. The feed motion begins when the segment G is at its lowest point, the stud or roller L then being at the bottom of the slot H′. Consequently, owing to said slot H′ and action of the roller L therein, the segment begins its motion slowly, whereby the sheet is not started abruptly and torn. After the start is fairly made the segment gradually increases its motion, and thus quickly completes the advance or feed of the sheet. When the feed of the sheet is made, the arm Q falls, and its tooth R drops on the wheel P, entering the space between two adjacent teeth *b* of said wheel, and when it sits true in said space the feed-roll is held in the exact place required to cut the sheet into uniform lengths. Should, however, there be a springing of the sheet, whereby it is advanced too far, or should its advance be insufficient, the position of the teeth *b* of the wheel P is such that the tooth R presses against either of the two teeth between which it enters, thus slightly returning or advancing the feed-roll until the true position of the tooth R is attained, whereby the sheet is so set or its position corrected relatively to the knife or cutter that the lengths of the sheet removed or cut are uniform. It will be seen that owing to the spring Q′, should the feed roll or wheel P fail to move, the spring Q′ permits the arm Q to yield, thus avoiding injury to the detent or teeth of the wheel P. As soon as the cut is accomplished, the arm Q is raised by the cam S, and its tooth R clears the wheel P, whence the intermittent feeding operation may be repeated. The tooth R is attached to a saddle or holder, R′, which encircles the arm Q, and is longitudinally movable thereon, so as to adjust the tooth with precision to the teeth of the wheel P, the holder being retained in adjusted position by the set-screw R″.

The sheets are cut from a roll of paper, and the cut sheets carried from the machine by an endless apron or belt, all of which are well known in machines of this character.

In lieu of two arms E and two pawls F, I may employ a single pawl for engagement with the ratchet-wheel, in which case one of the arms is dispensed with.

In Fig. 6 I show an end view of an expanding feed-roll, the periphery whereof is formed of sections or segments, which are connected with radial arms movably fitted to the body of the roll, thus adapting said periphery to be adjusted with precision relatively to the work to be accomplished by the roll.

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

1. A feed-roll, in combination with the pinion D, and an internally-toothed ratchet-wheel having a pawl adapted to be removed from the teeth of said ratchet by means of a lug on the pawl and a lug on said pinion, the two lugs engaging on the return motion of the pinion, substantially as and for the purpose set forth.

2. A feed-roll and internally-toothed ratchet-wheel, a pawl, and an arm which carries the pawl, in combination with a lug on the pawl, a lug on the arm, a rotary reciprocating pinion, and a lug on said pinion, the lugs on the pawl and arm being on opposite sides of the lug on the pinion, substantially as and for the purpose set forth.

3. A feed-roll, in combination with a ratchet-wheel, a pawl having a lug, an arm carrying the pawl and formed with a lug, a pinion provided with a lug, said arm and pinion being loosely fitted on the hub of the ratchet-wheel, and gearing imparting rotary reciprocating motion to said pinion, substantially as and for the purpose set forth.

4. The feed-roll and its shaft, in combination with a ratchet-wheel fixed thereto, a pawl, a loosely-fitted arm carrying said pawl, a loosely-fitted pinion with a lug which engages with said pawl, a toothed segment gearing with the pinion and provided with a slotted arm which is connected with the segment, and a stud which is secured to a wheel and projects into the slotted arm, substantially as and for the purpose set forth.

5. A feed-roll, a toothed disk, a cam, and a spring, and an arm operated by said cam and spring, in combination with a detent which is movably fitted to said arm, whereby it may be longitudinally adjusted thereon, substantially as and for the purpose set forth.

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