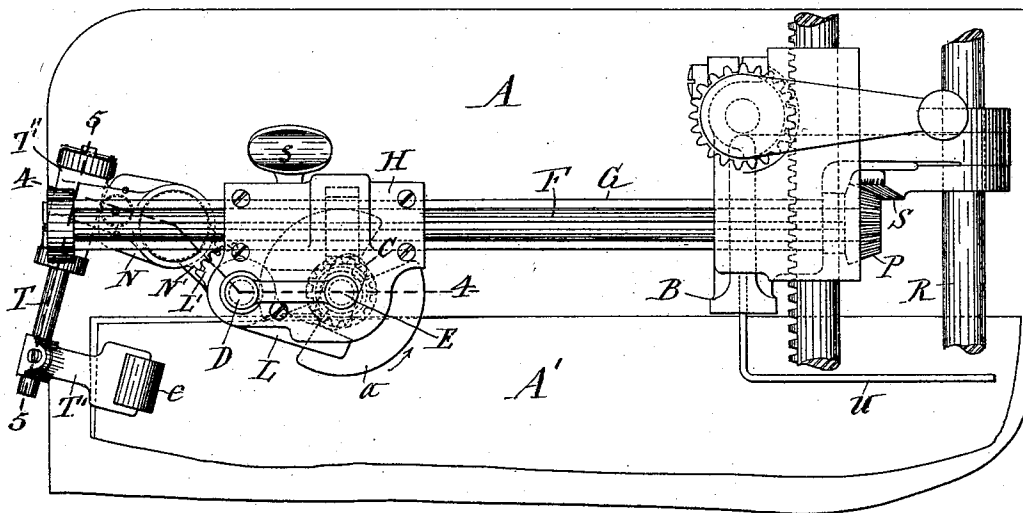
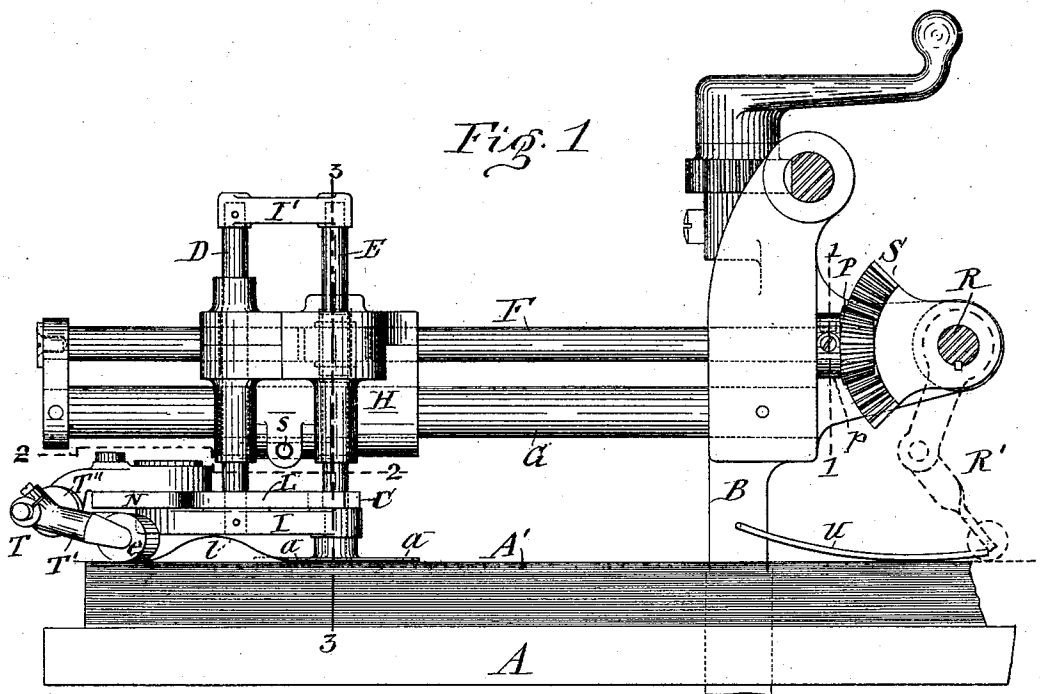


T. A. BRIGGS.
PAPER SEPARATING MECHANISM.

No. 487,514.

Patented Dec. 6, 1892.



WITNESSES

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(No Model.)

4 Sheets—Sheet 2.

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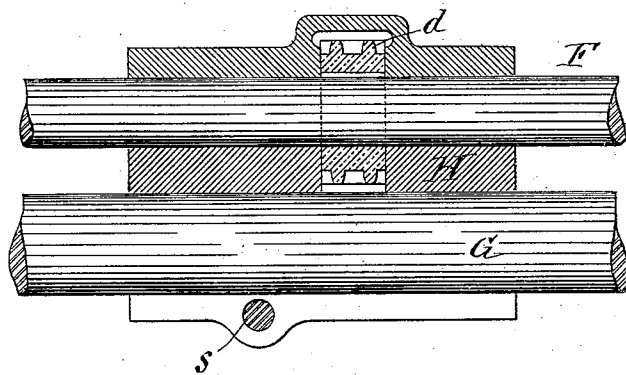


Fig. 3

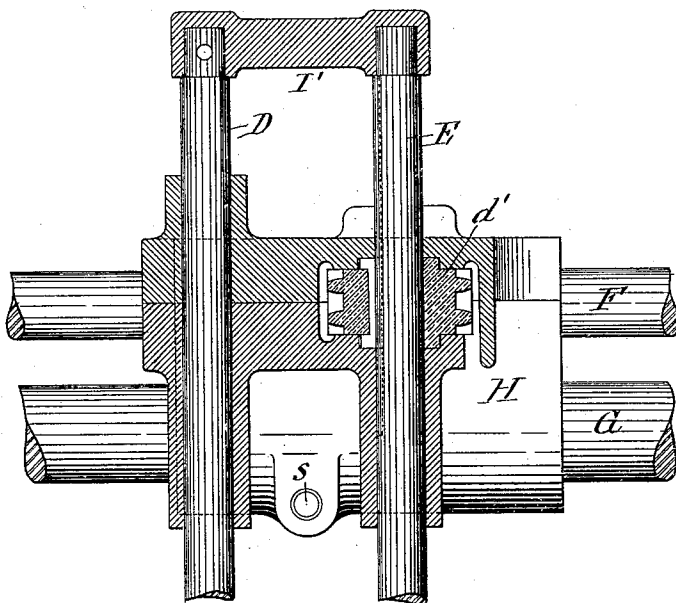


Fig. 4

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4 Sheets—Sheet 3.

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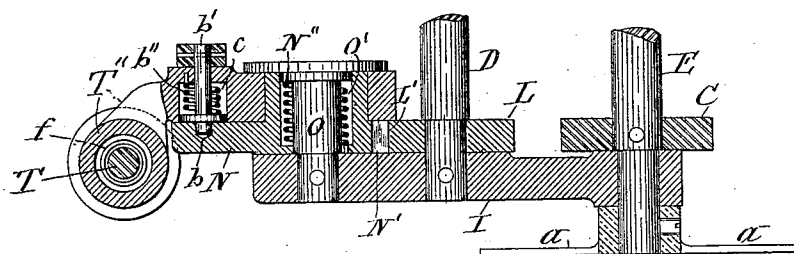


Fig. 5

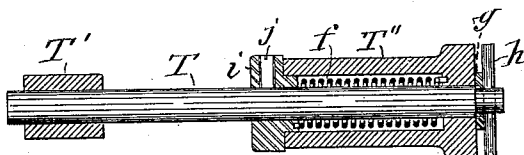


Fig. 6

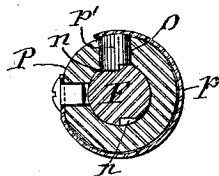


Fig. 7

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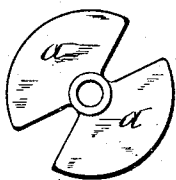
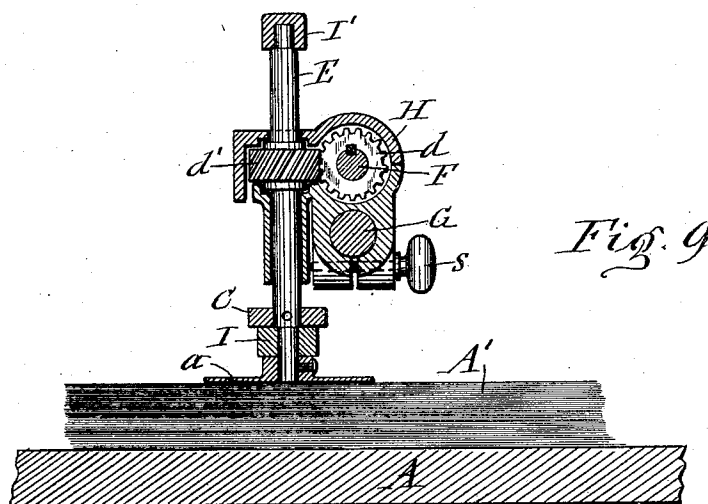
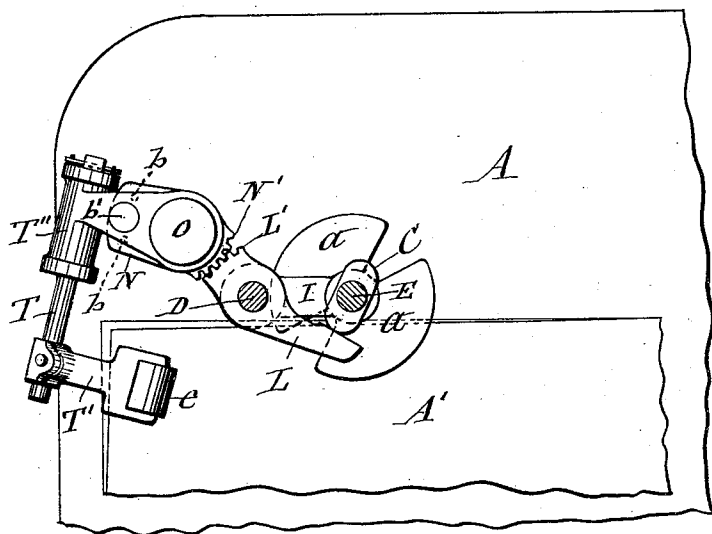
(No Model.)

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UNITED STATES PATENT OFFICE.

THOMAS A. BRIGGS, OF ARLINGTON, MASSACHUSETTS.

PAPER-SEPARATING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 487,514, dated December 6, 1892.

Application filed April 2, 1892. Serial No. 427,457. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. BRIGGS, of Arlington, in the county of Middlesex, in the State of Massachusetts, have invented new and useful Improvements in Paper-Separating Mechanisms, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to the mechanisms employed for separating the top sheet from a pile of paper preparatory to feeding said paper to a printing-machine or other machines designed to operate on a single sheet of paper at a time.

The object of the invention is to more positively insure the separation of the paper, as aforesaid, and by simple and efficient mechanisms; and to that end the invention consists in the improved construction and combination of parts, as hereinafter described, and set forth in the claims.

In the annexed drawings, Figure 1 is a side elevation of a paper-separating device embodying my invention. Fig. 2 is a top plan view of the same. Figs. 3 and 4 are enlarged sectional views of the connection of the separating mechanisms to their supporting-arm. Fig. 5 is a vertical longitudinal section on line 4 4 in Fig. 2. Fig. 6 is a longitudinal section on line 5 5 in Fig. 2. Fig. 7 is a transverse section on line 1 1 in Fig. 1. Fig. 8 is a horizontal transverse section on line 2 2 in Fig. 1. Fig. 9 is a vertical transverse section on line 3 3 in Fig. 1, and Fig. 10 is a detached plan view of the paper-separating disk or plates.

Similar letters of reference indicate corresponding parts.

A represents the table upon which is placed the pile of paper A' to be fed to a printing-machine or other machine requiring the sheets of paper to be fed to it separately. Said table is arranged movable vertically between the posts B of the frame of the machine, and is usually raised automatically with the paper-feeding mechanism by various means not necessary to be here illustrated. An exemplification of said automatic table-lifting mechanism is illustrated and described in my application for Letters Patent of the United States, Serial No. 412,989, filed November 24, 1891.

G is a rigid horizontal arm attached to the post B and extending rearward therefrom at a suitable elevation above the table A. On said arm is mounted movable longitudinally the block H, which is split longitudinally and clamped in its desired position by a screw s, passing transversely through the split portion. In said block is journaled the shaft F, which is parallel with the arm G and is also journaled in a suitable bearing on the post B. Said shaft extends sufficiently forward from the post to permit the beveled pinion P to be attached to the end of the shaft, said pinion meshing with the segmental gear fixed to the rock-shaft R, to which are connected the fingers R', which push the sheets of paper from the pile toward the machine which is to print or otherwise operate on the same.

Various means may be employed for imparting the rocking motion to the shaft—as, for instance, the mechanisms illustrated in my prior application for Letters Patent hereinbefore referred to.

In my said prior machine the shaft F is compelled to oscillate or rock with the rock-shaft R and the oscillating motion is converted into intermittent rotary motion of the vertical shaft E of the paper-separator by clutch mechanism seated in the block H. Said clutch mechanism is intricate and expensive and difficult of access for repairs or renewal. To obviate this, I now mount the pinion P loosely on the shaft F and provide the former with the radial perforation o and the shaft with shouldered notches n n, as shown in Fig. 7 of the drawings. To the exterior of the hub of the pinion P, I fasten one end of a spring-band p, which encircles said hub and bears with its free end on the outer end of a dog or clutch-pin p', seated movably in the perforation o. Said notches and the engaging face of the dog p' are so shaped as to cause the said dog to engage the shoulder of the notch, and thereby compel the shaft F to move with the gear S in one direction and allow the dog to slip out of the notch when the pinion is turned in the opposite direction. Hence an intermittent rotary motion is imparted to the shaft F. Vertically through the block H extend the rod D and shaft E, which are free to slide vertically therein. To opposite ends of said rod are

firmly secured the arms II', in which are journaled the ends of the shaft E. A worm-gear *d* is mounted loosely on the shaft F to allow said gear and block II to be shifted lengthwise of the shaft, and thereby adjust the paper-separating mechanism to its requisite position over the rear portion of the pile of paper. By a spline-and-feather connection of said gear with its shaft it compels said parts to turn in unison. Another worm-gear *d'* is similarly connected to the vertical shaft E and meshes with the gear *d*, as shown in Fig. 9 of the drawings. Said shaft is thus intermittently rotated and at the same time allowed to slide vertically.

To the foot of the vertical shaft E is firmly secured the paper-separator proper, which consists, essentially, of the horizontal plates *a a*, disposed in one and the same plane and extending in opposite directions from the shaft, so as to allow said plates to pass alternately under the successive top sheets of the pile of paper. The plates *a a* are of sufficient widths to invariably cause one of them to rest upon the top of the pile of paper, and thereby support the lower arm I and all parts connected to said arm. The top sheet of paper is therefore always subjected to pressure, which feature is very essential to the successful separation of the top sheet from the pile.

I preferably form the paper-separating plates *a a* in one piece of the form of a circular disk mounted rigidly on the shaft E, as aforesaid, and having at opposite sides of the latter the V-shaped notches *a' a'*, extending from the periphery to the hub of the disk, as shown in Fig. 10 of the drawings.

On the rod D, immediately over the arm I, is pivoted the lever L, one end of which is held in contact with the cam C, fixed to the shaft E, and the opposite end of said lever is formed with a toothed segment L'. To the rearwardly-extending free end of the arm I is secured a stud-pin O, to which is pivoted the supplemental lever N, which is formed with a toothed segment N', meshing with the segment L'. Said supplemental lever is also formed with a hollow upward-projecting hub O', the interior of which is somewhat larger than the pin O and is surrounded by a coil-spring N'', which is secured at opposite ends to the supplemental lever and to the head of the aforesaid pin, as shown in Fig. 5 of the drawings. Said spring exerts its force in a direction which causes the supplemental lever to hold the lever L in contact with the cam C. Upon the hub O' is loosely mounted the supporting-shank of the paper-buckling arm T, which shank is formed with a recess *c* in its under side. Vertically through the said recess and through the top of the said shank extends a pin *b'*, which by means of a spring *b''* is caused to enter one of a series of sockets *b* in the top of the supplemental lever. Said plurality of sockets allows the arm T to be set at different angles in relation

to the line of travel of the paper or edges of the pile of paper, which adjustment is required to operate on paper of different qualities.

To the free end of the arm T, I attach the paper-buckling finger T', adjustable lengthwise of said arm to bring said finger to bear at the proper point on the top sheet of paper, said finger having affixed to its free end the rubber block *e*, by which it bears upon the paper. The requisite pressure of said block upon the paper is obtained by the spiral spring *f*, similar to that shown in my prior application for patent hereinbefore mentioned. In the present case, however, I house said spring in the sleeve T'', formed on the supporting-shank of the arm T, the arm proper, consisting of a shaft extending lengthwise through the aforesaid sleeve and retained therein by a collar *g* and key *h* on the protruding end of the shaft and a collar *i*, fastened to the shaft at the opposite end of the sleeve by a set-screw *j*, as shown in Fig. 6 of the drawings. The spiral spring *f* is fastened at one end to the collar *i* and at the opposite end to the sleeve. By loosening the said collar on the shaft and turning it the tension of the spring can be adjusted as may be desired to obtain the requisite pressure of the finger T' upon the paper.

U represents a paper-straightening finger consisting of a piece of spring-wire attached at one end to the post B of the frame at the rear of the paper-feeding finger R' and extending with its free end forward and bearing thereby upon the paper to hold the same smoothly upon the pile, and thus insure the engagement of the feeding-finger R' with the top sheet to push the same from the pile.

In the operation of the described paper-separating mechanism the pile of paper is constantly subjected to the downward pressure of the paper-separating plates *a a*, and while one of said plates turns and slides upon the top sheet the cam C swings the arm T forward by means of the lever L. Said arm, moving much faster than the plate *a*, causes the finger T' by pressure of the rubber block *e* upon said top sheet to buckle up said sheet, as represented at *l* in Fig. 1 of the drawings. While the sheet is in said condition the shaft E turns sufficiently to cause the other plate *a* to be swung around and enter between the buckled sheet and subjacent sheet, and the first-named plate is then swung off from the pile of paper, and at the same time the cam C releases the arm T, and thereby allows said arm to be swung back by the spring N''. The top sheet being liberated it can be moved easily from the pile by the feeding-fingers R'.

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

1. In combination with the paper-buckling mechanism, rotary horizontal paper-separating plates disposed diametrically opposite each other in one and the same plane and

mounted on one and the same shaft and movable vertically and supported on the top of the pile of paper, as set forth.

2. In combination with the rock-shaft R, 5 segmental gear S, fixed to said shaft, vertical shaft E, paper-separating mechanism actuated by the latter shaft, horizontal shaft F, and gears transmitting motion from the shaft F to the shaft E, the shouldered notches *n* in 10 the sides of the shaft F, the pinion P, mounted loosely on said shaft and provided with the radial perforation *o* in its hub, the dog *p'* in said perforation, and the spring-hand *p*, encircling the hub of the pinion and secured 15 at one end thereto and bearing with the opposite end on the dog *p'*, substantially as described and shown.

3. In combination with the rod D, shaft E, 20 arm I, supported on said rod and shaft, and the cam C and paper-separating plates fixed to said shaft, the lever L, provided at one end with the toothed segment L', a spring holding said lever with the opposite end in contact 25 with the aforesaid cam, the supplemental lever N, pivoted to the free end of the arm I and formed with a toothed segment N', meshing with the segment L', and a paper-buckling arm extending from the supplemental lever, as set forth.

30 4. In combination with the rod D, shaft E, arm I, supported on said parts, and the cam C and paper-separating plates fixed to said shaft, the lever L, pivoted on the aforesaid rod and 35 having one end in contact with the cam and formed at the opposite end with the toothed segment L', the stud-pin O, rigidly attached to the free end of the arm I, the supplemental lever N, pivoted to said stud-pin and formed with the toothed segment N', the spring N'',

connected at opposite ends to said pin and 40 supplemental lever, and a paper-buckling arm extending from said supplemental lever, as set forth.

5. The combination of the oscillatory supplemental lever N, provided with sockets *b b*, 45 the paper-buckling arm T, having its supporting-shank pivoted on said lever, and the pin *b'*, movably connected to said shank and engaging one of the aforesaid sockets, as set forth and shown. 50

6. The combination of the oscillatory supplemental lever N, formed with the hub N'' and sockets *b b*, the paper-buckling arm T, having its supporting-shank pivoted on said 55 hub and provided with the recess *c*, the pin *b'*, extending vertically through the recessed portion of said arm, and the spring *b''*, seated in the recess and forcing the pin into the socket *b*, substantially as described and shown.

7. In combination with the supplemental 60 lever N, the paper-buckling arm consisting of the sleeve T'', pivoted to said lever, the shaft T, extending lengthwise through said sleeve, collars on the shaft at opposite ends of the sleeve and one of said collars clamped ad- 65 justably on the shaft by a set-screw, the spring *j*, housed in the sleeve and attached at opposite ends to the adjustable collar and to the sleeve, and the finger T', attached to the free end of the shaft, substantially as described 70 and shown.

In testimony whereof I have hereunto signed my name this 28th day of March, 1892.

THOMAS A. BRIGGS. [L. s.]

Witnesses:

WILLIAM H. H. TUTTLE,
RAYMOND BUFFUM.