No. 665,360. Patented Jan. 1, 1901.

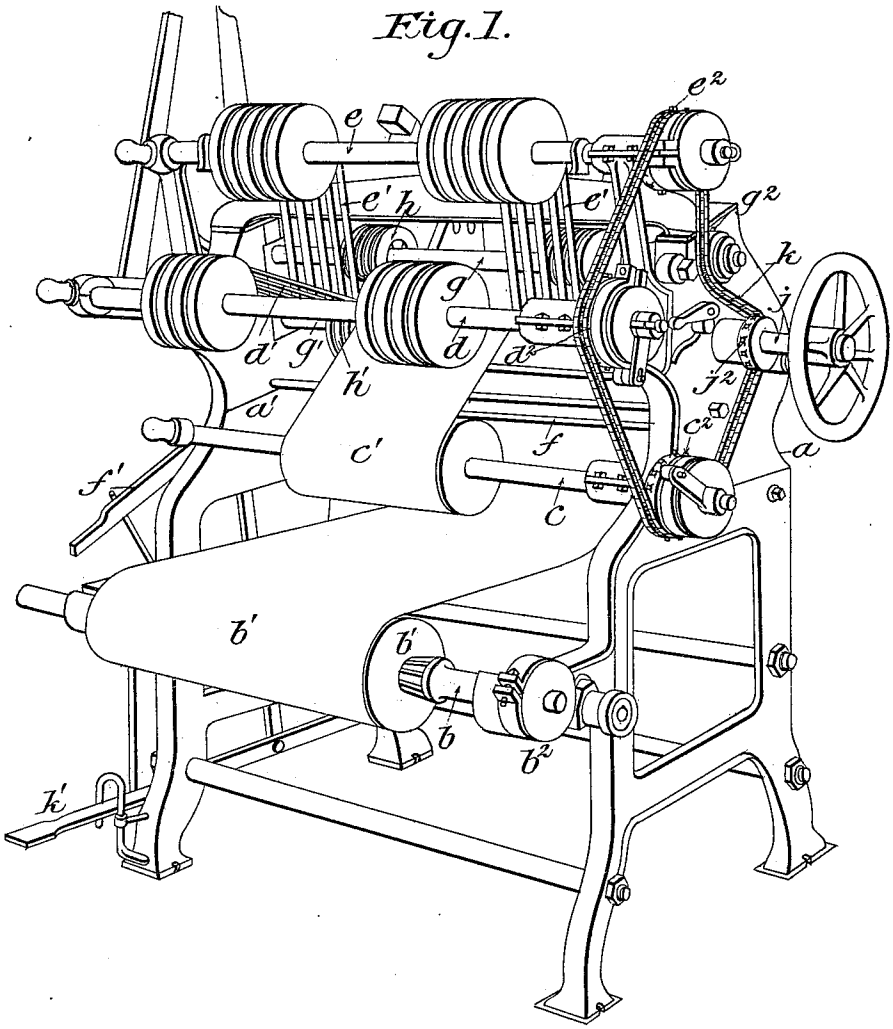
C. BECK.

ROTARY PAPER SLITTING AND REWINDING MACHINE.

(Application filed Feb. 10, 1900.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.



Witnesses:
C. Hugh Duffy
E. J. Webb

Inventor:
Chas. Beck
By O. E. Duffy & Co.
Atty.

THE NORRIS PETERS CO., PHOTO-LITHO, WASHINGTON, D. C.

No. 665,360. Patented Jan. 1, 1901.

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(No Model.) 3 Sheets—Sheet 2.

Fig. 2.

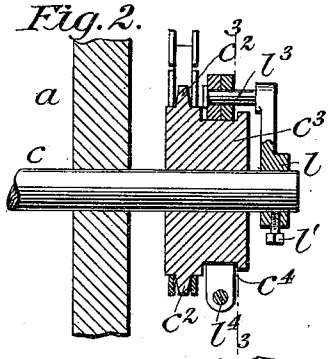


Fig. 3.

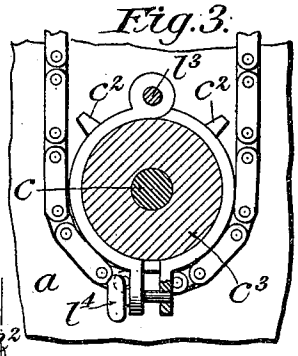


Fig. 6.

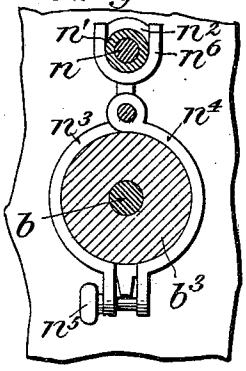


Fig. 5.

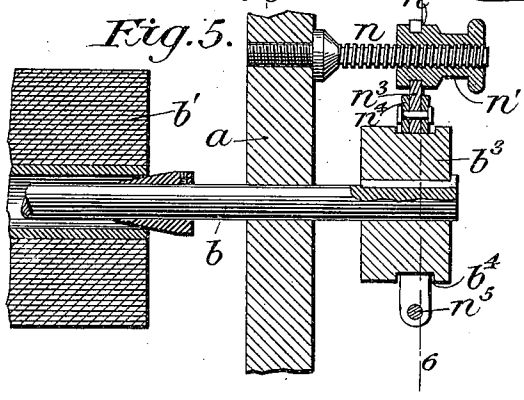


Fig. 9.

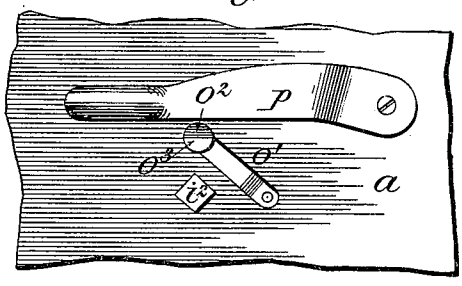


Fig. 8.

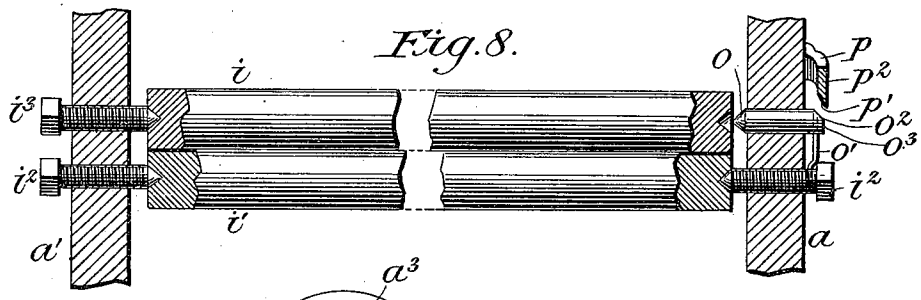


Fig. 12.

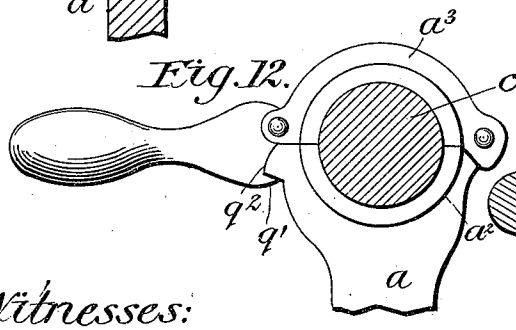
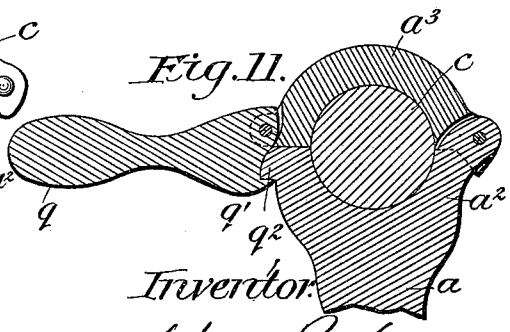


Fig. 11.



Witnesses:

C. Hoyle Duffy

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No. 665,360. Patented Jan. 1, 1901.

C. BECK.

ROTARY PAPER SLITTING AND REWINDING MACHINE.

(Application filed Feb. 10, 1900.)

(No Model.) 3 Sheets—Sheet 3.

Fig. 13.

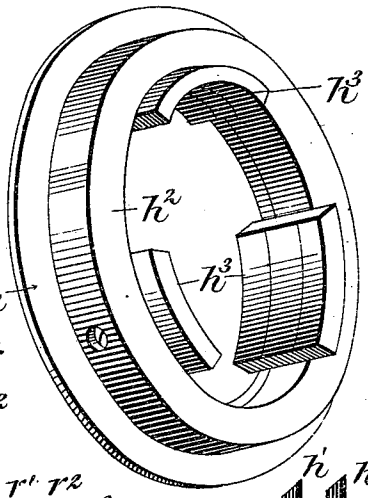


Fig. 4.



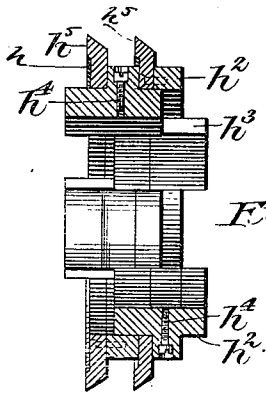


Fig. 14.

Fig. 15.

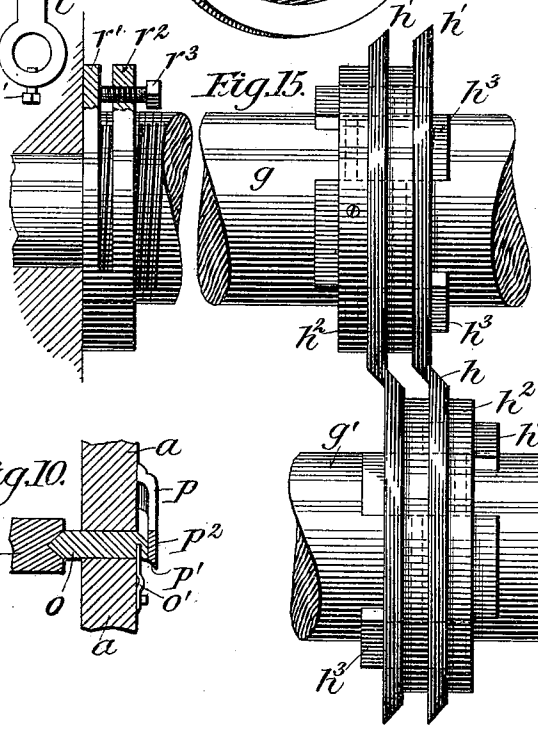


Fig. 16.

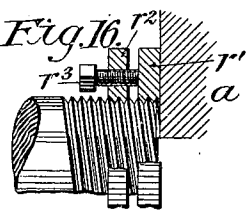
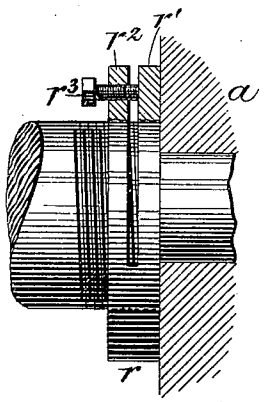


Fig. 10.



Witnesses:

Haugh Duffy

O. J. Hebb

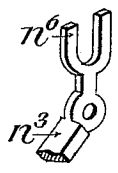


Fig. 7.



Inventor.

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By O. E. Duff & Co.

Atty.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

CHARLES BECK, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE CHAS. BECK PAPER COMPANY, LIMITED, OF SAME PLACE.

ROTARY PAPER SLITTING AND REWINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 665,360, dated January 1, 1901.

Application filed February 10, 1900. Serial No. 4,770. (No model.)

To all whom it may concern:

Be it known that I, CHARLES BECK, a citizen of the United States, residing at 609 Chestnut street, Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Rotary Paper Slitting and Rewinding Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to rotary paper slitting and rewinding machines, and has for its objects the general improvement of the construction and operation of such machines in the following respects: first, to so arrange the parts of the machine that the unwinding-shaft, one or more, but preferably three, the rewinding-shafts, and the starting and stopping mechanism shall all be on the front of the machine within range of vision of the operator at all times; second, to provide improved tension and shaft adjusting means for the unwinding-shaft; third, to provide improved bearings for the rewinding-shafts by which quick opening and closing lock-bearings are produced; fourth, to provide improved means for rendering the upper guide-roll easily removable, and, fifth, to provide improved adjustable bearing-washers for the cutter-shafts.

With these objects in view my invention consists in the improved construction, arrangement, and combination of parts hereinafter fully described and afterward specifically pointed out in the claims.

In the accompanying drawings, Figure 1 is a perspective view of a machine constructed in accordance with my invention. Fig. 2 is a detail sectional view of the tension mechanism of the rewinding-shafts. Fig. 3 is a transverse sectional view of the same on the broken line 3 3 of Fig. 2. Fig. 4 is a detail view of the clamp-carrying arm detached. Fig. 5 is a detail sectional view of the tension and shaft adjusting mechanism of the unwinding-shaft. Fig. 6 is a transverse sectional view of the same on the broken line 6 6 of Fig. 5. Fig. 7 is a fragmentary perspective view of the connecting portions of the clamps shown in Figs. 5 and 6. Fig. 8 is a partly-sectional view of the guide-rolls and their adjusting mechanism. Fig. 9 is a view in side elevation of the parts shown in Fig. 8. Fig. 10 is a sectional view illustrating the roll-removing mechanism in its holding position. Fig. 11 is a sectional view illustrating the removable upper bearing for the rewinding-shafts. Fig. 12 is a view of the same parts in side elevation. Fig. 13 is a perspective view of a hub and cutter-disk. Fig. 14 is a sectional view of a pair of adjacent cutter-disks and their hubs removed from the shaft. Fig. 15 is a view in front elevation of two pairs of hubs and disks mounted in operative positions. Fig. 16 is a detail view of part of the adjustable bearing-washers for the cutter-shafts.

Like letters of reference mark the same parts wherever they appear in the several figures of the drawings.

In the drawings, a a' indicate the sides of the frame, and b the shaft from which the roll b' of paper is to be unwound, provided with a fixed hub b^2, this shaft being at the front of the frame.

c, d, and e are the rewinding-shafts, the butt or unslit portion c' of the roll of paper being rewound on c and strips d' e' on d and e.

f indicates tension-rods of the well-known interlocking class situated in the rear of the frame, one set alternating with the other and interlocked by means of lever f'.

g g' indicate shafts journaled in the frame intermediate of the interlocking tension-rods f and the front of the frame and carrying cutting-disks h h', said disks having laterally-projecting cutting edges h^5. i i', Fig. 8, indicate guide-rolls journaled in front of these disks. The rolls and cutter-disks are driven from a main shaft j by a drive-chain k, engaging sprocket-wheels c^2, d^2, e^2, g^2, and j^2. The paper starts off the unwinding-shaft at the front, passes through the interlocking tension-rods at the rear, then through the slitting-disks, and is finally rewound on the rolls c, d, and e at the front of the machine, the narrow strips d' and e' being rewound on shafts d and e, and the wider butt c' of the roll of paper, which requires more tension than the strips, is rewound on shaft c, the object of

placing all of the rewinding-shafts at the front of the machine being to have them all under the eye of the operator while running the machine, so that in the event of breaks the machine may be instantly stopped by means of treadle k' to avoid loss of paper. A further advantage is that by placing the parts as herein shown a great saving in room is effected, the machine taking up much less floor-space, which sometimes is very costly.

I will now describe the tension devices of the rewinding-shafts c, d, and e, and as they are duplicates only one is shown in detail in Figs. 2, 3, and 4, in which the sprocket-wheel c^2 is extended to form a hub c^3, provided with a peripheral groove c^4, the sprocket and hub being loosely journaled on shaft c. On the shaft a radial arm l is adjustably secured by a set-screw l' and is provided with a hole l^2 at its outer end, in which is fixed a pin l^3. Clamp-bars m are pivoted together by pin l^3, pass around hub c^3 in groove c^4, and are tightened or loosened by a set-screw l^4. The sprocket-chain drives the hub and sprocket-wheel, and the friction between the hub and the clamps turns the shaft when sufficiently tight, the adjustment of the clamps allowing them to slip on the hub when necessary.

On the shaft b, Figs. 5, 6, and 7, is keyed or otherwise secured a hub b^3, having a peripheral groove b^4, the shaft being slidably mounted in its bearings in the frame a. A screw-threaded rod n is threaded into frame a, parallel with shaft b, and on this is threaded an elongated hand-nut n', having a peripheral groove n^2. A pair of clamp-bars $n^3 n^4$ encircle the hub in groove n^2 and are adjusted by screw n^5. A fork n^6, projecting from n^3, engages in the groove n^2 of hand-nut n'.

In Figs. 8, 9, and 10 I have illustrated the means for mounting the guide-rolls $i\,i'$. Each roll has a conical recess in each end. Screws i^2 are threaded through frames $a\,a'$ and have conical ends engaging the opposite ends of roll i'. A screw i^3 is threaded through frame a' into the recess in one end of roll i. A smooth pin o, slidably mounted in frame a, has its conical inner end engaging the opposite end recess. The pin o is held normally in its outer position, withdrawn from the recess, by a spring o', secured to the frame and engaging in a notch in the side of the pin. The pin is beveled off at o^2, the balance o^3 of the end being squared off. A lever p, pivoted to frame a, has a beveled face p' and straight face p^2. To press the pin o from its withdrawn position, as in Figs. 8 and 9, to its inner position to engage the roll, as in Fig. 10, the lever p is pressed down, the bevel-face p' engaging bevel-face o^2 of the pin and forcing it in and the straight face p^2 engaging straight end o^3 and holding it in.

The bearings of the shafts c, d, and e are illustrated in detail in Figs. 11 and 12, in which a is the frame, having half-bearings a^2, c the shaft in said bearing, and a^3 the upper half-bearing hinged at one end to a^2. A weighted handle or lever q is pivoted to the outer end of a^3 and is provided with a hook q', held normally in engagement with a tooth or projection q^2 on the frame by the weight of the lever. To raise the hinged bearings, it is only necessary to raise the handle q, the first movement upward thereof releasing the hook q^2 and the further movement raising the bearing.

In Figs. 13 to 16 I have shown the cutting-disks and their adjusting mechanism, in which the shafts are indicated at $g\,g'$ and the rotary cutter-disks at $h\,h'$. Each cutter-disk is secured to one side of a hub h^2 in any suitable manner, preferably by screws or other detachable fastening devices, in order that the cutter-disks may be easily removed from the hubs when necessary. Each hub is provided with a series of segmental bearing-blocks h^3, which may form integral parts of the hub or be separate pieces firmly secured thereto. Those blocks project inwardly from the bore of the hub and also extend beyond it at each end. Preferably these will be used on each hub, and they will be of uniform width and be uniformly spaced apart, and the space between them will preferably be equal to the space occupied by them, or approximately so, in order that the projecting ends of the blocks on one hub may fit snugly in the spaces between the blocks on an adjacent hub. This is not essential, however, and more than three blocks may be used on each hub, if preferred. Each hub is to be provided with similar devices for clamping it independently on the shaft, and in the drawings I have shown set-screws h^4 for this purpose.

In operation the several hubs with their attached cutters are slipped onto the shaft with the bearing-blocks in substantial contact therewith, it being necessary only to provide for sufficient looseness to permit the hubs to slide on the shaft, and when the cutters are arranged at the predetermined distance apart the hubs will be individually clamped on the shaft and the cutters will be firmly secured at a right angle to the shaft, the bearing-blocks effectually preventing any deviation of the cutter-disk from its true position, it being of course understood that the bearing-face of the blocks will be at a true right angle to the cutter when the latter is secured in position on the hub.

The cutters will be firmly held in position irrespective of whether the hubs are in contact or not, and the cutter-disks may thus be adjusted any desired distance apart above the minimum and be just as effective, as the segmental bearing-blocks form part of the bearing of the hub. It is, however, in adjusting the cutter-disks to the minimum distance apart that my invention possesses its most marked advantage, since I am enabled to get a lateral bearing for the cutter on the shaft twice the length of the distance between the cutters without diminishing the distance to which the cutters may be adjusted.

As illustrated in Fig. 14, the cutter-disks are as close together as it is possible to bring them; but as the bearing-blocks are enabled to interlock each cutter-disk has a lateral bearing twice the length of the distance between the cutters. In this figure the space between the cutters is three-eighths of an inch and the length of the bearing-block is three-fourths of an inch, thus adding firmness to the hub on the shaft. It will thus be seen that greater bearing-surface is provided to securely hold the cutter in its proper plane and at the same time the cutter-disks may be adjusted to almost any desired relative position, certainly to any position likely to be necessary in practical operation, for it must be understood that the length of the bearing-blocks may be less than indicated in the drawings and still be effective.

On the screw-threaded portions on the left-hand end of shaft g and right-hand end of shaft g' inside of the frame I have threaded rings r, preferably of brass, split part way around to form two sections r' and r^2. This ring can be moved outward to bear against the frames a and a', respectively, to bear against the natural tendency of the shaft g to move to the left and the shaft g' to move to the right during the cutting operation, especially when heavy stock is being cut. A screw r^3, threaded through section r^2 and bearing against section r', serves to force the sections apart, and thus lock the ring r against accidental turning.

I claim as new—

1. In a paper slitting and rewinding machine, the combination with the frame thereof, of an unwinding-shaft at the front thereof, tension-rolls at the rear, slitting-disks at the middle, guide-rolls at the delivery side of the slitting-disks, and rewinding-shafts at the front above the unwinding-shaft, the slitting-disks and the tension-rolls, and the starting and stopping mechanism at the front, substantially as described.

2. In a paper slitting and rewinding machine, the combination with the frame, of the unwinding-shaft journaled therein, a hub thereon provided with a peripheral groove, a screw-threaded rod secured in the frame parallel with the shaft, an elongated nut or sleeve on said rod provided with a peripheral groove, a clamp friction-bar adapted to engage half around the hub and provided with a forked end seated in the groove of the sleeve, a second clamp-lever pivoted to the first and adapted to engage around the other half of the hub, and a clamp-screw to draw the two clamp-bars together, substantially as described.

3. In a paper slitting and rewinding machine, the combination with the frame, of a rewinding-shaft journaled therein, a sprocket-wheel loosely journaled on the shaft and provided with an extended hub with a peripheral groove, a radial arm adjustably secured to the shaft and extending beyond the periphery of the hub, a pin secured in the arm parallel with the shaft and crossing the hub, a pair of clamp-bars pivoted together on the pin embracing the hub, and a screw for drawing them together, substantially as described.

4. In a paper slitting and rewinding machine, the combination with the frame, of a guide-roll having conical recesses in its ends, a screw threaded through one side of the frame and having a conical end engaging in one of said recesses, a pin slidably mounted through the other side of the frame, and having a conical end adapted to engage in the other recess, a spring for normally holding the pin outward, and means for pressing and holding it inward, substantially as described.

5. In a paper slitting and rewinding machine, the combination with the frame, of a guide-roll having conical recesses in its ends, a screw threaded through one side of the frame, and having a conical end engaging in one of said recesses, a pin slidably mounted through the other side of the frame and having a conical end adapted to engage in the other recess, a spring for normally holding the pin outward, the outer end of the pin being beveled off half-way across, and a lever pivoted to the frame and having an oppositely-beveled edge and straight face, substantially as described.

6. In a paper slitting and rewinding machine, the combination with the frame, of the cutter-disk shaft journaled therein and having shoulders bearing against the inside of the housing, a ring threaded upon the shaft inside of the shoulder split through part of its circumference, and a screw threaded through one portion and bearing against the other to force the two parts outward and serve as a lock-nut substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES BECK.

Witnesses:

CHAS. J. BECK, Jr.,

LEONIDAS BECK.