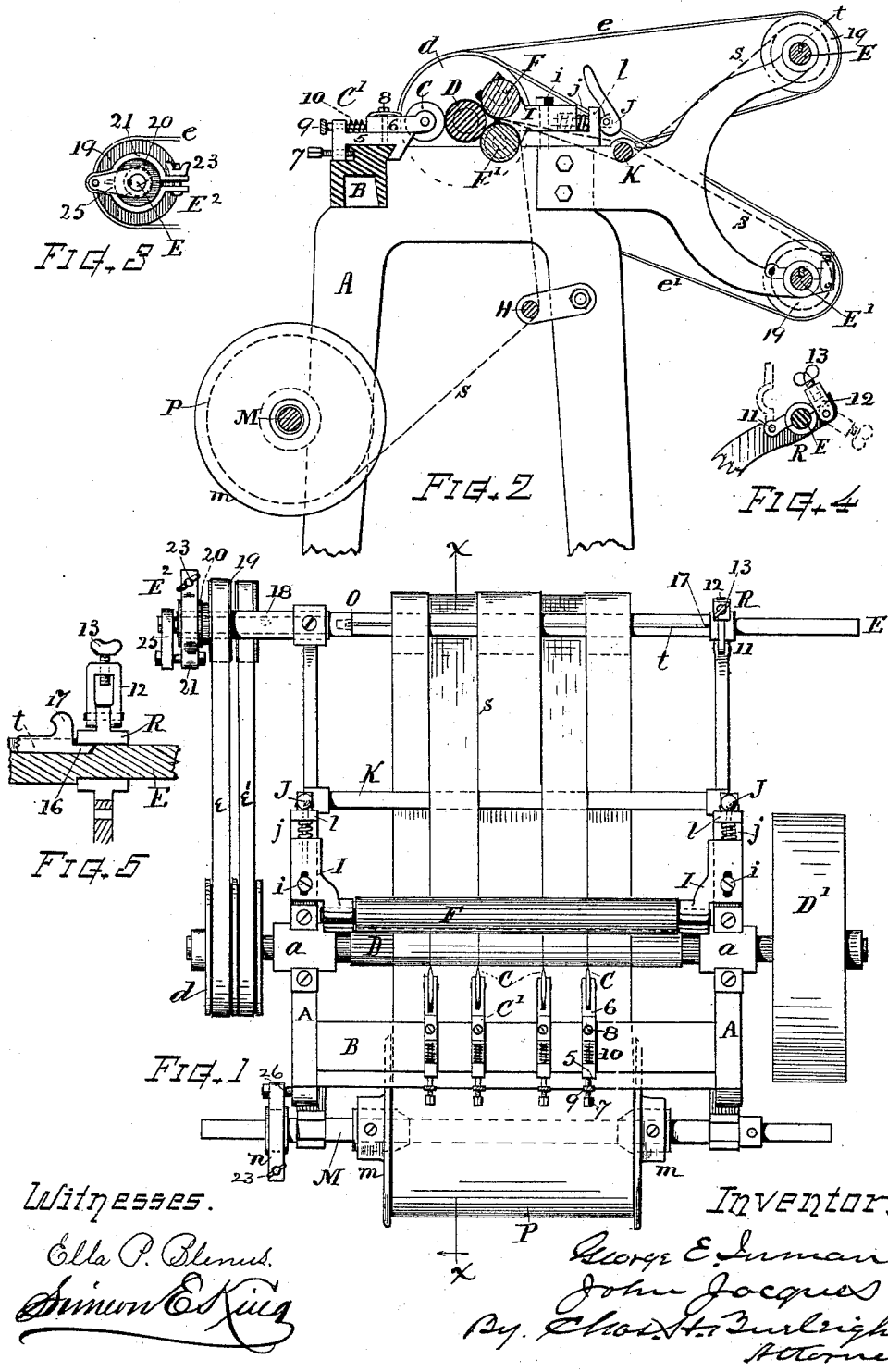


(No Model.)

G. E. INMAN & J. JACQUES.
PAPER SLITTING AND REWINDING MACHINE.

No. 465,575.

Patented Dec. 22, 1891.



UNITED STATES PATENT OFFICE.

GEORGE E. INMAN AND JOHN JACQUES, OF WORCESTER, MASSACHUSETTS.

PAPER SLITTING AND REWINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 465,575, dated December 22, 1891.

Application filed March 24, 1891. Serial No. 386,187. (No model.)

To all whom it may concern:

Be it known that we, GEORGE E. INMAN and JOHN JACQUES, both citizens of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Paper Slitting and Rewinding Machine, of which the following, together with the accompanying drawings, is a specification sufficiently full, clear, and exact to enable persons skilled in the art to which this invention appertains to make and use the same.

The object of our present invention is to improve and render more efficient machines for slitting and rewinding paper, and to provide in a machine for the purpose specified an auxiliary roll or rolls adjacent to and for supporting the cutter-bed roll in opposition to the pressure of cutters; also, to afford means for conveniently relieving said auxiliary rolls from the cutter-bed roll when threading up the machine; also, to perfect and improve details of the mechanism in various parts of the machine, as hereinafter fully explained, the particular features of invention claimed being more definitely set forth in the summary.

In the drawings, Figure 1 is a plan view of our improved paper slitting and rewinding machine. Fig. 2 is a vertical section at line *x x*. Fig. 3 is an end view of one of the friction devices for the winding-shafts. Fig. 4 shows one of the releasable bearings for the winding-shafts. Fig. 5 is a detail view showing the manner of confining the paper-holding spline of the winding-shaft.

In referring to parts, A denotes the frame; B, the front girt, whereon are mounted the adjustable holders which carry the revolving knives or cutters C.

D indicates the cutter-bed roll, its shaft, which is the main shaft, mounted to turn in bearings *aa* on the frame, and having on one end the driving-pulley D' and on its other end suitable pulleys *d* for the bands *ee'*, that operate friction mechanisms E², by which the winding-shafts E E' are rotated.

F and F' indicate auxiliary rolls disposed parallel with and adjacent to the cutter-bed roll D, both at the rear side thereof as near each other as convenient, and respectively located above and below the plane of the cutter and bed-roll axes, so that the centers of

the rolls have the triangular arrangement shown in Fig. 2. Said auxiliary rolls are journaled at their ends in adjustable bearings I, mounted upon the main journal-box or on the frame adjacent thereto, where they are securely confined by bolts *i*, but arranged to slide back and forth and provided with cams J and springs *j* for drawing back and pressing forward said bearing and rolls, as desired.

The auxiliary rolls F F' are pressed toward the roll D by the force of the springs *j*, which are of sufficient power to give a comparatively firm pressure of the rolls F F' against roll D, and as the faces of the several rolls are longitudinally parallel and lie directly against each other or against the webs of paper passing and compressed between them, the said rolls F and F' serve in a measure, within the limit of power of springs *j*, to sustain the cutter-bed roll D from springing or yielding laterally from the pressure of the cutters acting against its opposite side, while at the same time serving to guide the web of paper as it passes into and from said cutter-bed roll. The bearing-jaw for the upper auxiliary roll F is preferably made open, so that said roll can be readily lifted out to facilitate threading the paper into the machine.

The bearing-plate for the auxiliary rolls F F' is best recessed on its rear end for receiving the spring *j*, which exerts expansive force against a lug *l*, formed on its bed piece or frame. A link-bar attached to the plate and passed through the spring *j* and lug *l* connects with the cam J. When the cam-lever is swung backward and downward, the bearings and auxiliary rolls are drawn away from the roll D, and when the cam-lever is elevated, as shown in Fig. 2, the springs force forward the bearing-plates and press the auxiliary rolls firmly against the cutter-bed roll D to prevent flexure or springing of said bed-roll and to assist in sustaining it in opposition to the cutters and for holding and guiding the paper in contact with the surface of said roll.

The roll D, which is about one and three-fourths inch in diameter, more or less, forms a part of the main shaft, and is best made with an outer cylinder or surface of brass or copper, which can be removed from the shaft or body and replaced by a new cylinder when worn out.

The cutters C are circular knife-edged disks mounted in the holders C' and supported on the girt B, so that their edges run against the brass surface at the front of said roll D, as indicated.

The cutter-holder C' is composed of a clamp-bar 5, having a dovetailed lip or lips that lock onto the girt and is secured by a set-screw 7, the cutter C being carried by and rotatable in a bifurcated slide 6, that is longitudinally adjustable on the bar 5, held in place by a screw or bolt 8, and adjusted by means of a screw 9, a spring 10 being employed for pressing the cutter forward to its work. Any number of these cutter-holders and rotating cutters can be arranged on the girt for slitting the paper into a greater or less number of strips, as desired.

H indicates a guide-bar beneath the rolls, and K indicates a guide bar or roll between the bed-roll and winding-shafts E E', which latter are mounted in bearings on the rear part of the machine, two or more of such winding-shafts being employed, as desired.

M indicates the shaft for carrying the roll of paper P, supported in bearings on the front of the frame and provided with metal collars and end plates *m* for centering the paper roll. An adjustable friction device *n* is combined therewith for giving the proper degree of tension.

The winding-shafts E and E' are each separable at the point O, the part on which the strips of paper are wound being removable from the driving end portion, and the journal-bearing R at the right-hand side is made so that the upper part can be readily released to facilitate the removal of said shaft. This shaft is fitted with a shoulder at its bearing end, the journal thereof being turned off to a less diameter than the central part of the shaft, so that in normal position the removable portion of the shaft is confined from slipping out of engagement with the non-removable part at the joint *o* when the journal-box R is closed upon the journal, as indicated in Figs. 1 and 5. The cap of the journal-box R is hinged at one side at 11, and a swinging latch 12, carrying a thumb-screw 13, is arranged at its other side, which swings over the ear of the bearing-cap, as indicated in Fig. 4, and binds it firmly in place. The latch can be readily swung downward to release the bearing-cap, as indicated by dotted lines. The winding-shaft is grooved at one side and has a spline or bar *t* for attaching the end of the paper in the usual manner. One end of the spline is held by passing its end under the joint at the division of the shaft, while its other end has an extension 16, that enters the separable bearing, in the manner indicated in Fig. 5. The end of said spline is provided with a hook 17 to facilitate drawing it longitudinally out of its groove for releasing the rolls of paper wound on the shaft.

The operating-friction. E² is best made as

follows: A sleeve 18 is fixed in the bearing R', through which the rotative part of the shaft extends. Upon said sleeve is mounted a pulley 19 and friction-hub 20, running loose about the exterior thereof and rotated by the band *e*. Around said hub is a friction-ring 21 open at one side and provided with a clamp-screw 23. The opposite side of said friction-ring is connected by a crank 25 with the end of the shaft, as illustrated in Figs. 1 and 3. By means of the clamp-screw 23 the ring can be adjusted to give just the amount of friction required for winding up the strips of paper at such degree of tension, as may be desired. The friction device *n* for the paper-roll shaft can be of similar form to the above, and its ring fastened to the side of the frame by a stud 26. The paper is led from said roll P around the guide-bar H over the lower auxiliary roll F', thence under and around the cutter-bed roll D, whereon it is slitted by the cutters C. The strips are then led under the upper auxiliary roll F, and alternate strips are led to and wound upon the respective shafts E and E', those passing to the upper shaft E being carried beneath the guide roll or bar K, and those passing to the lower winding-shaft E' being carried above said guide roll or bar K. The function of the bar K is to separate the strips and guide them in such manner as to cause their edges to pass across each other at an angle or in X shape, so as to mutually rub off any adhering loose particles, scrap, or fiber from the edges of the respective strips as they run forward. The direction of the paper is indicated by the dotted line S on Fig. 2.

In some instances, or if desired, the paper can be led from the guide-bar H direct to the cutter-bed roll without passing over the roll F'. In such case said roll F' would run directly against the face of the cutter-bed roll D as a support therefor.

By means of the auxiliary roll or rolls the cutter-bed roll is supported and sustained in opposition to the pressure of the cutters. Hence a roll of small diameter can be employed for the cutter-bed, thus affording a better cutting action than on a large and heavy roll, while the paper being retained, guided, and drawn over said bed-roll by the auxiliary rolls, in the manner indicated, insures the straight and uniform cutting of the strips. The auxiliary rolls also serve to keep the surface of the roll D smooth by rolling down any burr or ridge that might be made by the cutters working into its surface. The bed-roll, being faced with brass or copper, is soft and does not dull the cutters like a steel or iron roll.

We are aware that rotatable cutters working against the face of a roll have heretofore been employed in machines for cutting and scoring paper-board, &c., and we do not therefore, claim, broadly, the use of the rotatable wheel-cutter in combination with a roll;

neither do we broadly claim the feature of supporting such a cutter by a holder that is adjustable upon a bar or girt, since holders of different structure from that shown have been employed in connection with a bar on which the holders are secured by dovetailed locking devices.

We do not claim, broadly, the use of a spline in a winding-shaft for holding the end of the paper strips, as splines have heretofore been used, but, so far as we are aware, with a different means of holding from that herein illustrated.

We claim as our invention herein to be secured by Letters Patent—

1. In a paper-slitting machine, the combination, with the cutter-bed roll, and circular knife-edged cutters, that cut against the surface thereof, of an auxiliary roll disposed parallel with and adjacent to the surface of said cutter-bed roll and arranged at a position substantially opposite to the cutters, said auxiliary roll serving both as a guide for the paper and for supporting said cutter-bed roll in opposition to the pressure of the cutters, as hereinbefore set forth.

2. The combination, substantially as hereinbefore described, of the cutter-bed roll, the circular knife-edged rotatable cutters acting against the front of said roll, two auxiliary rollers, both arranged parallel and working against said cutter-bed roll, adjacent to each other and substantially opposite to said cutters, the movable bearing-plates provided, respectively, with bearings for the journals of both said rollers adjustably fixed on the frame, and means, substantially as described, for effecting adjustment of said bearing-plates

to move said auxiliary rolls to and from the cutter-bed roll, as set forth.

3. The combination, substantially as described, of the main shaft having thereon the driving-pulley, the cutter-bed roll and band-pulleys, the circular rotating knife-edged cutters running against said roll, the auxiliary rolls adjacent to and supporting said bed-roll in opposition to said cutters, the winding-shafts, their operating-pulleys, with friction-hubs, the adjustable friction-rings on said hub having adjusting-screws therein, the cranks connecting the friction-rings and shafts, and the operating-belts from said band-pulleys to the friction-hub pulleys, substantially as and for the purposes set forth.

4. In a paper-slitting machine having a separable winding-shaft, with an intermatching joint, as at *o*, the removable portion thereof longitudinally grooved and fitted with a shouldered bearing-journal, the spline fitting said groove and having a hook and extended end *16*, that extends past said shoulder, in combination with the journal-bearing box *R*, provided with the cap *11*, that engages said shouldered journal and spline end, and cap-securing devices, all substantially as described.

Witness our hands this 19th day of March, A. D. 1891.

GEORGE E. INMAN.
JOHN JACQUES.

Witnesses to signature of Geo. E. Inman:

WM. G. TAYLOR,
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Witnesses to the signature of John Jacques:

CHAS. H. BURLEIGH,
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