

4 Sheets—Sheet 1.

MACHINE FOR SPLITTING AND WINDING PAPER.

Patented Sept. 8, 1896.

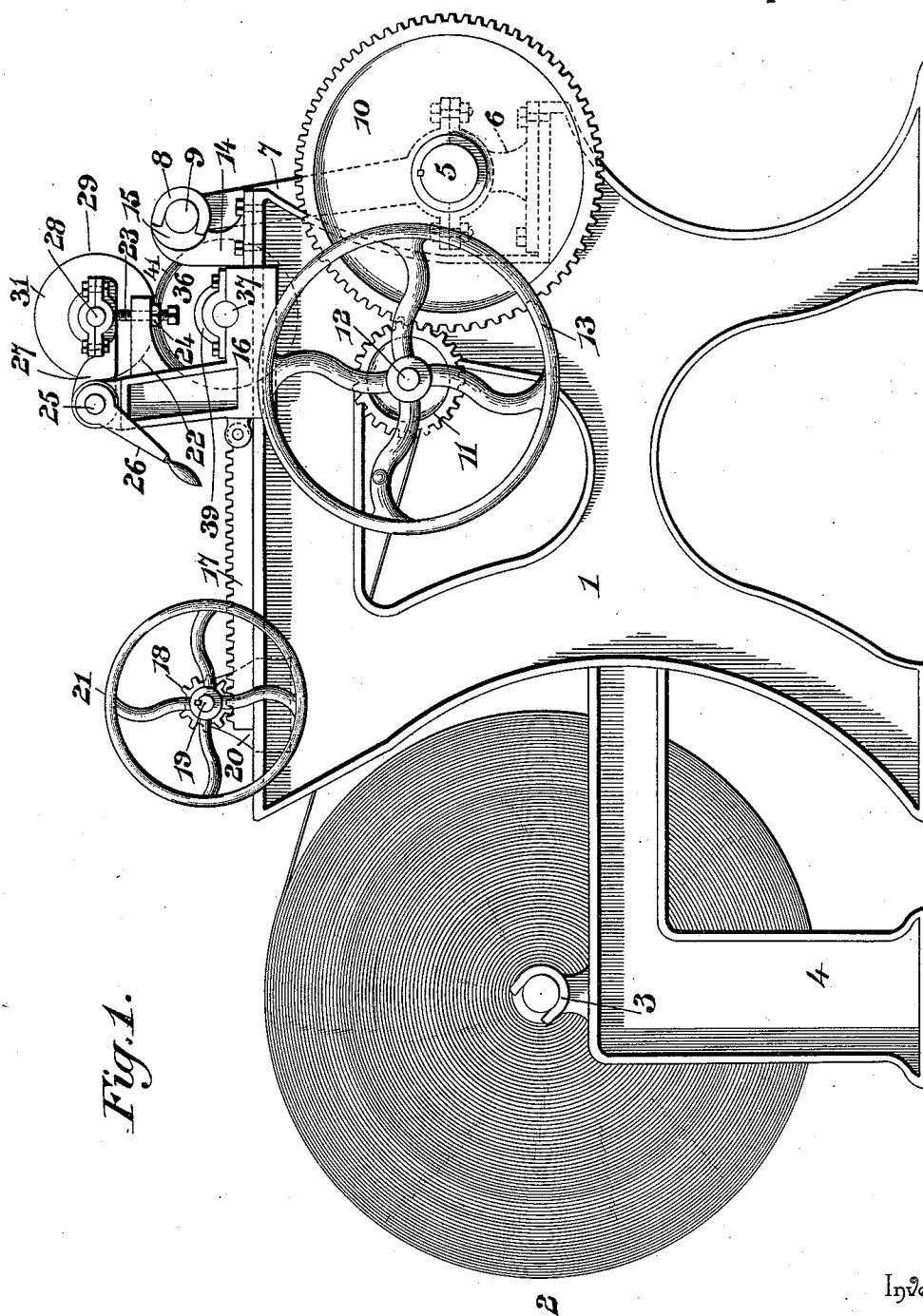


Fig. 1.

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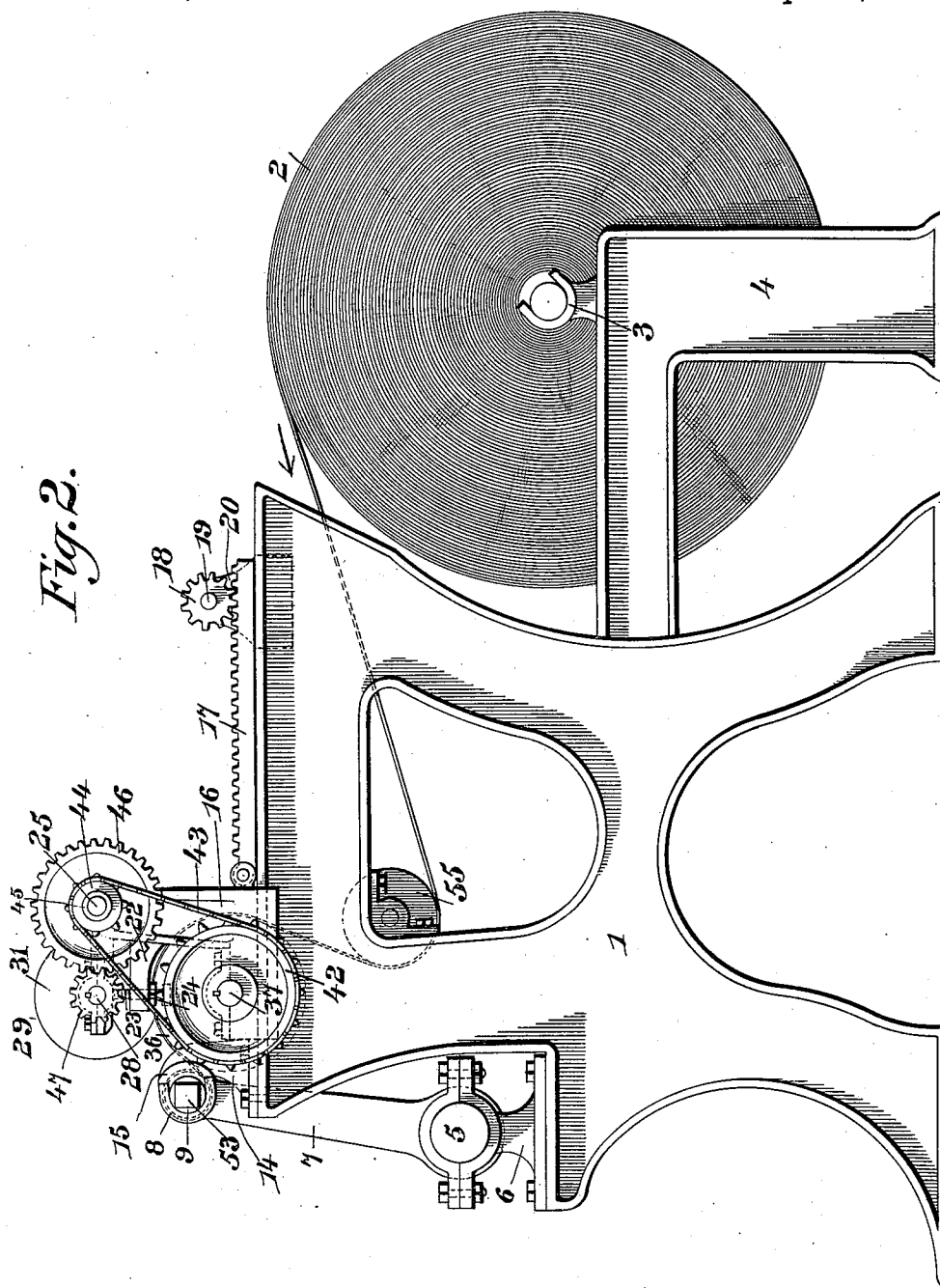
C. E. POPE.

MACHINE FOR SPLITTING AND WINDING PAPER.

No. 567,164.

Patented Sept. 8, 1896.

Fig. 2.



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Fig. 7.

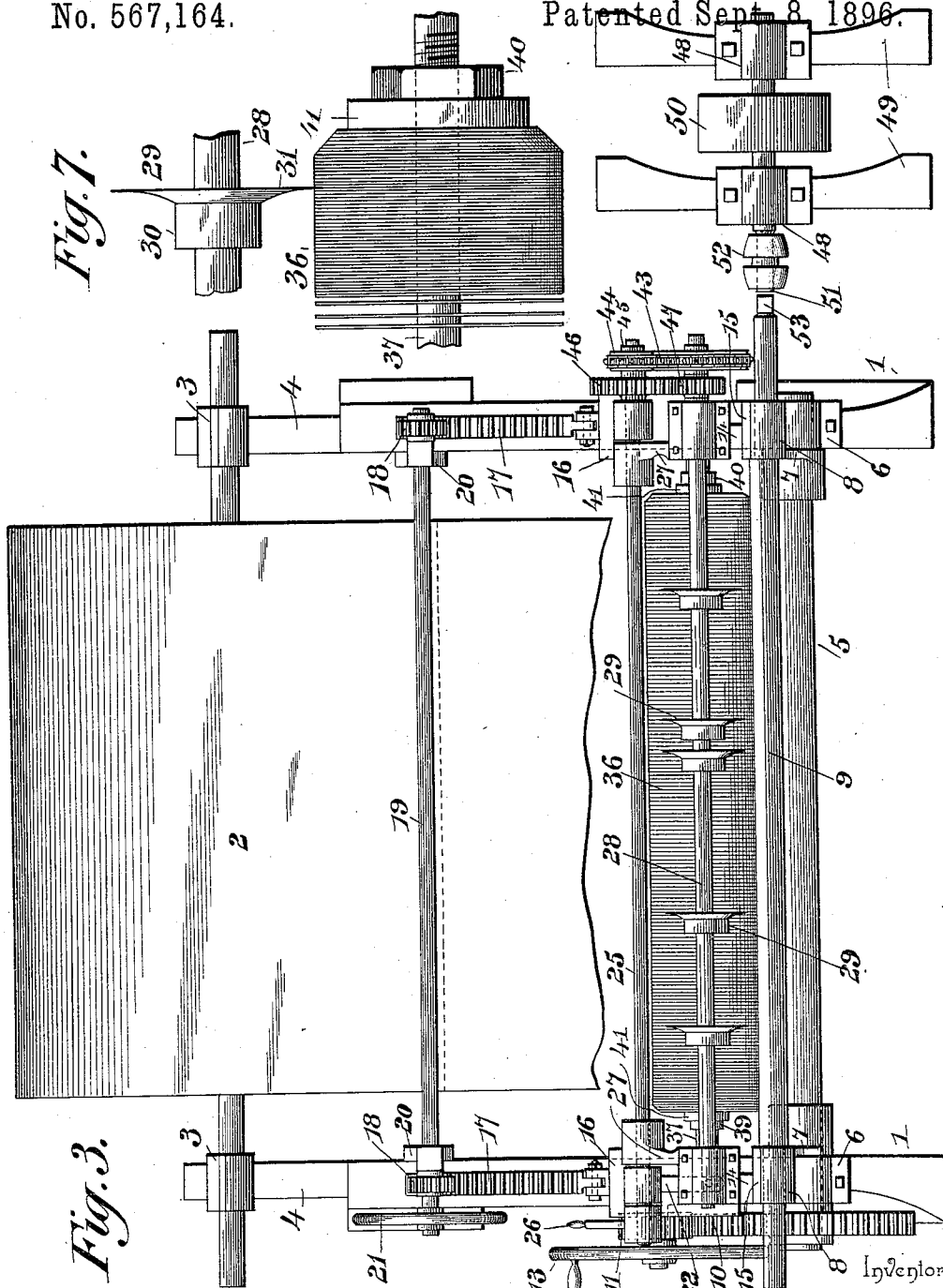


Fig. 3.

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(No Model.)

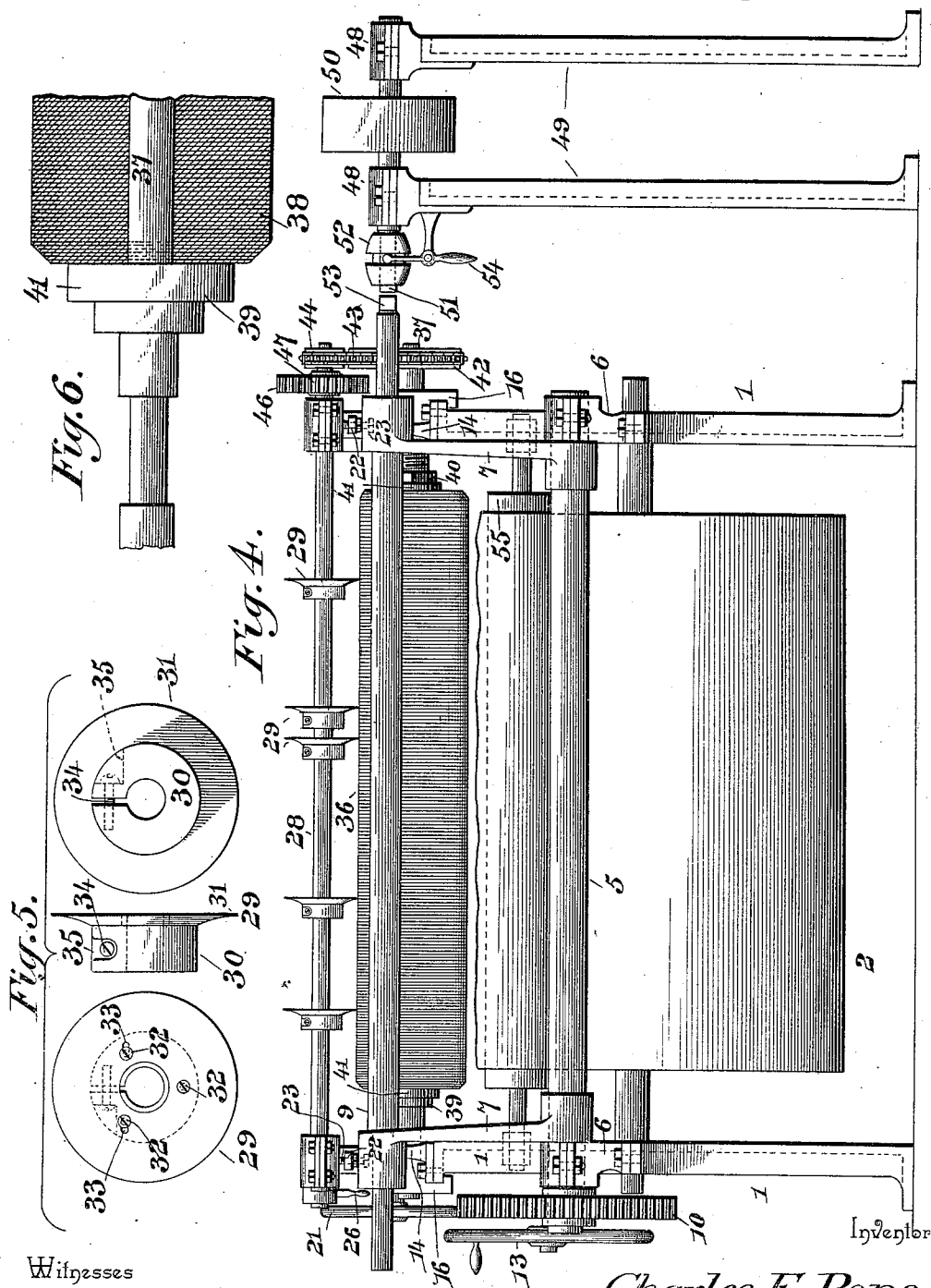
4 Sheets—Sheet 4.

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No. 567,164.

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UNITED STATES PATENT OFFICE.

CHARLES ELMER POPE, OF LYONS FALLS, NEW YORK.

MACHINE FOR SPLITTING AND WINDING PAPER.

SPECIFICATION forming part of Letters Patent No. 567,164, dated September 8, 1896.

Application filed October 30, 1895. Serial No. 567,398. (No model.)

To all whom it may concern:

Be it known that I, CHARLES ELMER POPE, a citizen of the United States, residing at Lyons Falls, in the county of Lewis and State of New York, have invented a new and useful Machine for Splitting and Winding Paper, of which the following is a specification.

This invention relates to machines for slitting rolls of paper as they come from the mill and winding the strips or fillets into rolls, the two operations being performed simultaneously, and has for its object to attain the desired end in a rapid and satisfactory manner, to make provision for alining the mandrel upon which the fillets or strips are wound with the actuating mechanism, to devise means for positively rotating the cutters from the resistance-roller over which the paper passes from the main roll to the mandrel and which acts in opposition to the said cutters to sustain the strip of paper during the slitting or cutting operation, to provide for gaining ready access to the sheet or strip of paper for splicing in the event of the sheet parting or the main roll paying out before the roll-strips have attained the required size, and, lastly, to improve the general construction of this class of machines whereby their usefulness and effectiveness are enhanced and the parts easily reached for removing the strip-rolls and placing the parts in operative relation.

Other objects and advantages are contemplated and result from the special organization of the machine, and will become apparent as the details of the latter are fully understood; and to this end the improvement consists, essentially, in certain novel structural features and combinations of parts which hereinafter will be more particularly described, illustrated, and finally outlined in the subjoined claims.

In the attached drawings, forming a part of this application, is illustrated a machine constructed in accordance with the principles of this invention, although various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention, and in said drawings—

Figure 1 is a side elevation of the improved machine; Fig. 2, a reverse side view thereof.

Fig. 3 is a top plan view of the same. Fig. 4 is a front view. Fig. 5 represents different views of a cutter. Fig. 6 is a detail view of the resistance or bed roller. Fig. 7 is a detail view of one end of the bed-roller, showing a cutter in operative relation therewith.

The same reference-numerals denote corresponding and like parts in all the figures of the drawings, in which—

1 indicates the framework for supporting the operating parts; and may be of any desired pattern and shape according to the design and purpose and character of the work to be performed.

The roll of paper 2 as received from the mill is mounted in open bearings 3, secured to a rear extension 4 of the framework, and by having the bearings 3 open the journals of the core or mandrel upon which the sheet of paper is wound can easily and quickly be placed in position or removed from the bearings, as will be readily understood. A shaft 5 is mounted in bearings 6 at the front end of the machine and is provided near its ends with radius-arms 7, formed at their outer ends with open bearings 8, which receive the mandrel 9, upon which the strips or fillets of paper are wound immediately after being cut. A gear-wheel 10 is secured upon one end of the shaft 5 and meshes with a pinion 11, secured upon a shaft 12 in the rear of the shaft 5, and which is provided with a hand-wheel 13, by means of which the said shaft 12 and the shaft 5 are turned in their bearings when it is required to move the radius-arms 7. Standards 14 are secured to the top portion of the framework near the front end thereof and form stops to limit the rearward movement of the radius-arms 7 when moving the latter into an initial position, thereby bringing the mandrel 9 in alinement with the actuating mechanism, whereby it is rotated to wind the strips or fillets of paper thereon. The mandrel 9 is held in the bearings 8 by removable blocks 15, which are fitted into the open ends of the said bearings 8 to close the latter, and which will be displaced automatically when the radius-arms 7 are turned from an upright to a pendent position, thereby facilitating the removal of the mandrel 9 from the bearings 8 after the roll-strips have attained the required size. This operation

will be clear when it is remembered that the bearings 8 are open. Hence when the arms 7 are caused to assume a pendent position the open bearings will no longer retain the blocks 5 15 and the mandrel 9, which will fall away therefrom in the manner stated. No injury will result to the rolls, as the latter will come between the side pieces of the frame, and no damage can happen to the mandrel, as the 10 latter leaves the arms before they reach a vertical position by reason of the bearings 8, opening to one side of the arms, the openings tending toward the extremities of the arms. A carriage is slidably mounted upon the 15 framework and comprises similar side brackets or standards 16, to each of which is attached a rack-bar 17, which meshes with a corresponding pinion 18 near the end of a transverse shaft 19, mounted in bearings 20 20 near the rear end of the frame. The shaft 19 is provided at one end with a hand-wheel 21, by means of which it is turned when it is required to slide or move the carriage upon the frame toward or from the mandrel 9 for 25 any desired purpose. This carriage supports the cutting mechanism and the resistance or bed roller acting in opposition thereto and bears the mechanism by means of which a positive motion is transmitted from the resistance or bed roller to the cutting mechanism. 30 Arms 22 extend from the brackets 16 and support the set-screws 23, by means of which the relative distance of the cutting mechanism is adjusted with respect to the resistance or bed roller. Jam-nuts 24 are 35 mounted upon the set-screws 23 and are adapted to engage with the arms 22 and hold the set-screws in the located position.

A transverse shaft 25 is mounted in bearings at the upper ends of the brackets 16 and 40 is provided at one end with a lever 26 for convenience in turning the shaft 25 in its bearings. Arms 27 project from the shaft 25 and have bearings at their free ends, in which is 45 journaled the shaft 28, upon which are placed the rotary cutters 29, the latter comprising a split hub 30 and an annular cutter 31. The annular cutters are similarly formed and are dished and are secured to the hub in any de- 50 sired manner, preferably by means of machine-screws 32, which pass through suitable openings in the cutter and enter threaded openings in the end or side of the hub. Usually three screws will be provided to se- 55 cure a cutter to its hub, the middle screw being located opposite the split in the hub and the side screws being disposed one upon each side of the said split, as shown most clearly in the left-hand view of Fig. 5, and 60 the openings 33, through which the end screws pass, are elongated so as to admit of the expansion and contraction of the hub when fitting the cutter upon the shaft 28. A binding-screw 34 connects the separated ends 65 of the hub, and the head thereof fits in a recess 35 in the side of the hub, so as to be out of the way and obtain a uniform bearing,

whereby the separated ends of the hub can be drawn together when it is required to se- 70 cure the cutter upon the shaft 28 against rotation. It will be understood that the rotary cutters 29 are strung upon the shaft 28, and when it is required to change their relative location the fastening-screws 32, adjacent to the split of the hub, are loosened and the 75 binding-screw 34 of the cutter or cutters to be shifted is turned back, thereby admitting of the cutter being moved upon the shaft 28 to the required position, which when attained is preserved by turning up the binding-screw 80 34 previously loosened, so as to cause the hub to become contracted and grip the shaft 28 sufficiently tight to prevent the cutter moving thereon, and the screws 32 previously loosened are retightened to prevent any pos- 85 sible looseness of the parts. The arms 27 rest upon the set-screws 23, and by adjusting the latter the relative distance between the cutters 29 and the resistance or bed roller 36 can be varied, thereby providing for varia- 90 tions in the size of the cutters 29 and roller 36.

The resistance or bed roller 36 comprises a shaft 37, journaled at or near its ends in bearings provided in the brackets or stand- 95 ards 16, and paper disks or washers 38, slipped upon the shaft 37 and confined thereon between a collar 39 at one end and a binding-nut 40 at the opposite end, said binding-nut 40 being mounted upon a threaded portion of the shaft 37 and adapted to screw thereon, 100 so as to clamp the paper disks or washers 38 and hold them in proper relation. A washer 41 is interposed between the binding-nut 40 and the adjacent end of the paper disk-body, and is of a size corresponding to the collar 105 39, which is of a slightly-less diameter than the diameter of the paper disks 38, thereby admitting of the edge portion of the latter being comparatively free so as to yield slightly for the penetration of the edge portion of the 110 rotary cutters without materially injuring or detracting from the effectiveness of the bed-roller. A sprocket gear-wheel 42 is keyed upon the projecting end of the shaft 37 and supports a sprocket-chain 43, by means of 115 which motion is transmitted from the sprocket-wheel 42 to a sprocket-pinion 44, mounted upon the shaft 25, carrying the gear-wheel 46, which is in mesh with a pinion 47, keyed to the end of the cutter-shaft 28. The sprocket- 120 pinion 44 and gear-wheel 46 are connected by a sleeve 45, loosely mounted upon the shaft 25. By this means the motion imparted to the resistance or bed roller 36 is transmitted to the cutting mechanism, and the latter posi- 125 tively operated. It will be seen that the train of gearing is such as to rotate the cutting mechanism at a relatively higher rate of speed than the resistance or bed roller. Hence the slitting or cutting of a sheet of paper is ac- 130 complished in a thorough manner and without producing a ragged edge.

The power-driven shaft 48 is located to one side of the machine and is mounted in bear-

ings at the upper ends of standards 49 and is provided with a band-pulley 50, which is driven from any suitable source of power in any of the usual ways. This power-driven shaft 48 aligns with the mandrel 9 when the latter occupies a normal or initial position, and its projecting end 51 is made angular and supports a coupling or clutch sleeve 52, by means of which the shaft 48 and the mandrel are connected together when it is required to positively rotate the mandrel for winding the strips or fillets of paper thereon to form the rolls. The adjacent end of the mandrel is made angular, as shown at 53, to correspond with the angular portion 51 of the shaft 48, and receives the coupling or clutch 52 when the latter is moved to cause the mandrel and shaft 48 to revolve as a unitary part. The coupling 52 is moved in any desired manner, and, as shown, a shipper-lever 54 is employed for the purpose and is fulcrumed to an arm projecting from the inner standard 49.

When it is required to cut a roll of paper into ribbons, strips, or fillets, the said roll is mounted in the bearings 3, and the sheet is drawn therefrom, passed beneath a guide-roller 55, thence upward and over the resistance or bed roller, and its end portion is secured to the mandrel 9 in any convenient way. The power-driven shaft 48 being coupled to the mandrel substantially as herein stated, the said mandrel is rotated and draws the sheet of paper from the roll 2 and over the resistance or bed roller and imparts a rotary movement to the latter, and this motion is transmitted to the cutting mechanism through the train of gearing herein particularly described, and the rotary cutters resting upon the bed-roller will slit or cut the strip of paper into strips, ribbons, or fillets of the required width, and these strips are wound upon the mandrel, as will be readily understood. It will be understood that the position of the mandrel is fixed by reason of the standards 14 and the coupling of the said mandrel to the power-driven shaft 48. The tension of the paper strip or sheet against the rear side of the bed-roller will hold the latter against the strips or fillets being wound upon the mandrel, and as the diameter of the mandrel increases by reason of the strips or fillets winding thereon the bed-roller will move rearwardly and thereby allow for the increasing of the roll-strips. Should the sheet of paper tear or become broken, the machine is stopped by ungearing the shaft 48 and the mandrel 9, or by stopping the shaft 48 and by manipulating the hand-wheel 21 the carriage can be drawn back, thereby separating the bed-roller and mandrel a sufficient distance to admit of splicing the ends of the sheet, after which the carriage is moved forwardly by operating the hand-wheel 21 until the bed-roller and the mandrel or the rolls thereon come into engagement. After the rolls on the mandrel have attained the required size the machine is stopped and the

mandrel ungeared from the shaft 48, and the arms 7 are thrown forwardly and downwardly, thereby permitting the blocks 15 and the mandrel to drop from the bearings 8. The mandrel is now withdrawn from the rolls and is placed in position in the bearings 8, and the hand-wheel 13 is manipulated so as to bring the mandrel into its initial or normal position, when the operation just described is repeated. The shaft 5 is operated to move the arms 7 in either direction by means of the hand-wheel 13, as will be readily understood.

Having thus described the invention, what is claimed as new is—

1. In a machine for cutting a sheet of paper into strips or fillets and winding the latter into rolls, the combination with the cutting mechanism, of a shaft, radius-arms attached to and movable with the shaft and having open bearings at their free ends, a mandrel removably fitted in the said bearings, bearing-blocks removably fitted in and closing the open ends of the said bearings, standards adapted to engage with the bearing-blocks to retain them and the mandrel in the said bearings and limit the movement of the arms in one direction, and mechanism for positively turning the shaft to cause the arms to assume a pendent position to permit the mandrel and bearing-blocks to automatically fall away from the said bearings, substantially as set forth for the purpose described.

2. In a machine for dividing a sheet of paper into ribbons or strips and winding the latter into rolls, the combination with the cutting mechanism, of a shaft, radius-arms carried by and movable with the said shaft and having open bearings at their free ends, a mandrel removably journaled in the said bearings, bearing-blocks removably fitted in and closing the open ends of the bearings, and standards disposed to retain the said blocks in position and to hold the mandrel in a normal position, substantially as and for the purpose set forth.

3. In a machine for dividing a sheet of paper into ribbons or strips and winding them into rolls, the combination of a mandrel, mechanism for positively rotating the mandrel to wind the ribbons thereon, a horizontally-movable carriage, a bed-roller adapted to engage with the rolls of ribbon and automatically move the carriage away from the mandrel, and positively driven thereby, a shaft 25 mounted upon the carriage and operated from the bed-roller, a shaft adjustably mounted upon the carriage and receiving its motion from the shaft 25 at all stages of its adjustment, and carrying cutters, and rack-bars and a pinion-bearing shaft for quickly returning the carriage to a working position when starting new rolls, substantially as described.

4. In a machine for dividing a sheet of paper into ribbons or strips and winding the

same into rolls, the combination with the cutting mechanism, and a power-driven shaft, of a shaft provided with radius-arms, a mandrel journaled in the said arms and adapted to have the ribbons or strips wind thereon, means for limiting the movement of the radius-arms in one direction so as to bring the mandrel and the power-driven shaft into alinement, and a coupling for connecting the mandrel and power-driven shaft, substantially as and for the purpose set forth.

5. In a machine for dividing a sheet of paper into ribbons or strips and winding the same into rolls, the combination of a bed-roller, a shaft extending parallel with the axis of the bed-roller and having arms, a rotary cutter journaled to the arms and adapted to act jointly with the bed-roller to cut the sheet into strips, means for adjusting the rotary cutter toward and from the bed-roller, a lever carried by the shaft provided with the said arms so as to throw the cutter away from the bed-roller, a gear-wheel loosely mounted upon the last-mentioned shaft and receiving motion from the bed-roller, and gearing for driving the rotary cutter from the gear-wheel at any adjusted position of the said cutter, substantially as set forth.

6. In a machine for cutting paper into strips or ribbons, the combination with a bed-roller, and a shaft extending parallel with the bed-roller, of rotary cutter adjustably mounted upon the said shaft and having elongated openings, a hub split in one side, a binding-screw for drawing the separated ends of the hub together to clamp it on the shaft at the required position, and screws for connecting the hub and the cutter, the screws upon op-

posite sides of the split portion of the hub working in the elongated openings of the cutter and adapted to secure the parts when clamped, substantially as set forth.

7. A machine for dividing a roll of paper into strips or ribbons and rewinding the latter, the same consisting of a shaft having radius-arms, actuating mechanism for the said shaft, a mandrel removably supported in the radius-arms, a power-driven shaft, a coupling for connecting the mandrel and the power-driven shaft, standards for limiting the movement of the radius-arms and holding the mandrel in alinement with the power-driven shaft, a carriage, a bed-roller journaled in the carriage and normally bearing against the mandrel or the rolls thereon, and rotated by the frictional contact of the paper strip passing thereover, a shaft mounted on the carriage and under the control of the attendant, and provided with arms, a rotary cutting mechanism journaled in the said arms and positively driven from the bed-roller and at a relatively higher rate of speed, set-screws for limiting and adjusting the distance between the cutter mechanism and the bed-roller, and provisions for the quick adjustment of the carriage to and from the mandrel, substantially in the manner set forth for the purpose described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

CHARLES ELMER POPE.

Witnesses:

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