

No. 610,329.

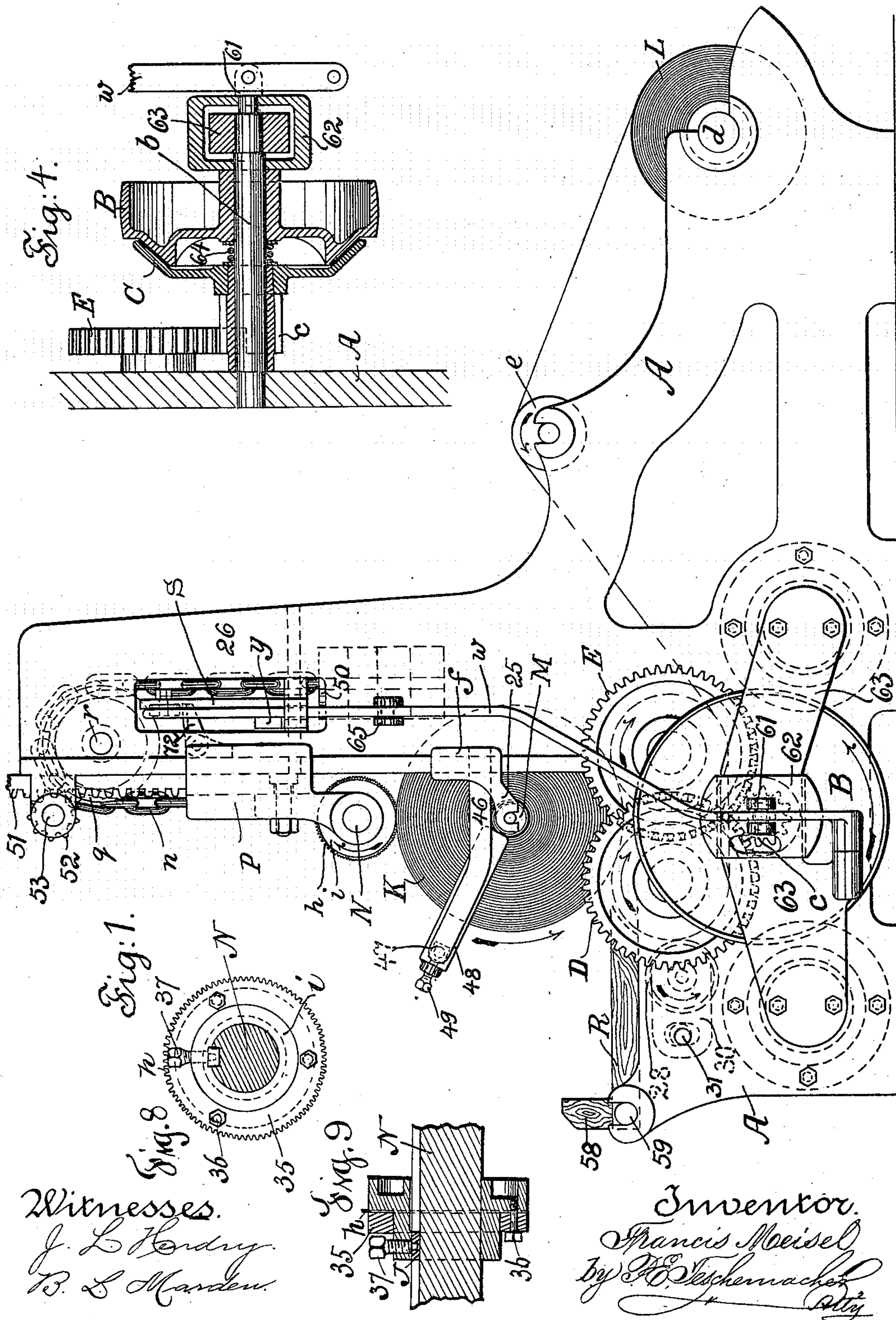
Patented Sept. 6, 1898.

F. MEISEL.
PAPER CUTTING AND WINDING MACHINE.

(Application filed Aug. 27, 1897.)

(No Model.)

3 Sheets—Sheet I.



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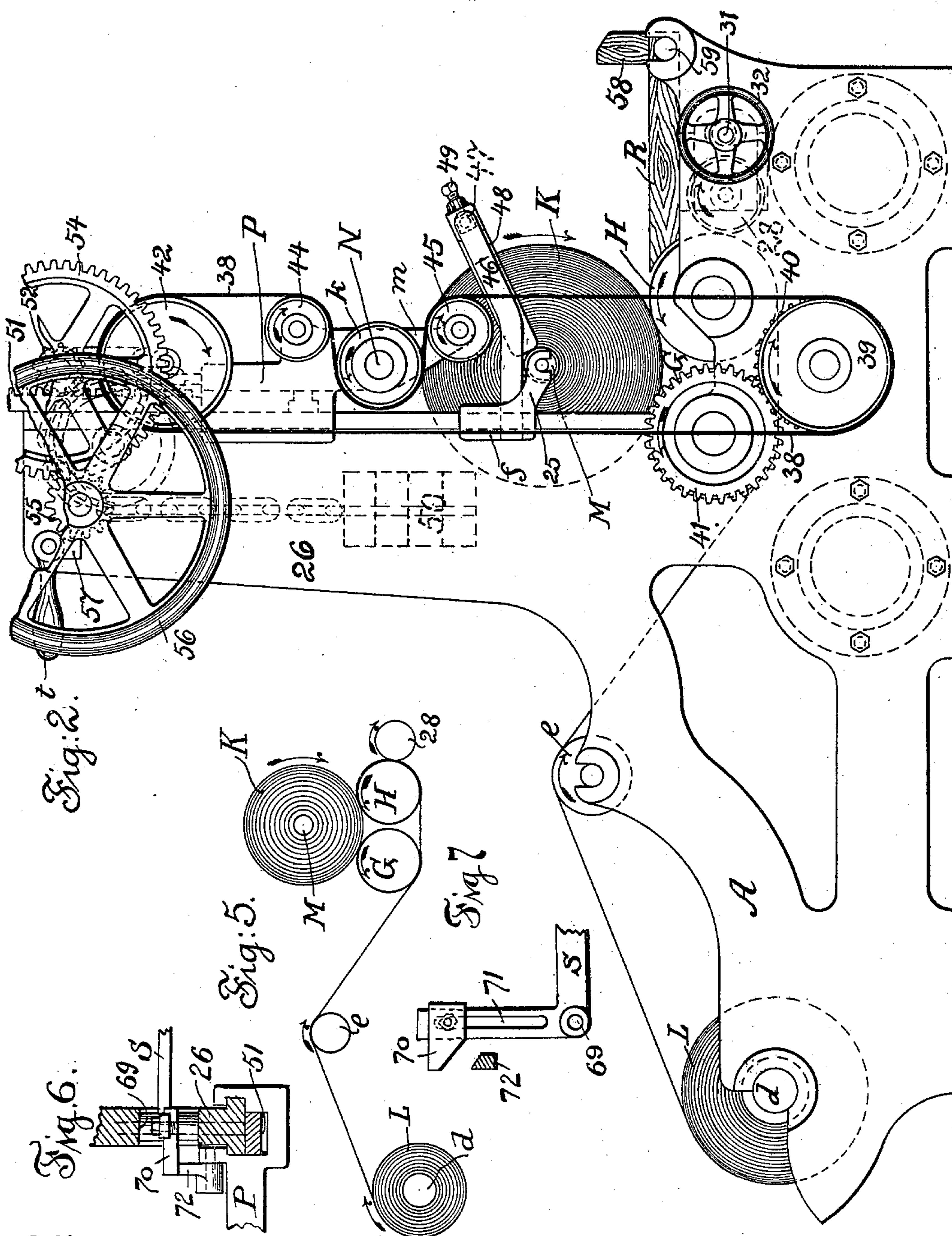
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3 Sheets—Sheet 2.



Witnesses.
J. L. Hardy.
B. L. Harden.

Inventor.
Francis Mersel.
by A. T. Stechemacher
July

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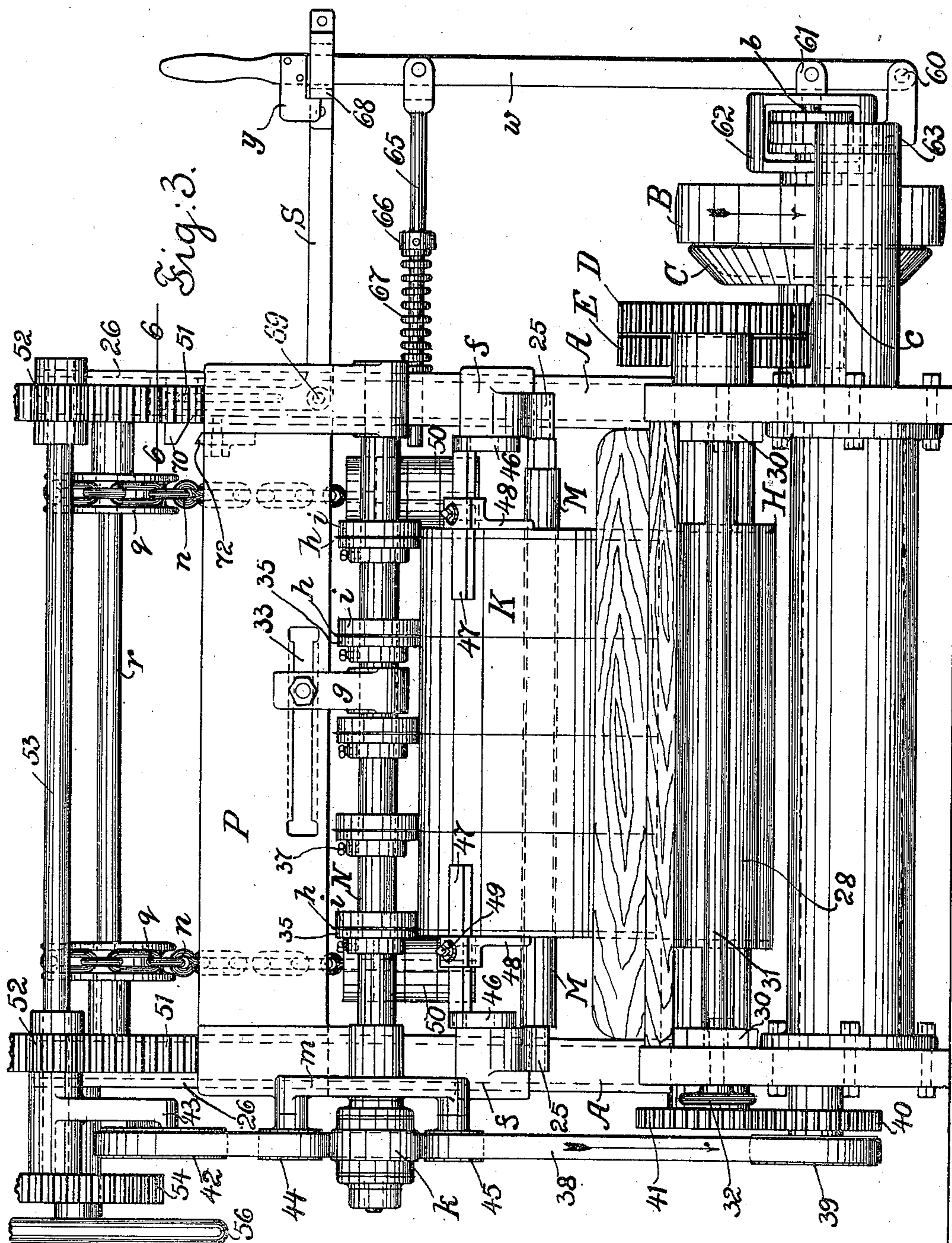
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(No Model.)

3 Sheets—Sheet 3.



Witnesses.
J. L. Hendry.
B. L. Menden.

Inventor.
Francis Meisel
by P. E. Schenck
Att'y

UNITED STATES PATENT OFFICE.

FRANCIS MEISEL, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE KIDDER PRESS MANUFACTURING COMPANY, OF SAME PLACE.

PAPER CUTTING AND WINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 610,329, dated September 6, 1898.

Application filed August 27, 1897. Serial No. 649,778. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS MEISEL, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in Machines for Cutting Webs of Paper and Winding up the Same into Rolls, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is an elevation of one side of my improved paper cutting and winding machine. Fig. 2 is an elevation of the opposite side. Fig. 3 is a front elevation of the machine. Fig. 4 is a sectional detail of the clutch or friction pulley which is connected with the automatic stop-motion. Fig. 5 is a diagram illustrating the course of the web of paper through the machine. Fig. 6 is a horizontal section on the line 6 6 of Fig. 3. Fig. 7 is a detail of a portion of the stop-motion. Fig. 8 is a side elevation of one of the paper-cutting disks and the collar by means of which it is secured to the cutter-shaft. Fig. 9 is a vertical central section of the same.

Paper-making machines are now very generally employed by which webs of paper of great width are produced—for instance, of a width of a hundred inches or more—such webs being cut into strips of suitable widths and subsequently wound up into rolls. To provide a machine especially adapted for winding and slitting webs of paper of this description is the object of my invention, which consists in certain novel features and combinations of parts, as will be hereinafter fully set forth, and specifically pointed out in the claims.

In the said drawings, A represents the framework of the machine, from one end of which projects a long stud *b*, Fig. 4, upon which runs the driving-pulley B, provided on one side with a conical face, which is adapted when operated by a lever, to be hereinafter described, to engage a correspondingly-shaped friction clutch-wheel C, rotating on said stud and carrying a long pinion *c*, which meshes with and drives two gears D E, lying in different planes and secured to the ends

of the shafts of two friction winding-cylinders G H, Fig. 2, which support and rotate by frictional contact therewith the long roll of paper K as it is cut into strips of the desired width by rotary cutters, to be hereinafter described.

The web of paper to be reeled up by the friction thereon of the winding-cylinders G H to form the roll K and cut into strips by the cutters is taken from a roll L, Figs. 1, 2, and 5, mounted on a shaft *d*, having its bearings in the framework A, the paper thence passing over a guide-roll *e*, under the winding-cylinders G H, and up over the latter to the collapsible core shaft or cylinder M, upon which it is wound up to form the roll K, the journals at the ends of the said core-shaft fitting within open bearings at the ends of arms 25, projecting from grooved slides *f*, movable vertically on guides formed at the edges of the uprights 26 of the framework A.

The web of paper is held against the front winding-cylinder H with sufficient friction to insure its being drawn from the roll L by a rubber-covered pressure-roll 28, Fig. 3, rotated by frictional contact with the cylinder H, the shaft of said roll 28 being supported in journal-boxes 30, which slide horizontally in suitable guideways in the side pieces of the framework, as shown dotted in Figs. 1 and 2, whereby the pressure-roll is made movable toward and from the cylinder H, said movement being effected by an eccentric shaft 31, passing through slots in the sliding journal-boxes 30 and having its bearings in the sides of the framework, outside of which it is provided with an operating hand-wheel 32, by turning which the pressure of the roll 28 against the paper may be increased or diminished as desired. The roll 28 prevents the wrinkling of the paper and by its action in properly delivering the paper to the roll K serves to keep said roll in its proper position in contact with both of the winding-cylinders G H.

N is the cutter-shaft, the journals of which run in bearings in lugs projecting from a heavy cross-bar P, extending transversely across the machine and sliding vertically on guides at the edges of the uprights 26, said

shaft being also supported intermediate between its ends by a hanger *g*, made adjustable horizontally in a slot 33 in the cross-bar *P* and provided with a clamping-bolt and nut, as shown in Fig. 3. The shaft *N* carries a series of thin steel circular cutters *h*, having their peripheries provided with "lancet-shaped" teeth, as shown in Fig. 8, which perforate the paper to the depth of a number of thicknesses. These cutters will produce a continuous cut as the paper is wound on the roll-shaft *M*. Each of the circular cutters *h* is secured in place upon a collar *i*, being clamped between the same and a ring 35, slipped over the smaller portion of the collar and fastened thereto by screws 36, Figs. 8 and 9, said collars being each made adjustable longitudinally upon the shaft *N*, which is provided with a spline or groove, in which fits a block or gib *j*, upon which is turned a set-screw 37, passing through the collar, as shown in Fig. 9, the cutters being in this manner made adjustable along the shaft *N*, so that they can be set at the required distances apart to cut the web of paper into strips of different widths, the hanger *g* being made adjustable horizontally, as before described, to permit of the adjustment of the cutters adjacent thereto. The collars *i* and rings 35 bear directly upon the roll of paper *K* and by their frictional contact therewith assist in rotating the same, causing the paper to be wound tightly upon the core-shaft, and as these collars and rings are of less diameter than the cutters *h* they serve to limit and determine the amount of penetration of their teeth as they revolve in contact with the paper.

To one end of the cutter-shaft *N* is secured a driving-pulley *k*, which is driven by an endless belt 38, passing around and receiving motion from a pulley 39, which rotates on a stud projecting from the framework near its bottom and has secured to its hub a gear 40, which meshes with and is driven by a gear 41, fixed to one end of the shaft of the rear winding-cylinder *G*. The belt 38 is stretched between the pulley 39 and a pulley 42 thereover, rotating on a stud projecting from a hanger 43, Fig. 3, at the top of one of the uprights 26, and passes down under an idle-pulley 44, thence around the rear side of the pulley *k* of the cutter-shaft *N* and over another idle-pulley 45 back to the pulley 39, the pulleys 44 45 rotating on fixed studs projecting from the opposite ends of an arm *m*, secured to the cross-bar *P*, this construction and arrangement of parts enabling the cross-bar and cutter-shaft to be raised or lowered, as required, without varying the tension on the driving-belt, and by thus driving the cutter-shaft by means of a belt receiving motion from one of the winding-cylinders the collars *i* and rings 35, which rest on the paper, are caused to rotate with the same surface velocity as said winding-cylinders. The upper pulley 42 is made adjustable vertically to

enable the belt to be tightened if it should become slack.

To each of the slides *f* is secured an arm 46, carrying at its end a bar 47, Fig. 3, of polygonal shape in cross-section, upon which slides a gage 48, made adjustable horizontally on said bar and provided with a set-screw 49. These gages are set close up to the ends of the roll of paper *K* which is being wound up on the core-shaft *M* and serve to hold the narrow trimming cut off by the two end cutters *h* and prevent it from dropping off the roll until the latter is removed from the machine.

The cross-bar *P* is supported by means of heavy chains *n*, passing over pulleys *q* on a transverse shaft *r*, said chains being provided with counterbalance-weights 50, preferably made in removable sections, the cross-bar being raised as the diameter of the roll increases. These weights may be increased or diminished for the purpose of varying the pressure of the collars and rings on the roll of paper *K* through the medium of the cutter-shaft *N* and cross-bar *P*, as may be found necessary for different grades or thicknesses of paper.

To the opposite ends of the cross-bar *P* are secured two vertical rack-bars 51, which are engaged by pinions 52 on a shaft 53, having its bearings in the uprights 26 and carrying a gear 54, with which meshes a pinion 55 on the hub of a hand-wheel 56, by turning which the cross-bar *P* and parts connected therewith may be raised up out of the way when required to remove the roll *K* or commence the winding up of a new one. When raised in this manner, the cross-bar is locked in place by a lever *t*, having a tooth 57, which engages the teeth of the pinion 55, as shown in Fig. 2, said tooth 57 being inclined on one side, so that while it will prevent the rotation of the pinion 55 in one direction it will permit it to rotate in the opposite direction as the bar *P* is raised by the increase in the diameter of the roll *K*.

The heavy bar *P* will supply the weight necessary for tightly winding the cut strips on the core-shaft *M*, and therefore a cutter-shaft of less diameter may be used than where a cutter-shaft is employed without such cross-bar. The cross-bar *P* also prevents the cutter-shaft from springing, which is very important, since some of these shafts are used on paper one hundred and fifty inches in width. If a shaft of such length was of a diameter large enough to prevent springing the collars and cutters would have to be correspondingly enlarged and their cost thereby greatly increased.

As soon as the roll of paper has attained the desired diameter the cross-bar, with the cutter-shaft is raised, and the roll is moved forward onto a table *R*, from which it may be removed in any suitable manner. The table is provided at its front edge with a guard 58 to hold the roll in place thereon and is pivoted at 59 to enable it to be swung up into a

vertical position as required to afford access to the cylinder H and pressure-roll 28 when the severed end of the web is to be adjusted in place previous to attaching it to the core-shaft M to form a new roll.

I will now describe the stop-motion by which the machine is stopped automatically as soon as the diameter of the roll K has reached the desired limit.

10 *w* is a hand-lever fulcrumed at 60 and pivoted between two lugs 61, projecting from a hollow piece or yoke 62, open at both sides, through which passes the support 63 for the outer end of the pulley-stud *b*, as shown in 15 Figs. 1 and 4. The piece 62 is arranged to slide longitudinally on the stud *b* and bears against the hub of the driving-pulley B, being carried inward by the lever *w* to force said pulley into contact with the friction clutch-wheel C and thereby set the machine in motion. A spring 64, Fig. 4, is introduced between the wheel C and the hub of the pulley B to keep the latter at all times in contact with the sliding piece 62, so that when the 25 lever *w* is moved outward the pulley B will be drawn back out of contact with the wheel C, thereby stopping the machine. To the lever *w* is pivoted a horizontal rod 65, the opposite end of which slides through an opening in the framework A, between which and a collar 66 it is encircled by the spiral spring 67, which acts to throw the lever outward and disconnect the pulley from the wheel C. 30 At the upper end of the lever *w* is a hook *y*, which when the lever is forced inward by hand to start the machine engages a projection 68 on the horizontal arm of a bell-crank lever S, pivoted to the framework at 69 and having its upright arm provided with a toe 70, adjustable vertically in a slot 71 by means of a bolt and nut, as shown in Fig. 7. To the cross-bar P is pivoted a bell-crank 40 tappet 72, the vertical arm of which takes a bearing against the cross-bar, as shown dotted in Fig. 1, while its horizontal arm projects outward into a position to strike the inclined side of the projection 70 when the cross-bar P has been carried upward to the desired height by the roll of paper K, thus operating 50 the lever S and tripping the lever *w*, which is then actuated by the spring 67, when the pulley B will be moved by the spring 64 out of contact with the wheel C, causing the machine to instantly stop as desired.

55 To vary the diameter of the roll K and consequently the quantity of paper reeled upon the core-shaft M, it is merely necessary to adjust the toe 70 in the slot 71 of the lever S to release the stop-motion at the desired time, and I am thus enabled to make any desired number of rolls of uniform size without requiring any care or attention on the part of the operator.

65 When the cross-bar P is raised to its full height, the tappet 72 will be above the toe 70, and on the descent of the bar P it will turn

upward on its pivot, as is necessary to allow it to slip past said toe.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a machine for cutting and winding paper, the combination with a pair of positively-driven winding-cylinders both revolving in the same direction and a core-shaft on which the paper is wound by frictional contact with the said two winding-cylinders, of a vertically-sliding cross-bar located above the winding-cylinders and carrying a horizontal cutter-shaft mounted in suitable bearings in said bar; said cutter-shaft being provided with circular cutters and collars of a diameter slightly less than that of the cutters and adapted to rest upon the paper being cut to thereby limit the degree of penetration of the cutters, and the said cross-bar serving as a weight to press the collars down on the paper for tight winding and also preventing the cutter-shaft from springing, substantially as described.

2. In a machine for cutting and winding paper, the combination of a pair of positively-driven winding-cylinders both revolving in the same direction, a pressure-roll co-operating with one of said winding-cylinders to feed forward the paper, means for adjusting the pressure-roll toward and from said cylinder a core-shaft on which the paper is wound by frictional contact with the said two winding-cylinders, a vertically-sliding cross-bar located above the winding-cylinders and carrying a horizontal cutter-shaft mounted in suitable bearings in said cross-bar; said cutter-shaft being provided with circular cutters and collars adjustable longitudinally upon said shaft, and said collars being of a diameter slightly less than that of the cutters and resting upon the paper being cut to thereby limit the degree of penetration of the cutters, substantially as described.

3. In a machine for cutting and winding paper, the combination with a pair of positively-driven winding-cylinders both revolving in the same direction, and a core-shaft on which the paper is wound by frictional contact with the said two winding-cylinders, of a vertically-sliding cross-bar located above the winding-cylinders and carrying a horizontal cutter-shaft mounted in suitable bearings in said bar; said cutter-shaft being provided with circular cutters and collars adjustable longitudinally upon said shaft, and said collars being of a diameter slightly less than that of the cutters, and an automatic stop-motion actuated by the increase of diameter of the roll being wound whereby the machine is stopped when the roll of paper being wound up has attained the desired diameter, substantially as described.

4. In a machine for cutting and winding paper, the combination with the winding-cylinders, the core-shaft carrying the roll of paper being wound up, and the vertically-slid-

ing cross-bar carrying the cutter-shaft, of an automatic stop-motion consisting of a friction pulley or clutch, a spring-actuated lever for operating the same, a catch-lever for holding the first-mentioned lever against the resistance of its spring, said catch-lever being provided with an adjustable toe or projection, and a projection on the cross-bar adapted to contact with said toe and thereby operate the catch-lever to stop the machine when the roll of paper has attained the desired diameter, substantially as described.

5. In a machine for cutting and winding paper, the combination with the two friction winding-cylinders and a core-shaft carrying the roll of paper being wound up, of a vertically-sliding cross-bar located above the winding-cylinders, a cutter-shaft mounted in bearings at the ends of the cross-bar and carrying circular cutters and collars, the latter resting on the paper being cut, and a hanger for supporting the cutter-shaft intermediate between its ends, said hanger being made adjustable horizontally on the cross-bar to permit of the adjustment of the cutters and collars on the cutter-shaft, substantially as described.

6. In a machine for cutting and winding paper, the combination with the two friction winding-cylinders, and a core-shaft carrying the roll of paper being wound up, of a vertically-sliding cross-bar located above the winding-cylinders, a cutter-shaft mounted in bearings at the ends of the cross-bar and carrying circular cutters and collars, the latter resting on the paper being cut, a driving-pulley on the cutter-shaft, a belt passing over said pulley and over pulleys above and below the same and allowing the cross-bar and cutter-shaft to rise and fall without changing its tension, and receiving motion through suit-

able gearing from the shaft of one of the winding-cylinders, whereby the collars on the cutter-shaft are caused to be rotated with the same surface velocity as the winding-cylinders, all constructed to operate substantially as described.

7. The combination with the paper-winding mechanism and cutting or slitting mechanism moved away from the rolls being wound by the increasing diameter of such rolls, of a stop-motion having a releasing member in the path of a part of the cutting or slitting mechanism and actuated thereby when such mechanism is moved a predetermined distance by the roll being wound, substantially as described.

8. The combination with the paper-winding mechanism and a cutting or slitting mechanism moved away from the rolls being wound by the increasing diameter of such rolls, of a stop-motion having an adjustable releasing member in the path of a part of the cutting or slitting mechanism and actuated thereby when such mechanism or a part thereof is moved into contact therewith by the roll of cut paper when it reaches a certain diameter, substantially as described.

9. The combination with a core-shaft and mechanism for winding the paper thereon, of a vertically-sliding cross-bar over the core-shaft and provided with intermediate and end bearings or brackets, and a cutter-shaft mounted in said series of bearings against springing and carrying a series of collars and cutters, substantially as described.

Witness my hand this 21st day of August, A. D. 1897.

FRANCIS MEISEL.

In presence of—

P. E. TESCHEMACHER,
S. V. MERTSCHINSKY.