(No Model.) 4 Sheets—Sheet 1.

C. A. CORNELL & E. S. ROBISON.

WINDING MACHINE.

No. 601,495. Patented Mar. 29, 1898.

Fig. I.

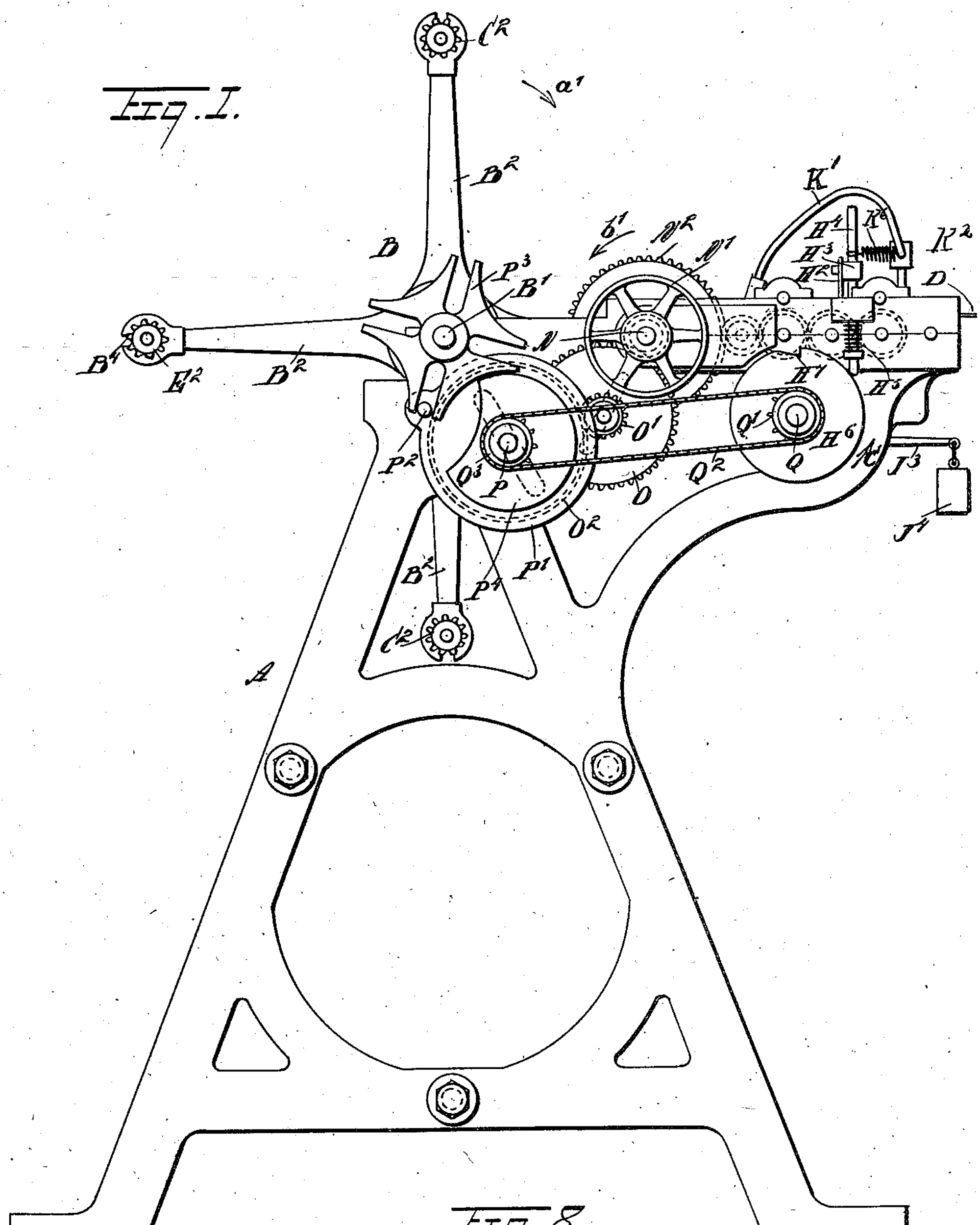
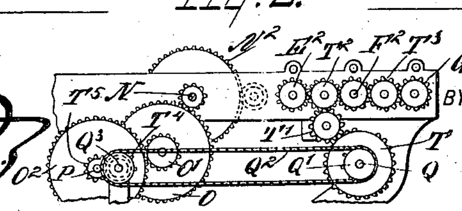


Fig. 8.



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WINDING MACHINE.

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Fig. 2.

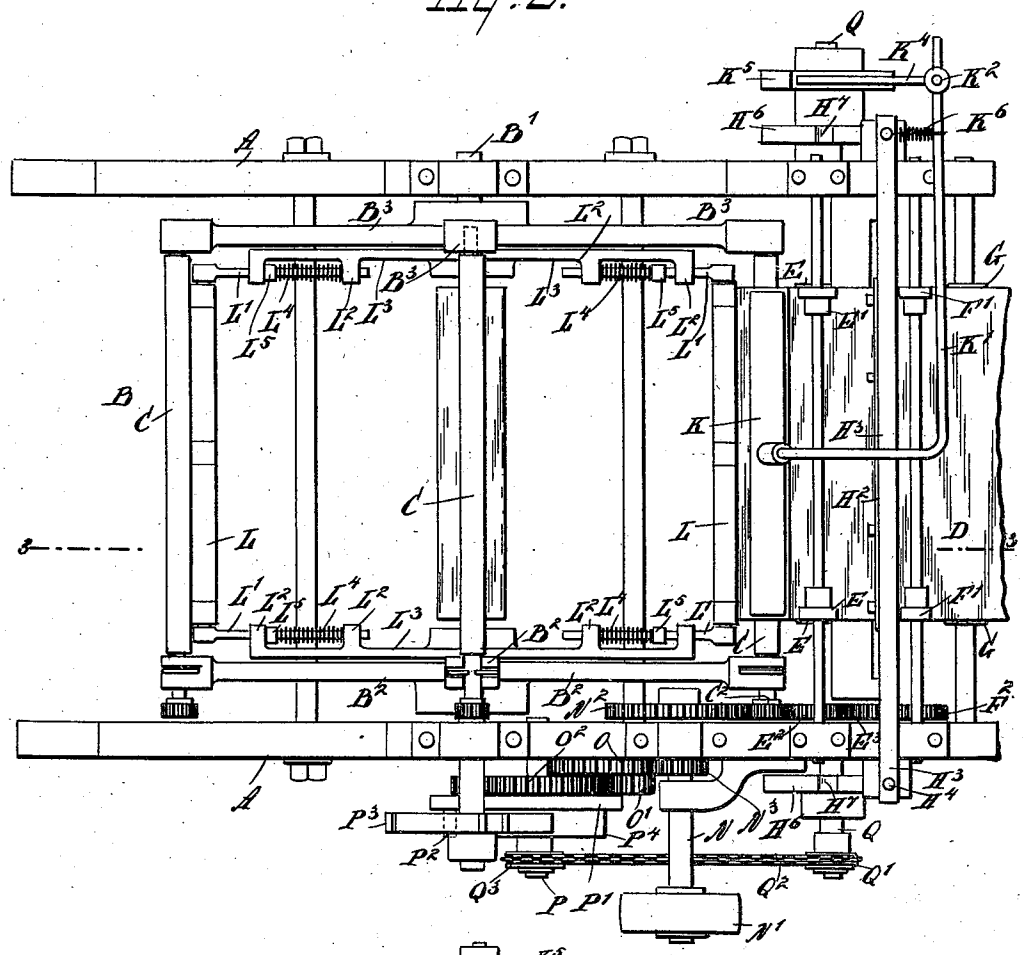

Fig. 6.

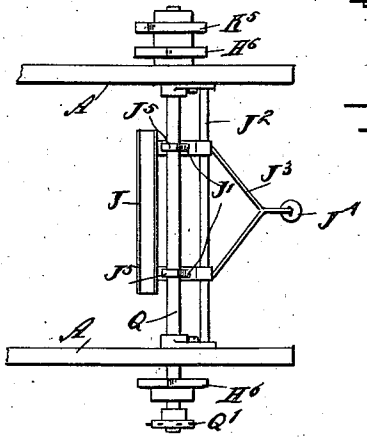

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Fig. 3.

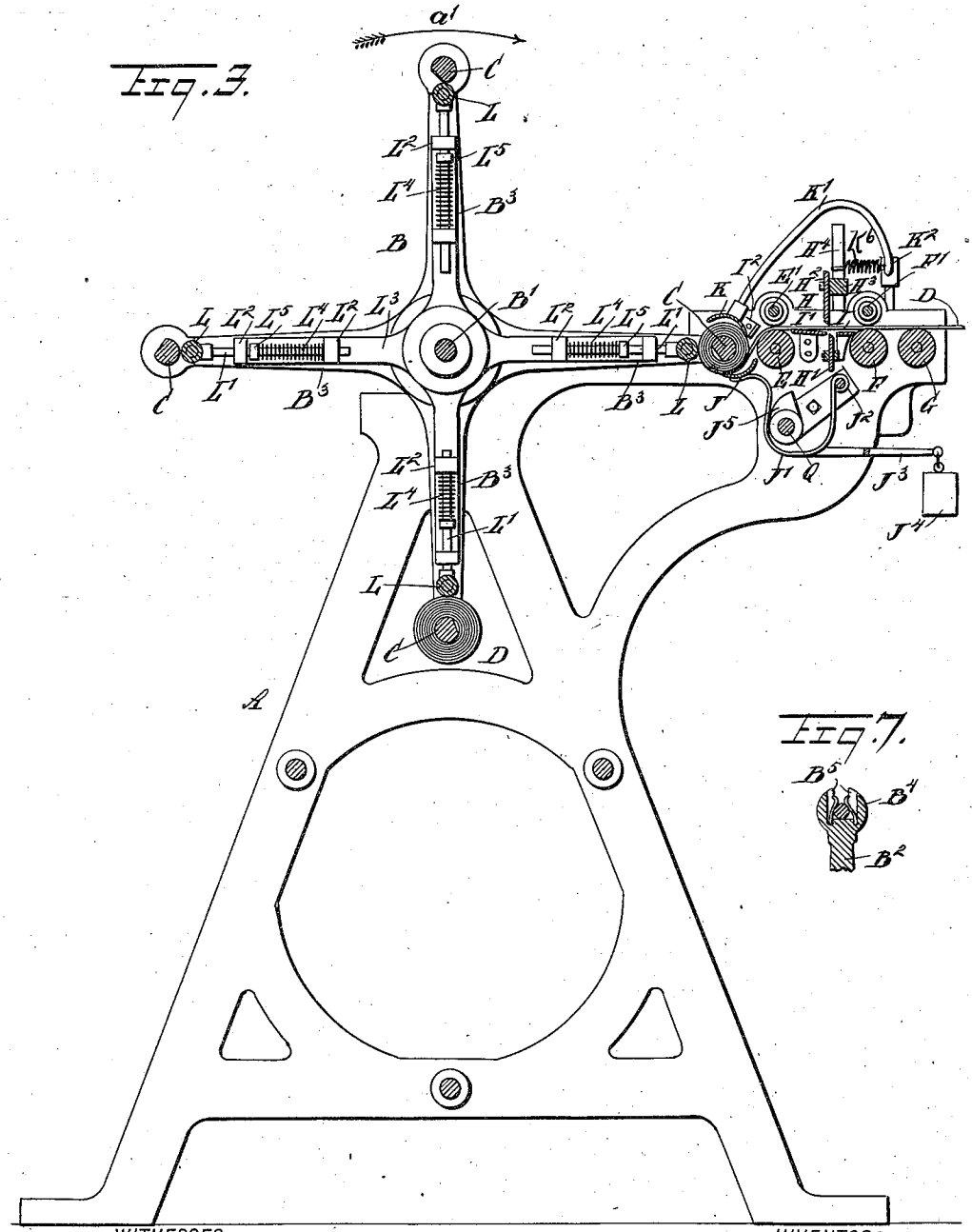

Fig. 7.

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Fig. 4.

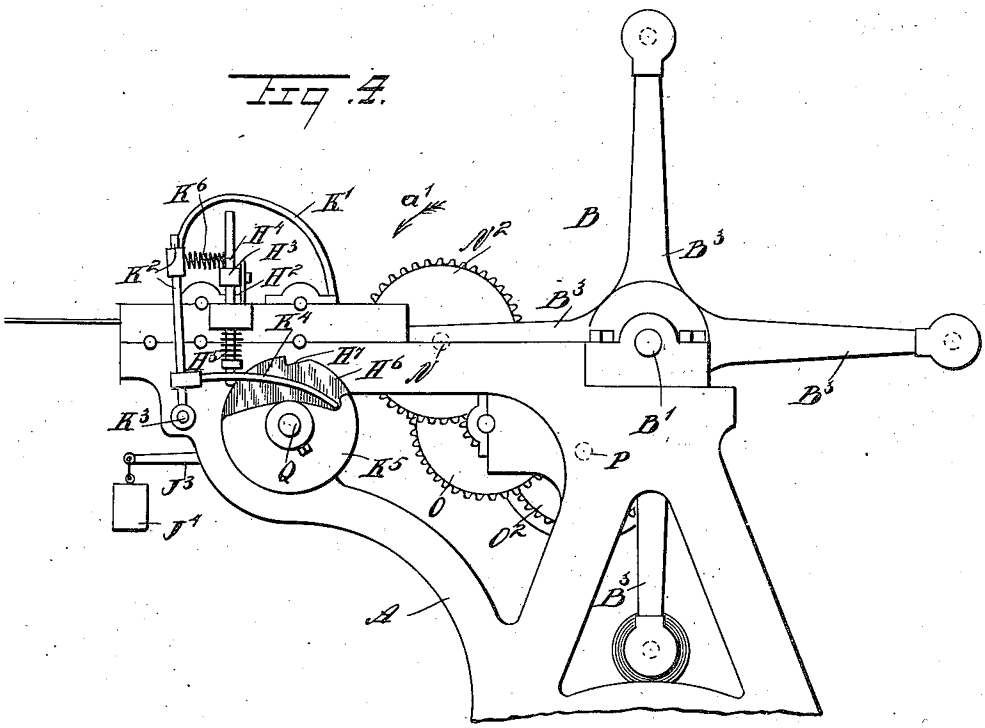
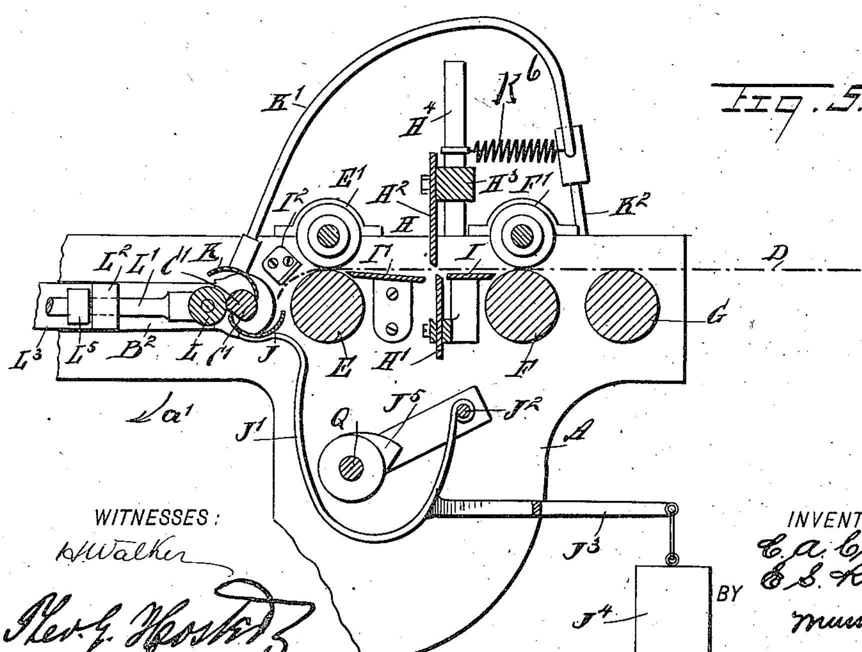


Fig. 5.



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UNITED STATES PATENT OFFICE.

CHAUNCEY ALLEN CORNELL AND ELMER STATES ROBISON, OF PITTSFIELD, MASSACHUSETTS.

WINDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 601,495, dated March 29, 1898.

Application filed June 12, 1897. Serial No. 640,469. (No model.)

To all whom it may concern:

Be it known that we, CHAUNCEY ALLEN CORNELL and ELMER STATES ROBISON, of Pittsfield, in the county of Berkshire and State of Massachusetts, have invented a new and Improved Winding-Machine, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved winding-machine more especially designed for winding wall-paper or other endless material into rolls of any desired length, the machine being durable in construction, automatic in operation, and arranged for adjustment for winding up rolls of different lengths.

Our invention consists of certain features which will be hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the improvement. Fig. 2 is a plan view of the same. Fig. 3 is a sectional side elevation of the same on the line 3 3 of Fig. 2. Fig. 4 is a rear side elevation of part of the improvement. Fig. 5 is an enlarged sectional side elevation of the feed mechanism, the cutting mechanism, and the winding-up device. Fig. 6 is a reduced plan view of the paper-starting device for the winding-roller. Fig. 7 is an enlarged sectional side elevation of one of the bearings for the winding-roller, and Fig. 8 is a side elevation of a modified form of a driving-gear for the feed-rolls.

The improved winding-machine is mounted upon a suitably-constructed frame A, in which is journaled a transversely-extending shaft B', carrying a frame B, formed with sets of oppositely-arranged arms B^2 B^3, in the outer ends of which are journaled winding-up rollers C, each adapted to receive the paper D and wind the same in a roll during the time the frame is at a standstill, as indicated in the drawings.

The frame B receives an intermittent rotary motion in the direction of the arrow *a'*, as hereinafter more fully described, and an intermittent rotary motion is given to the feed mechanism for the paper D from the same source supplying motion to the said frame, but at a different period, so that the frame B is at a standstill while the feed is actuated and the feed is at a standstill while the frame B intermittently rotates.

The feed mechanism consists of sets of rollers E E' and F F', journaled in suitable bearings in the sides of the frame A, and of which the rollers E F are preferably made solid and are rotated, while the rollers E' F' rotate loosely on the top of the paper. A receiving and guiding roller G is journaled in the sides of the frame A in front of the roller F to receive paper or other material from a wall-paper-making or other machine, the said roller serving to properly guide the paper to the first set of feeding-rollers F F'. A cutting device H is arranged between the sets of feed-rollers E E' and F F', and the paper passes over tables I I' between the sets of feed-rollers F F' and E E', the adjacent edges of the said feed-tables being a sufficient distance apart for the cutting mechanism to operate and cut the paper for the desired length of roll to be formed.

The paper after it passes through the last feed-rollers E E' is guided downwardly by a transversely-extending bar I^2 to pass upon the winding-up roller C between a guide-bar J, made segmental in cross-section, one edge of which is adapted to press the paper in contact with the peripheral surface of the winding-up roller C, which latter is preferably formed with a flattened side C', as is plainly indicated in the drawings. A second guide-bar K, similar to the guide-bar J, is arranged over the winding-up roller C and likewise presses with one edge against the paper, so as to hold the same in contact with the said winding-up roller C and cause the end of the paper to pass under the second layer of paper passing through the feed-rollers between the table I^2 and bar J upon the said roller.

On the inside of each winding-up roller C is arranged a pressure-roller L, adapted to press the layers of paper during the winding-up process, so as to insure the formation of a tight smooth roll, the said pressure-roller being yieldingly mounted, as hereinafter more fully described, so as to move inward as the roll increases in size. The guide-bars

J and K swing outwardly by the action of cams as the size of the roll increases, as hereinafter more fully described.

The frame B, the feed-rollers E F, the cutting mechanism H, and the guide-bars J K receive their motions from a main driving-shaft N, journaled on one side of the frame and provided at its outer end with a pulley N′, connected by a belt with other machinery for imparting a continuous motion to the shaft N.

The shaft N is provided at its inner end with a gear-wheel N^2 in mesh with a pinion C^2, secured on one end of the winding-up roller C, so that the rotary motion of the gear-wheel N^2 is transmitted to the pinion C^2 to rotate the roller C and wind the paper. The pinion C^2 is in mesh with the outer side of the gear-wheel N^2, as plainly indicated in Fig. 2, to permit the pinion C^2 to pass into and out of mesh with the said gear-wheel when the frame B is rotated in the direction of the arrow a'. When the pinion C^2 is in full mesh with the said gear-wheel, as shown in Figs. 1, 2, and 3, then the said frame is held stationary for the time being to cause the gear-wheel N^2 to rotate the said pinion and revolve the roller C, as previously explained. When moving into mesh with the gear-wheel N^2 and during the time the frame B is stationary, the pinion C^2 also meshes with a gear-wheel E^2, secured on the lowermost feed-roller E, so that this feed-roller is rotated from the pinion C^2 during the time the paper is wound on the roller C. The gear-wheel E^2 is in mesh with an intermediate gear-wheel E^3 in mesh with a gear-wheel F^2 on the feed-roller F, so that the latter is rotated simultaneously with the feed-roller E to feed the paper as long as the winding-up roller C is rotating.

When the frame B is rotated, the pinion C^2 moves out of mesh with both gear-wheels N^2 E^2, so that the pinion C^2 is not driven and does not drive the feed mechanism, which thereby remains at a standstill during the rotary motion of the frame B.

In order to rotate the frame B from the shaft N, we provide the latter with a pinion N^3, forming part of a train of gear-wheels O O′ O^2, of which the latter is secured on a shaft P, carrying a disk P′, supporting a tooth P^2, engaging a star-wheel P^3, secured on the shaft B′ for the frame B. The star-wheel P^3 has as many slots for the tooth P^2 to engage as there are sets of arms B^2 B^3 in the frame B, and consequently each revolution of the wheel or disk P′ imparts by the tooth P^2 a greater revolution to the star-wheel P^3 and its frame, so as to bring the next following roller C into proper position for receiving the paper, as above explained. The number of revolutions necessary for rotating the disk P′ once for a number of revolutions of the shaft N can be regulated by changing the gears composing the train of gear-wheels, so that more or less paper is wound upon a roller C to form a roll according to the desired length of paper desired for a single roll. The peripheral surface of the star-wheel P^3 is curved to conform between its slots with the peripheral surface of a locking-wheel P^4, formed on the disk P′, so that the frame is locked in position during its stationary period, it being understood that the parts referred to form a locked intermittent movement of a well-known construction.

The cutting mechanism H is provided with a stationary knife H′ and a vertically-movable knife H^2, adapted to cut the paper between the feed-tables I I′ just previous to a rotary motion being given to the frame B. The knife H^2 is secured on a transversely-extending knife-bar H^3, adjustably secured at its ends on rods H^4, fitted to slide in suitable bearings attached to the sides of the frame A. The rods H^4 are pressed on by springs H^5 in a downward direction, and the lower ends of the said rods are in frictional contact with the peripheral surface of cam-wheels H^6, secured on a transversely-extending shaft Q, journaled in suitable bearings in the sides of the frame A.

In the peripheral surface of the wheels H^6 are formed notches H^7, timed relatively to the locked intermittent movement above referred to, so that the rods H^4 drop into the said notches H^7 by the action of the springs H^5 to move the knife H^2 downward and cut the paper just previous to the tooth P^2 engaging the star-wheel P^3, so as to turn the same. The shaft Q, carrying the said wheels H^6, rotates in unison with the shaft P, and for this purpose the shaft Q is provided with a sprocket-wheel Q′, over which passes a sprocket-chain Q^2, also passing over a sprocket-wheel Q^3, secured to the said shaft P. The cam J^5 receives the required movement for guiding the bars J and K, and for this purpose the guide-bar J is secured on arms J′, attached to a shaft J^2, mounted to turn in suitable bearings in the sides of the frame A. From the arms J′ extends outwardly and rearwardly an arm J^3, supporting a weight J^4 for holding the bar J in firm contact with the paper.

The arms J′ are adapted to be engaged by cams J^5, secured on the shaft Q, previously mentioned, the said cams being shaped in such a manner as to impart a downward swinging motion to the arms J′ and the bar J as the roller C fills with paper, the said cams thus compensating for the increase in the thickness of the rolls. The cams J^5 also serve to hold the bar J in a lowermost position during the time the roller C with its finished roll of paper thereon swings downward with the frame B, the said bar J immediately returning to engage the next empty roller C to hold the end of the paper thereon when starting to wind the paper on a second roller. The other bar K is carried by an arm K′, adjustably held in a rod K^2, pivoted at K^3 on the rear side of the frame, as plainly indicated in Fig. 4.

On the rod K^2 is secured an arm K^4 in fric-

tional contact with a cam K^5, secured on the rear end of the shaft Q. A spring K^6 presses on the arm K^2 to hold the bar K normally in contact with the paper, it being understood that the said bar K swings gradually outward upon the increase of the thickness of the roll of paper by the action of the cam K^5 on the arm K^4. The cam K^5 is so shaped that when a second roller C is moved into position for receiving the end of the paper then the bar K immediately swings down to guide the paper around the roller C, as previously explained.

Each pressure-roller L, previously mentioned, is journaled in the ends of rods L', fitted to slide loosely in bearings L^2, secured on spiders L^3, attached to the shaft B', adjacent to the sets of arms B^2 B^3. A spring L^4 is coiled on each rod L' and presses with one end on one of the bearings L^2 and with its other end on a collar L^5, secured to the rod L', so that the spring L^4 presses the rod L' outward to hold the pressure-roller in contact with the winding-roller C and the paper thereon, and at the same time the springs allow the roller to yield upon the increase of the thickness of the roll of paper.

In order to permit a convenient removal of the roller C and its roll of paper thereon at the time the filled roller is in an outermost left-hand position, we provide the bearing B^4 in the arm B^2 with a slot and springs B^5 for holding the journal of the roller in the bearing, but permitting of pulling it out of the same and then drawing the other journal out of the bearing of the arm B^3. A new roller C is then substituted for the one removed with the roll of paper.

The operation is as follows: When the several parts are in the position illustrated in the drawings and the shaft N is rotated in the direction of the arrow b', then the gear-wheel N^2 will drive the feed-rollers, as previously described, to feed the paper upon the winding-up roller C, rotated from the said gear-wheel N^2, as above explained, so that paper is wound upon the said roller. At the same time the pinion N^3, by means of the train of gear-wheels O O' O^2, rotates the shaft P and wheel P', which by its disk P^4 holds the star-wheel P^3 locked for the time being. The rotary motion of the shaft P is transmitted by the sprocket-wheel Q^3, sprocket-chain Q^2, and sprocket-wheel Q' to the shaft Q, so that the cams J^5 and K^5 cause an outward swinging of the guide-bars J and K, as previously explained, as the roll of paper increases in thickness. The rotary motion of the shaft Q causes the cam-wheels H^6 to rotate in the direction of the arrow c', so that finally the notches H^7 are brought in alinement with the lower ends of the rods H^4 and the latter suddenly drop downward by the action of the springs H^5 to move the knife H^2 in a like direction and cut off the paper over the stationary knife H'. When this takes place, the tooth P^2 engages a corresponding tooth in the star-wheel P^3, so as to rotate the latter and cause a turning of the frame B in the direction of the arrow a' to move the roller C, having the paper wound upon itself, into a lowermost position and to bring the formerly-uppermost roller C into position for receiving the paper. During this movement the feed-rolls are stationary, as their driving-pinion C^2 has moved with the roller C into a lowermost position, and when the next roller C comes into the position mentioned its pinion C^2 again establishes connection between the gear-wheel N^2 and the gear-wheel N^3. In the meantime the cams J^5, K^5, and H^6 have, however, acted on their respective arms J' K^4 and rods H^4 to cause a like movement of the guide-bars J and K and a return upward movement of the knife H^2, so that the paper is fed forward by the rollers F F' as soon as the roller F is set in motion, it being understood that the knife H had previously returned to its uppermost position. The above operation is then repeated.

The feed-rollers E and F and the receiving-roller G may be driven directly from the shaft P, as shown in Fig. 8, instead of by the gear-wheel C^2 on the winding-up roller C, as previously described and shown in Figs. 1 and 2.

The shaft Q (see Fig. 8) carries a gear-wheel T in mesh with an intermediate gear-wheel T', driving the intermediate gear-wheel T^2, corresponding to the intermediate gear-wheel E^3 for the gear-wheels E^2 and F^2, driving the feed-rollers E and F. An intermediate gear-wheel T^3 connects the gear-wheels F^2 and G^2 with each other to rotate the receiving-roller G.

The shaft Q is driven by sprocket-wheels Q' and Q^3 and the sprocket-chain Q^2 from an intermediate gear-wheel T^4 and a gear-wheel T^5, secured on the shaft P.

The gear-wheel T is minus a few teeth, so that the feed-roller stops temporarily at the proper time—that is, as soon as the knife drops and cuts the paper. The rollers resume the feed of the paper as soon as the frame B brings another winding-up roller in position to receive the paper.

Having thus fully described our invention, we claim as new and desire to secure by Letters Patent—

1. A winding-machine, provided with an intermittently-revolving frame carrying a series of winding-rollers, each of which is adapted to receive paper in its turn, and means for rotating a roller at a time, to wind up a desired length of paper at the time the frame is at a standstill, feed mechanism for the paper and means for automatically stopping said feed mechanism while the revolving frame is rotated and to actuate it when one of the winding-rollers is in position to receive the paper, substantially as shown and described.

2. A machine of the class described, comprising a frame carrying a series of rollers, feeding mechanism for winding paper on said

rollers, means for intermittently revolving the frame for bringing its rollers into operative connection with the feeding mechanism, and a start and a stop mechanism for stopping the feeding operation during the rotation of the roller-frame.

3. A winding-machine, provided with an intermittently-revolving frame carrying a series of winding-rollers, each of which is adapted to receive paper in its turn, means for rotating a roller at a time, to wind up a desired length of paper at the time the frame is at a standstill, an intermittent feed for the paper to the said roller, means for automatically stopping said paper-feed while the winding-roller frame is being rotated, and starting said feed when a winding-roller is in position to receive a roll of paper, the feed-rollers being driven from the said winding-roller, substantially as shown and described.

4. A winding-machine, provided with an intermittently-revolving frame carrying a series of winding-rollers adapted to receive the paper in turn, a driving device for rotating a winding-roller at a time, and an intermittent movement for connecting the said driving mechanism with the said frame and intermittently rotating the same, to disconnect the said driving mechanism from the winding-roller, substantially as shown and described.

5. A winding-machine, comprising a frame having a series of winding-rollers journaled therein and itself journaled upon a shaft central to said winding-rollers, fixedly-journaled rotating means adapted to engage said winding-rollers at one point of their orbit, and an intermittent rotating mechanism operated from the same source to rotate the frame at intervals, an amount equal to the difference between winding-rollers.

6. A winding-machine comprising an intermittently-revolving frame carrying a series of winding-rollers, a driving mechanism for rotating a winding-roller at a time, feed-rollers driven from the said winding-roller, a cutting mechanism for cutting the paper, and means, substantially as described, for actuating the cutting mechanism from the said driving mechanism, substantially as shown and described.

7. A winding-machine, provided with a winding-roller, a guide-bar made segmental in cross-section, one edge of said bar being adapted to rest on the said roller and its opposite edge disposed at a distance from the roller to guide the edge of the paper around the roller, and means for imparting a gradual swinging motion to the said bar as the roll of paper increases in thickness on the winding-roller, substantially as shown and described.

8. A winding-machine, provided with a winding-roller, two guide-bars being arranged on opposite sides of the said winding-rollers and each made segmental in cross-section, with one edge of each bar in contact with the said winding-machine, and a pressure-roller in peripheral engagement with the winding-roller between the said contacting edges of the guide-bars, substantially as shown and described.

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