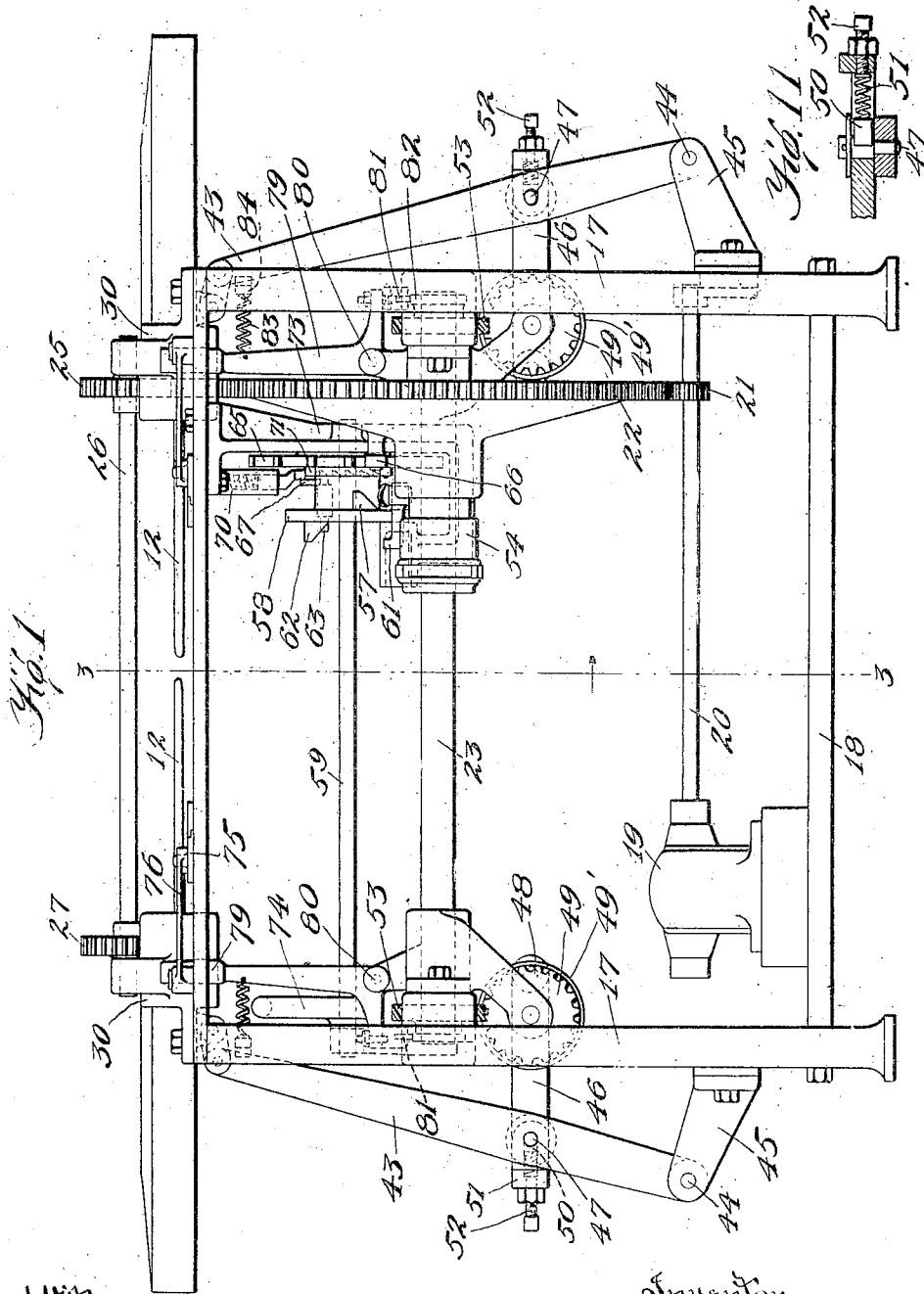


A. SKOPSRUD.
 REEL OR WINDING MACHINE.
 APPLICATION FILED OCT. 16, 1908.

952,282.

Patented Mar. 15, 1910.

4 SHEETS—SHEET 1.

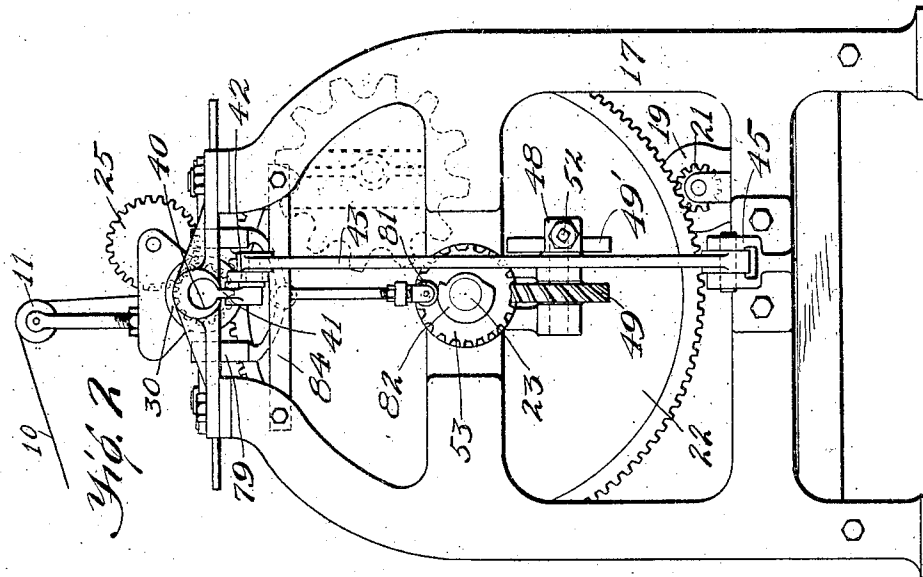


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4 SHEETS—SHEET 2.



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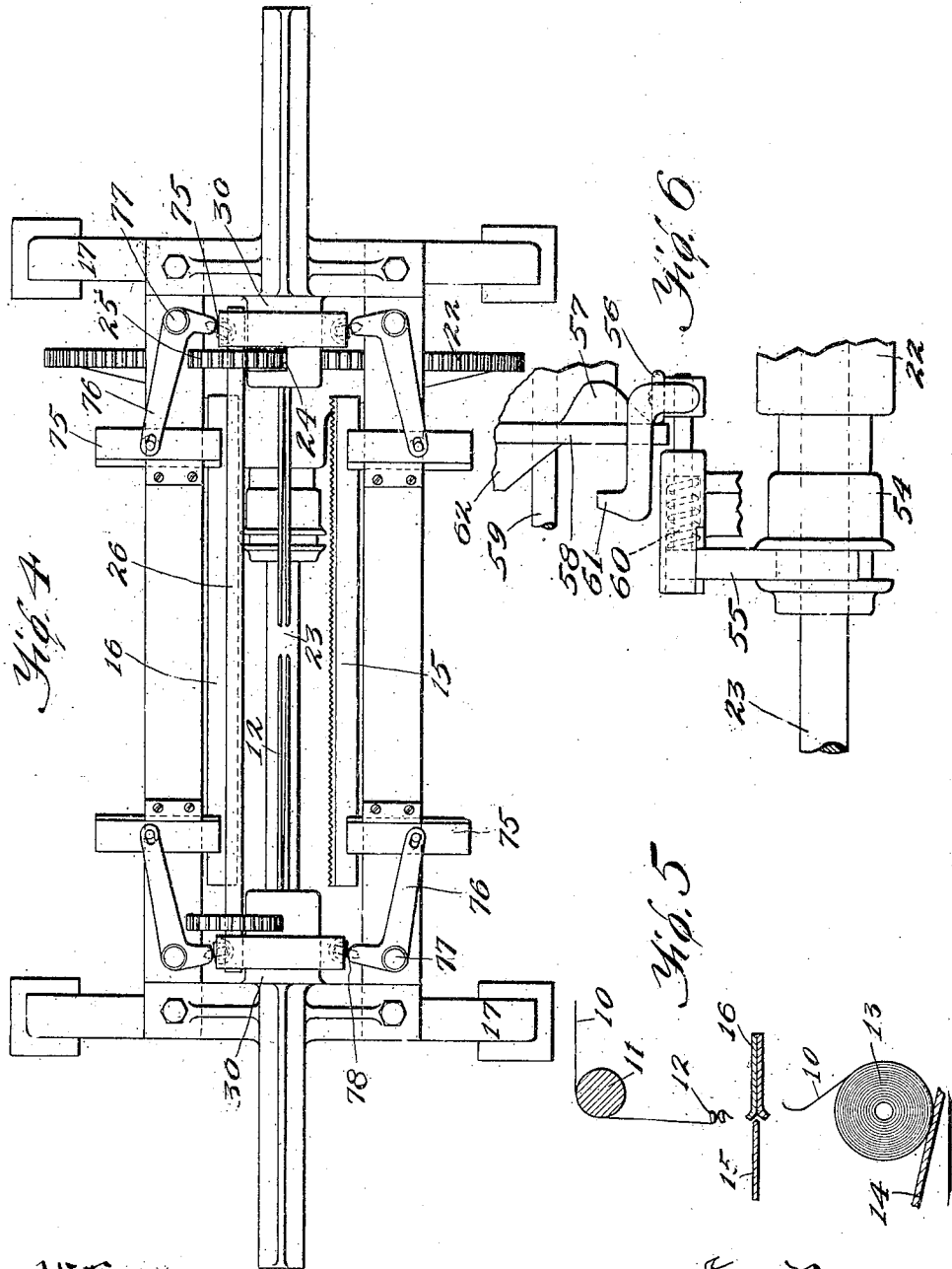
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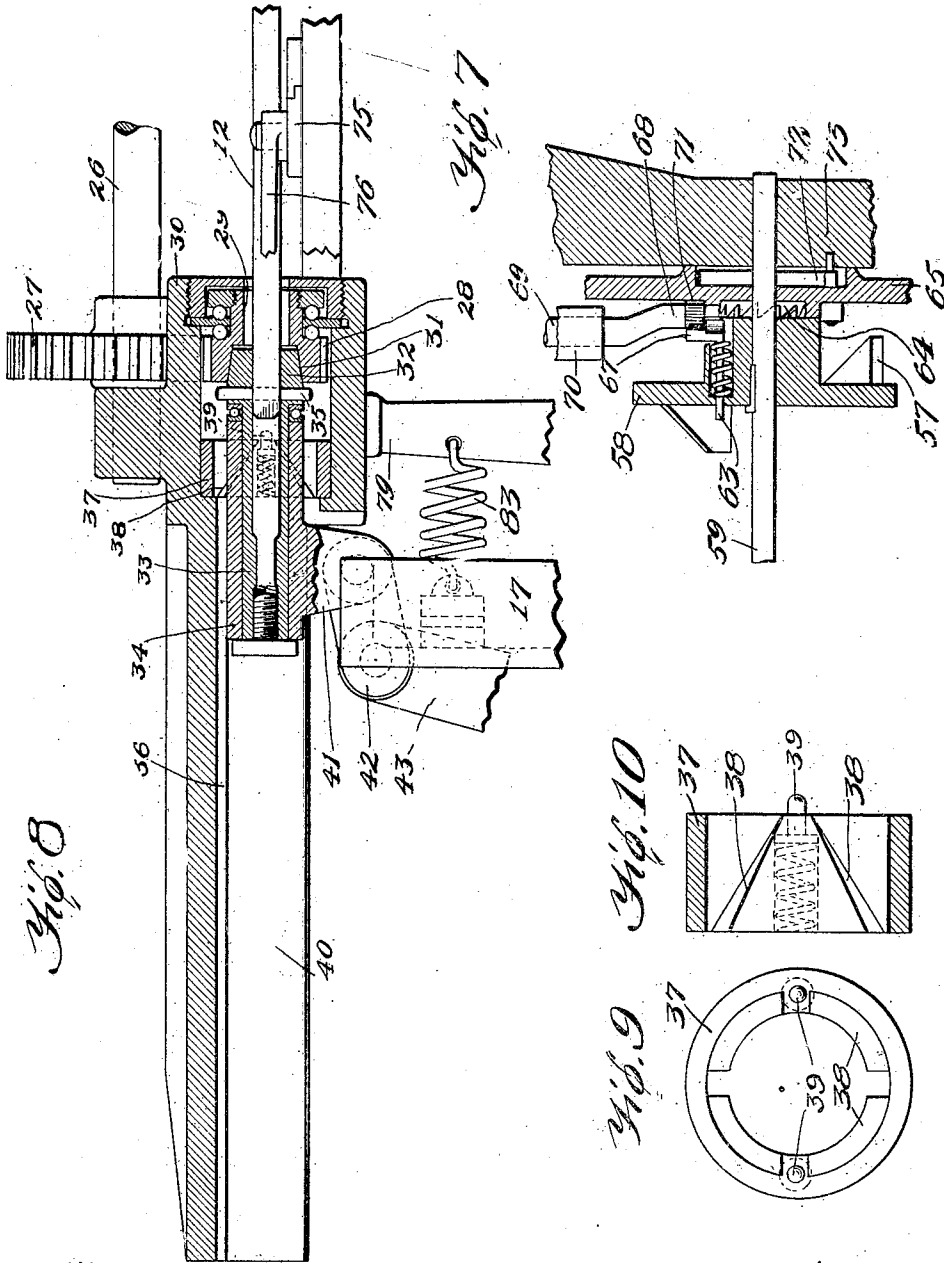
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4 SHEETS—SHEET 4



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UNITED STATES PATENT OFFICE.

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REEL OR WINDING-MACHINE.

952,282.

Specification of Letters Patent. Patented Mar. 15, 1910.

Application filed October 16, 1908. Serial No. 458,109.

To all whom it may concern:

Be it known that I, ANTON SKOFSRUD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Reels or Winding-Machines, of which the following is a specification.

This invention relates more particularly to machines or apparatus for winding up paper, cloth or other flexible materials into rolls of any desired size, and is particularly adapted to wind a plurality of rolls from a continuous source of supply, cutting off the fabric or material as each roll is completed, in order to start the next succeeding roll. Its objects are to provide a machine of this character, which will perform the various desired operations effectively and rapidly; which will form a roll, cut off the material or weaken the same, and start the next succeeding roll, such operations preferably being performed automatically; which may readily be adjusted to vary the size of the rolls to be formed; and which will have such other advantages and desirable features as will be clearly pointed out and described hereinafter.

I have illustrated my improved apparatus in the accompanying drawings, in which—

Figure 1 is a side view of a machine embodying this invention; Fig. 2 is an end view as seen from the right-hand end of Fig. 1; Fig. 3 is a sectional view taken on the line 3—3 of Fig. 1; Fig. 4 is a plan view; Fig. 5 is a diagrammatical view illustrating the operation of the winding spindles and cutting-off devices; Fig. 6 is a detail showing the clutch-operating mechanism; Fig. 7 is a detail showing the ratchet and release device for operating the clutch cam; Fig. 8 is a detail showing the head piece and spindle-turning mechanism; Figs. 9 and 10 are details of the collar used for turning the spindles to vertical position; and Fig. 11 is a detail of the spring connection between the crank arms and spindle-reciprocating levers.

The construction of my improved machine will be most readily understood if the various operations indicated in Fig. 5 are borne in mind. The paper, cloth, or other fabric 10 is preferably brought over a guide roller 11 and the end drawn through the slotted spindles 12. After the spindles have been revolved a sufficient number of times

to form the roll 13, they are drawn out, allowing the roll to drop onto a supporting chute 14. As soon as the roll drops, the knives or perforating devices 15 and 16 move in and engage with the vertical portion of the fabric, preparatory to rendering the same. While the knives are in this position, the spindles 12 move inwardly and again engage with the fabric. As soon as they reach their innermost position, they start to turn and break off the end of the fabric, which is held by the perforating devices, and simultaneously start to wind the next roll. The knives or perforating devices 15 and 16 are then withdrawn, ready for the next operation. The machine proper for performing these various operations in a practical manner, comprises a frame 17 having a bottom support 18 for a motor 19. The shaft 20 of the motor 19 is provided with a gear 21 engaging with a gear 22 loosely mounted on a shaft 23 having suitable bearings in the frame 17. The gear 22 engages with a pinion 24 which is adapted to drive one of the clutches for operating the spindles 12. The pinion 24 also engages with a gear 25 mounted on a shaft 26 having bearings in the frame 17, or brackets therefrom, and provided at its opposite end with a similar gear 27 which meshes with a pinion 28 on the clutch for operating the other spindle 12.

As shown in detail in Fig. 8, the gear 28 is connected to, or formed integral therewith, a revoluble sleeve 29 which is preferably mounted with ball bearings in the head piece 30 of the frame 17. This sleeve or rotatable member 29 is provided with a conical recess 31 adapted to receive the conical clutch member 32. The cone or clutch member 32 is on the end of a trunnion or hollow shaft 33 which engages with a slidable bearing member 34. The clutch member 32 carries one of the split or forked spindles 12, the opposite spindle being supported in a similar manner in the opposite end of the machine. These forked spindles, which engage with the material to be wound, are preferably made with the outer faces of the forked members substantially flat and with the inner faces rounded, as indicated in Fig. 5, so that the material will readily start to wind thereon and also so that the spindles may be readily withdrawn after the roll has been formed. It will also be noted that it is necessary to bring these spindles

so that the opening between the forks will always be in a vertical position, ready for engagement with the vertical portion of the material to be wound when the spindles move inward to engage with the material. In order to accomplish this, the clutch members 32 are provided with keys or pins 35 which extend out beyond the sides of the bearings 34 so that either end of the pins may engage with the slots 36 in the head piece 30 when the spindles are reciprocated to withdraw them from the roll and to move them inwardly for engagement with the material. In order to insure the engagement of one or the other end of the pin 35, with the slot 36, I provide a collar 37 having inwardly projecting cam faces 38 adapted to engage with the ends of the pin 35. In order to prevent the end of the pin from striking the edge where these surfaces unite, and resting thereagainst, I provide a spring-pressed pin 39 at the point where these surfaces meet, this pin being rounded on its projecting end so that it will yield slightly when struck by the pin 35 and also tend to throw the pin to one side or the other when it will move along the cam face 38 to its vertical position.

The bearings 34 move in slideways 40 in the heads 30 and are provided with downwardly projecting lugs 41 which are connected, by means of links 42, with the upper ends of the arms 43. These arms are pivoted at 44 to brackets 45 on the lower end members of the frame 17. The arms 43 are moved in and out to reciprocate the spindles, by means of crank arms 46 pivoted at 47 to said arms and at 48, to crank wheels 49'. In order to give a yielding movement to the arms 43, when they move inwardly to throw the clutch member 32 into engagement, the pivot pins 47 engage with slidable half-bearings 50 in the crank arms 46, these bearings being held in normal position by means of springs 51 which may be regulated with the adjusting screws 52 in the ends of the arms 46. The wheels 49' are driven by means of gears 49 secured therewith on the same shafts, and these gears are driven by gears 53 on the shaft 23.

In order to give an intermittent movement to the shaft 23, I have provided a clutch mechanism for connecting the same with the hub of the gear 22. The clutch 54, for connecting the hub with the shaft, may be of any ordinary or preferred form of construction, and, as shown in the drawings, is thrown into and out of engagement by means of a shifter 55, as indicated in Fig. 6. This shifter is provided with a roller 56 adapted to be engaged by a cam 57 on a wheel 58 mounted on an adjacent shaft 59. The shifter is also provided with a spring 60 for throwing the clutch out of engagement; but in order to insure prompt operation, the

shifter is also provided with a lug 61 adapted to be engaged by a cam 62 on the opposite face of the wheel 58. The wheel 58 is loosely mounted on the shaft 59, and is driven by means of a dog 63 mounted in the hub thereof and adapted to engage with the teeth of a ratchet wheel 64 also mounted on the shaft 59. This ratchet wheel 64 is secured to, or made integral with a toothed wheel 65 which is driven by means of a roller or pin 66 on the face of the gear 22, the arrangement being such that the toothed wheel 65 is turned one tooth for each revolution of the gear 22. However, it will be noted that two or more pins or rollers 66 may be arranged on the gear 22, if desired to give the toothed wheel a different movement. The cam wheel 58 will, of course, turn in unison with the toothed wheel 65 as long as the dog or pawl 63 is in engagement with the ratchet wheel 64; but as the size of the roll to be formed depends upon the relative number of turns of the gear 22, before the shaft 23 is clutched therewith and turned to operate the withdrawal of the spindles and the cutting-off devices, it may be desired to vary the relative movement between the gear 22 and the shaft 59. For this purpose the pawl or dog 63 is provided with a projecting pin 67 which is adapted to be engaged, at times, by a shoe 68 on the lower end of a spring-pressed slide 69 mounted in a bearing 70 secured to the upper part of the frame 17. When the shoe or cam 68 is in its lowermost position, the pin 67 will engage therewith when the wheel 58 is turned. As soon as the pin is pressed inwardly, the dog will be released, and the wheel 58 and shaft 59 will, of course, not be turned. In order to again free the pin 67, so that the wheel 58 will again turn, I provide a cam 71 on the face of the toothed wheel 65, which cam will engage with the shoe 68 and raise it so that the pawl will be free to engage with the ratchet wheel. The length of time during which the pawl is held out of engagement may be readily varied by varying the length of the cam 71. The toothed wheel 65 is held in normal position, or prevented from too great movement, when the roller 66 engages therewith, by means of a friction spring 72 which rests in a recess in the hub on the wheel 65 and has a projection engaging with the supporting bracket 73.

A further object in having the cam wheel 58 so that it may be moved forwardly with the shaft 59, independent of the toothed wheel 65, is to provide means so that the clutch may be operated manually in order to start a new roll, as for instance, when some defect has been noted in the paper or fabric being wound. In order to turn the shaft 59 to operate the cam and clutch, this shaft is provided with a hand wheel 74 whereby it may be turned forwardly at any

desired time in order to throw the shaft 23 into engagement with the gear 22.

The cutting-off or perforating devices 15 and 16 are preferably arranged to engage with the paper or fabric to be wound, at a point just below the winding spindles 12. These devices may comprise ordinary knives or shears, but for paper or the like, I prefer to make the blade 15 with a serrated edge which coacts with a V-shaped groove formed along the edge of the blade 16. This latter blade may be made of one piece or, as shown, may be formed of two thin strips of metal riveted together. Preferably, these blades do not entirely sever the material, but rupture or weaken it so that as soon as the spindles 12 start to turn, they will complete the rupture and pull the depending edge of the material out of engagement with the blades, when the blades will then move back to normal position, out of the way of the roll. These blades are secured to slides 75 mounted on the top of the frame 17, as indicated particularly in Fig. 4. These slides are operated by means of bell-crank levers 76 pivoted at 77 on the frame 17. The opposite ends of the levers 76 engage, by means of ball and socket joints or universal joints 78, with the forked upper ends of bell-crank levers 79 which are pivoted at 80 to brackets on the frame 17. The lower outwardly projecting arms of the levers 79 are provided with adjustable rollers 81 which engage with cams 82 on the ends of the shaft 23. Springs 83, secured to the upper arms of the levers 79, tend to move the upper ends of said bell-crank levers away from the center of the machine, so that the bell-crank levers 76 will be swung in to cause the cutting-off devices to approach each other and engage with the material which is being wound. These cutting-off devices, however, are normally held out of operative position by means of the cams 82 which engage with the rollers or contact members at the ends of the arms 79 and thereby hold said ends up against the action of the springs 83, these cams being preferably formed so that when the cutting-off devices are to act, the roller or contact device 81 may drop suddenly to allow the quick action of the springs 83.

It will, of course, be noted that other means than the motor may be provided for driving my improved machine, and various details thereof may be changed to suit varying conditions, as will be readily understood by one skilled in the art. However, the operation of the machine as shown and described may be readily understood. The motor, being started, gives a constant movement to the gear 22 which in turn imparts a constant movement to the spindle-turning gears 28. As soon as a roll has been formed on the spindles 12, the clutch 54 is automatically operated and causes the shaft 23 to

be turned one revolution. This operates the gears 49 and consequently the crank arms 46, thereby swinging the levers 43 outwardly and withdrawing the spindles from the roll. The roll then drops and the cams 82 release the ends of the levers 79, so that the springs 83 throw the cutting-off devices into contact with the portion of the fabric between the guide roller 11 and the roll which has just been formed. This holds the fabric in a vertical position in alinement with the centers of the spindles, so that when the spindles, which have been brought with the slots therein in vertical position, approach each other they engage with the material as the arms 43 again swing inwardly. The spindles start to revolve as soon as the clutch cone 32 engages with the opening 31, and, as they start to turn, the material will be ruptured to complete the severing, and the cutting-off devices again move back to normal position. This operation may then be repeated as long as the supply of material lasts.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A reel or spindle of the character set forth, comprising a shaft having a central slot therein containing to one end thereof, said slot increasing in width from its inner end to the open end, the outer faces of the spindle forming the forked end being substantially flat and the inner faces forming the sides of the slot being rounded, substantially as described.

2. In a reel or winding machine, the combination of a pair of oppositely disposed spindles having slots in the adjacent ends thereof for receiving the material to be wound, means for turning said spindles, and means for reciprocating said spindles.

3. In a machine of the character set forth, the combination of a pair of oppositely disposed spindles, said spindles being bifurcated to receive the material to be wound, means for turning said spindles, means for withdrawing said spindles from the finished roll, and means for turning said spindles, so that the openings therein will lie in a predetermined plane, and for moving said spindles inwardly to engage with the material to be wound.

4. In a reeling machine, the combination of a pair of oppositely disposed bifurcated spindles, means for turning said spindles, means for reciprocating said spindles, and means for partially severing the material being wound, at a point between the spindles and the completed roll, and holding the partially severed end until the spindles have again engaged with the material.

5. In a reeling machine for forming rolls from a continuous source of supply, the combination of means for guiding the material,

means for forming a roll and releasing the same, and severing means adapted to hold the end of the material until the roll-forming means have again engaged with the same to form the next roll.

6. In a reeling machine, the combination of a forked winding spindle, a slide carrying said spindle, a guideway for said slide, means for reciprocating said slide, means for turning said spindle, a slot in said guideway, a pin connected with said spindle and adapted to engage with said slot, and beveled surfaces at the end of said slot for turning said pin to proper position for engagement with the slot.

7. In a reeling machine, the combination of a pair of oppositely disposed forked spindles, rotatable supports for said spindles, rotatable members adapted to engage with said supporting members to turn the same, slidable bearings for said rotatable spindle-holding members, levers engaging with said slidable bearings for reciprocating the same, crank arms yieldingly connected with said levers, crank wheels for operating said arms, and means for turning said crank wheels.

8. In a reeling machine, the combination of oppositely disposed slotted spindles, rotatable supports for said spindles, rotatable members adapted to engage with said supports to turn the same, gears on said rotatable members, a counter-shaft, gears on said counter-shaft engaging with the gears on said rotatable members, a driving gear engaging with one of the gears on said rotatable members, means for turning said driving gear, a shaft on which said driving gear is loosely mounted, a clutch for driving said shaft from said driving gear, means for intermittently operating said clutch, slidable bearings for said rotatable spindle supports, slideways for said bearings, arms engaging with said bearings for reciprocating the same, crank arms engaging with said last-named arms, gear wheels with which said crank arms are connected, and gears on said driving wheel shaft engaging with said last-named gears.

9. In a machine of the character set forth, the combination of a driving gear, a shaft on which said gear is loosely mounted, a clutch for driving said shaft from said gear, a second shaft, a cam wheel on said shaft for operating said clutch, a toothed wheel on said second-named shaft, a ratchet and

pawl for driving said cam wheel from said toothed wheel, and a pin or roller on said gear wheel for turning said toothed wheel.

10. The combination with a driving gear, of a shaft on which said gear is loosely mounted, a clutch for causing said shaft to be turned by said gear, a second shaft, a cam wheel on said second shaft for operating said clutch, a toothed wheel on said second shaft, a roller on said gear for operating said toothed wheel, a ratchet wheel on said toothed wheel, a pawl in said cam wheel adapted to engage with said ratchet wheel, a spring for holding said pawl in normal engagement, a pin on said pawl, a spring-pressed shoe mounted independently of said devices and adapted to engage with said pin to throw said pawl out of engagement, and a cam on said toothed wheel for raising said shoe to allow the pawl to again engage with said ratchet wheel.

11. In a reeling machine, the combination with a reeling device, of laterally movable severing devices, slides carrying said severing devices, horizontally arranged bell-cranks for operating said slides, vertically arranged bell-cranks having their upper arms engaging with said first-named bell-cranks for swinging the same, contact devices on the lower ends of said last-named bell-cranks, cams engaging with said contact devices for holding said severing devices in normal position, and springs engaging with said vertically arranged bell-cranks for moving the severing devices together to engage with the material to be severed.

12. In a machine of the character set forth, the combination of a frame, a motor mounted in said frame, a pinion on the motor shaft, a driving gear engaging with said pinion, a shaft on which said driving gear is loosely mounted, winding spindles, means for turning said spindles from said driving gear, a clutch for causing said driving gear to turn the shaft on which it is mounted, means for intermittently throwing said clutch into, and out of engagement with said shaft, spindle reciprocating means driven from said shaft, cutting-off devices, and means operated by said shaft for actuating said cutting-off devices, substantially as described.

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