No. 683,865. Patented Oct. 1, 1901.

A. SKOFSRUD.

PAPER REELING MACHINE.

(Application filed Nov. 23, 1900.)

(No Model.) 6 Sheets—Sheet 1.

Fig. 1

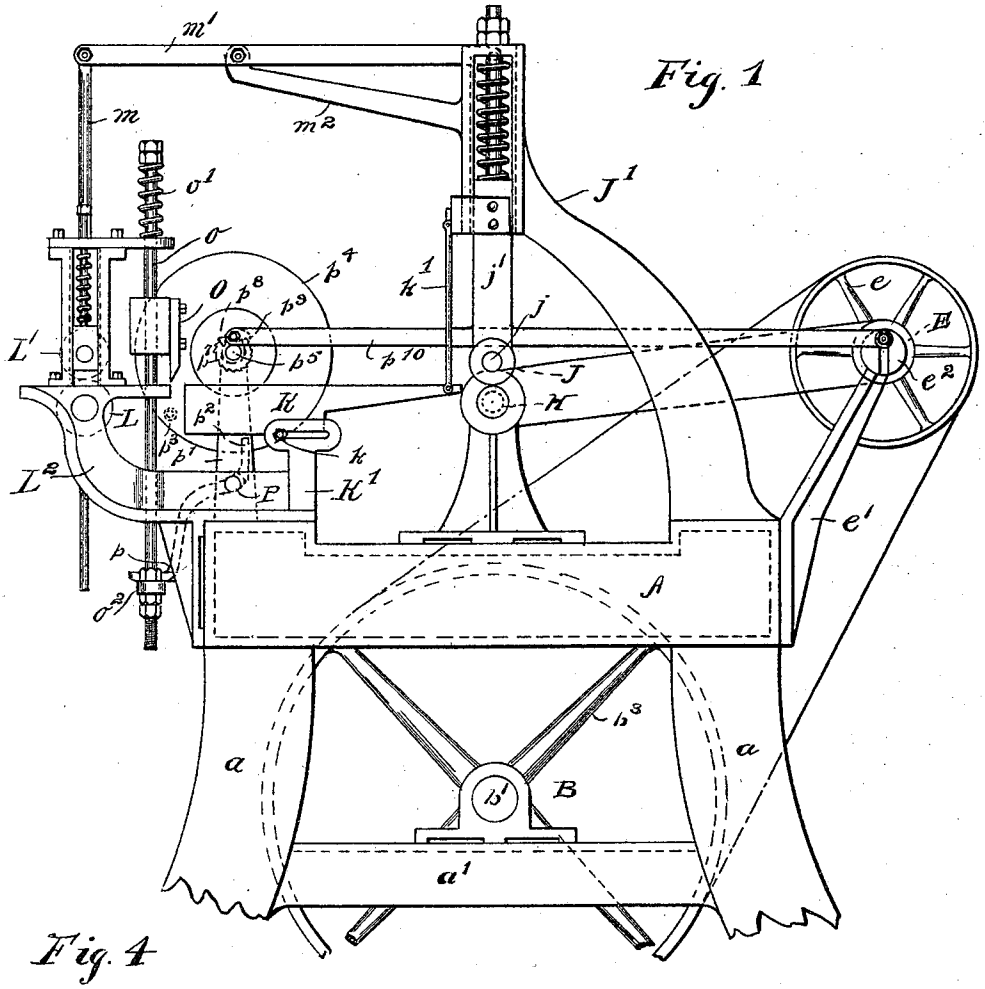


Fig. 4

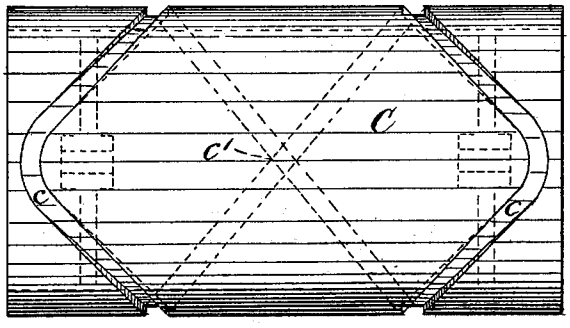
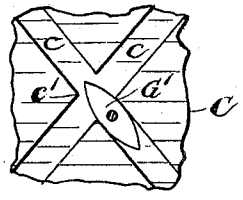


Fig. 5



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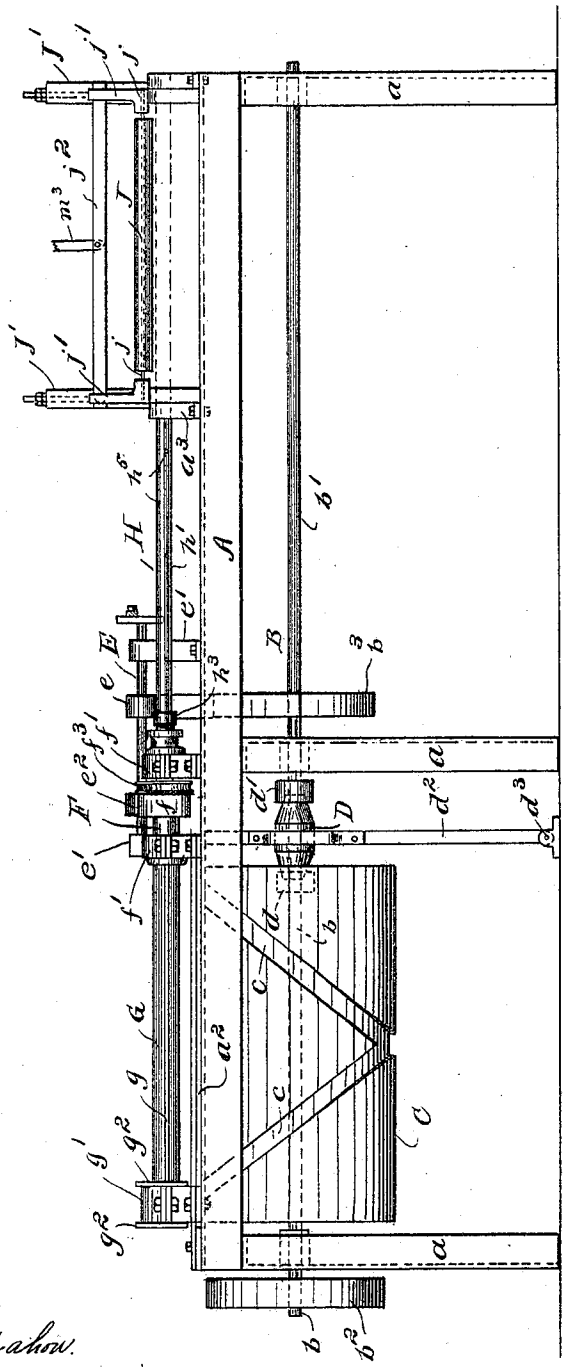


Fig. 2

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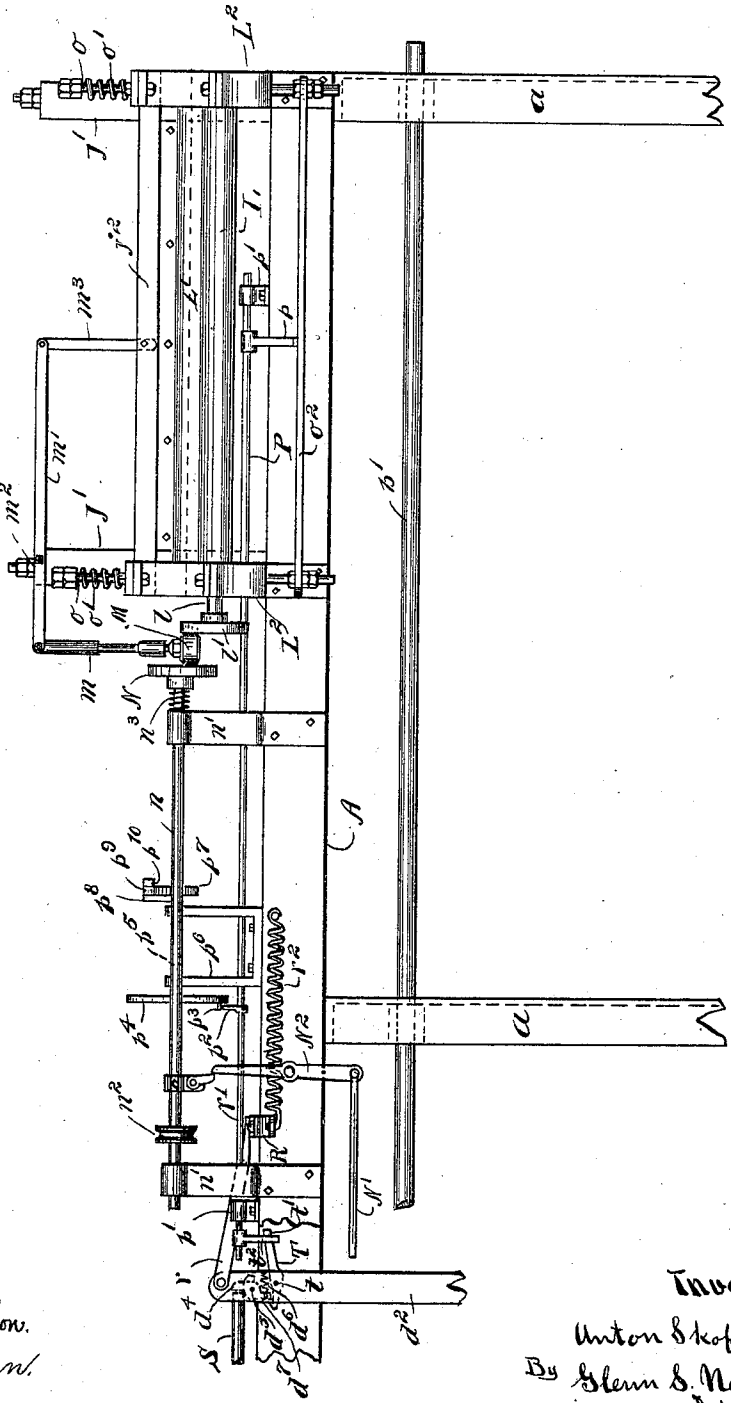


Fig. 3

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Fig. 6

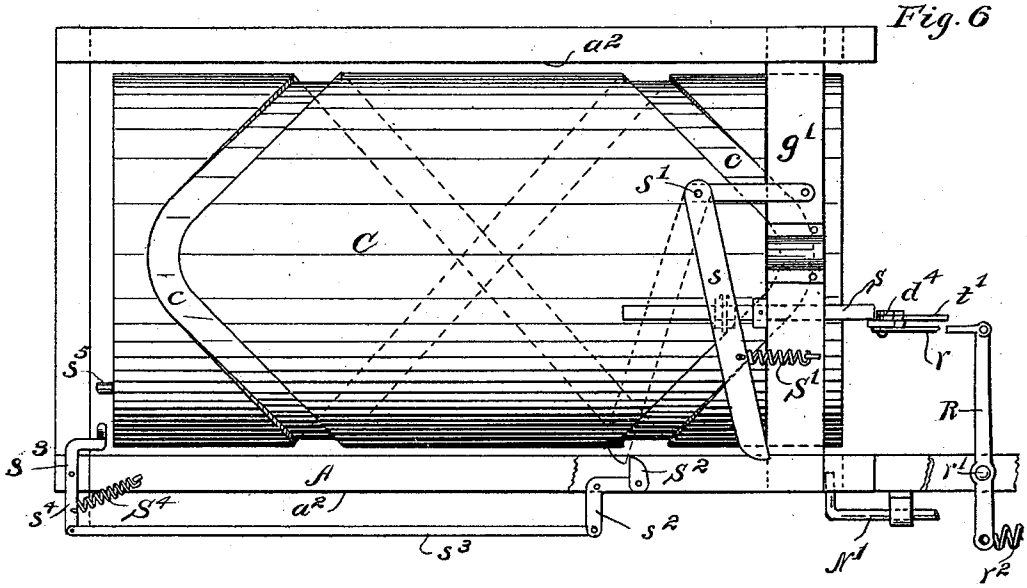
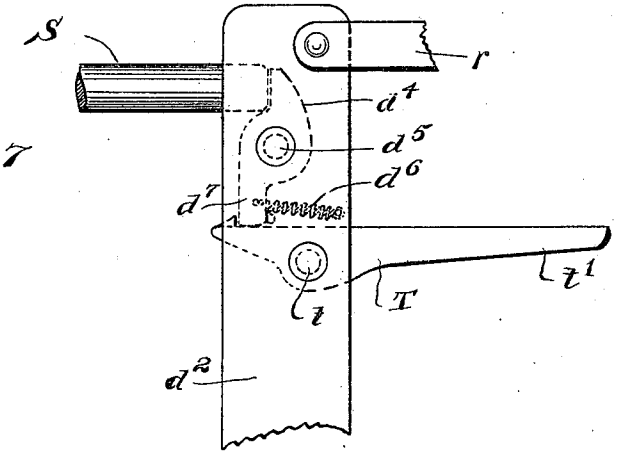


Fig. 7



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(No Model.) 6 Sheets—Sheet 5.

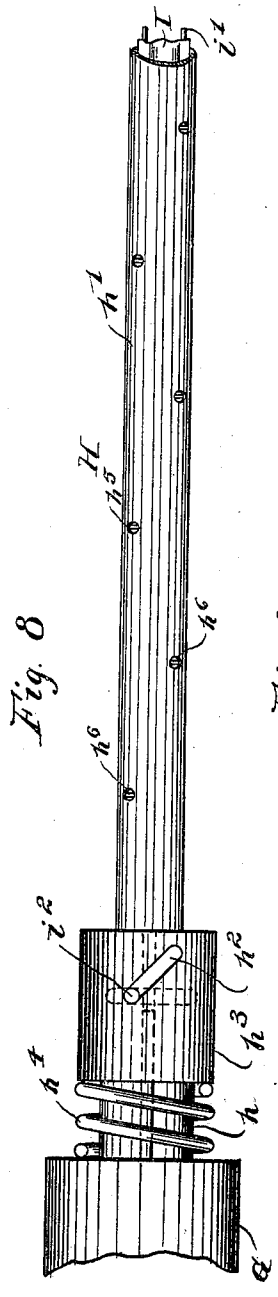


Fig. 8

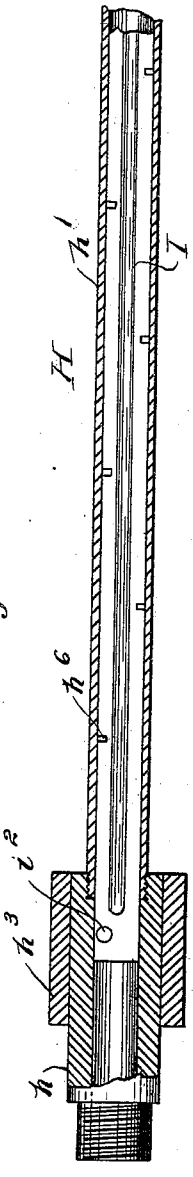


Fig. 9

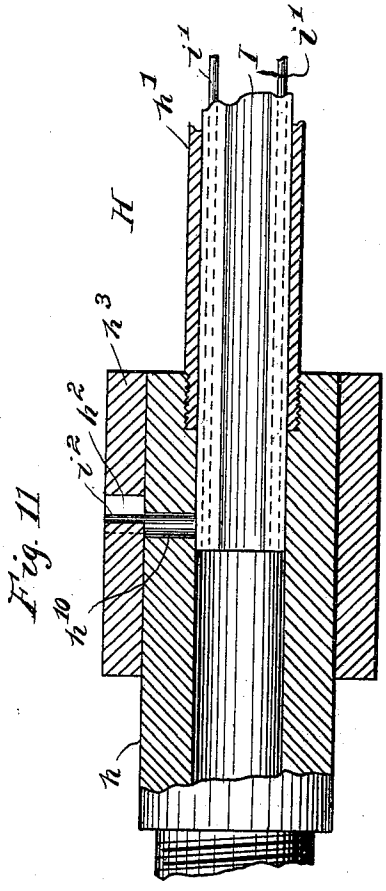


Fig. 11

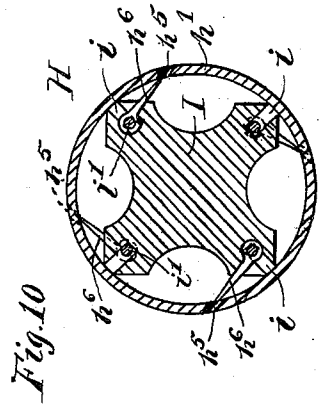


Fig. 10

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(Application filed Nov. 23, 1900.)

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Fig. 12

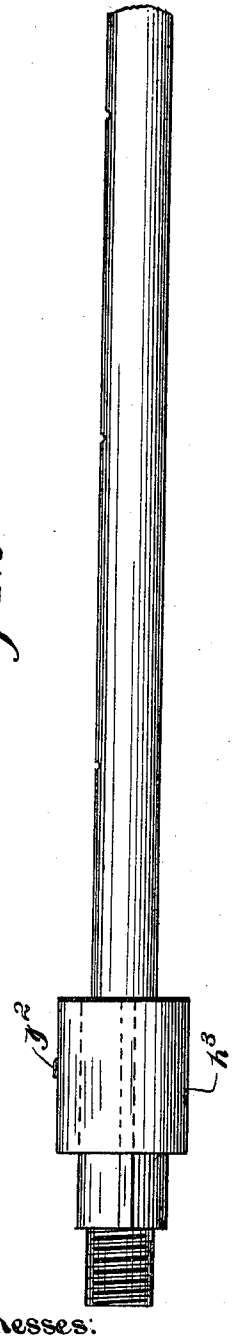


Fig. 13

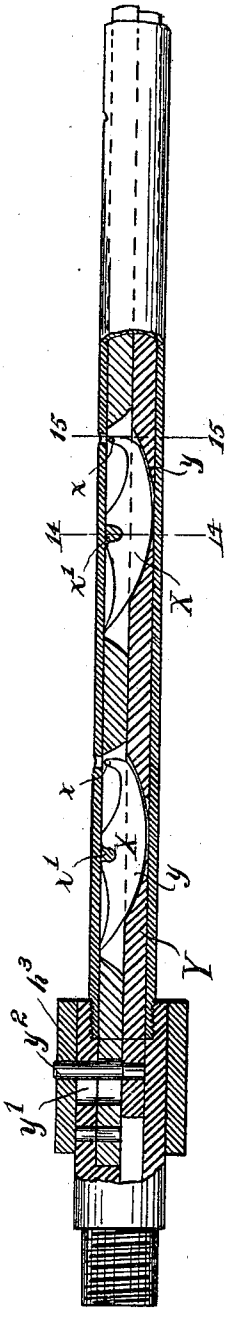


Fig. 15



Fig. 14



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UNITED STATES PATENT OFFICE.

ANTON SKOFSRUD, OF CHICAGO, ILLINOIS.

PAPER-REELING MACHINE.

SPECIFICATION forming part of Letters Patent No. 683,865, dated October 1, 1901.

Application filed November 23, 1900. Serial No. 37,549. (No model.)

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 Paper-Reeling Machines, of which the following is a specification.

This invention relates to improvements in machines for winding paper from large rolls into small rolls or for making sheets of paper into rolls or tubes.

It consists in combining means for feeding and severing the paper, a novel spindle for winding the paper, and means for reciprocating the spindle, and in combining with these essential elements various details and features for the automatic operation of the machine, which will be described hereinafter.

In the drawings, Figure 1 is an end view of a machine embodying my invention. Fig. 2 is a side elevation with parts removed showing principally the winding and reciprocating mechanism. Fig. 3 is an elevation of the reeling end of the machine, showing the feeding and cut-off or severing mechanism. Fig. 4 is the grooved cam-drum for reciprocating the spindle. Fig. 5 is a detail showing the cross-head pendent block. Fig. 6 is the clutch-operating mechanism. Fig. 7 is the tripping device for the clutch-lever. Figs. 8 and 9 are views of the spindle. Figs. 10 and 11 are enlarged details of the same. Figs. 12, 13, 14, and 15 are details showing a modified form of spindle.

A is a suitable frame supported on legs a, provided with cross-braces a' for supporting the shaft-bearings.

B is the main driving-shaft, divided at the clutch into sections b and b'.

b^2 is the driving-pulley, mounted on the section b. A cam-drum C is also loosely mounted on this section, but is provided with a clutch-ring d, whereby it may be thrown into engagement with the shaft by the double clutch cone-sleeve D. Another clutch-ring d' on the shaft-section b' enables it to be thrown into engagement with the first section when the cone-sleeve D is thrown to the right, Fig. 2. A clutch-lever d^2, pivoted at d^3 and having a tripping mechanism at the top, is provided for operating the clutch.

On the section b' is fixed a pulley b^3, with a belt running to a pulley e on a counter-shaft E, supported by brackets e' at the rear of the frame. A second pulley e^2 on this counter-shaft is belted to a pulley f on an elongated sleeve F, carried in bearings supported by brackets f' in the center of the frame. A shaft G, passing through the sleeve, is provided with a spline registering with a keyway in the sleeve, so that the shaft will be rotated therewith, but may be reciprocated therein. The shaft may rotate freely in a cross-head g' at the end thereof, but is prevented from lateral movement therein by the collars g^2. The cross-head slides in suitable ways a^2 on the frame A, and an elongated pointed block G', (shown in Fig. 5,) pivoted to the lower side of the cross-head, is adapted to engage with grooves c in the double-grooved cam-drum C. The method of double-grooving the drum is shown in Fig. 4. It is done in this manner to obviate the use of a drum of too large diameter, and in order to prevent the cross-head-driving device, which might otherwise be a roller, from taking the wrong groove at the point c' where they cross it is made elongated and pointed, as shown. By making it in this shape it takes the curves at the end of the drum and alines itself on the longitudinal courses, so that it readily passes over the opening made by the intersecting groove. The cross-head also carries a plunger for operating the clutch-lever, which will be more fully described hereinafter.

Attached to the end of the shaft G is the winding-spindle H. (Shown in Figs. 8, 9, 10, and 11.) A threaded socket h is screwed into the shaft, and a tube h' is firmly fastened therein, or the tube may be made integral with the socket. A shaft I of irregular cross-section is loosely fitted in the tube. Slots i are cut therein to admit the insertion of rods i' and form bearings therefor. Spaced at suitable intervals on these rods i' are placed small barbs or needles h^6, with their points resting on the walls of small holes h^5 in the tube and adapted to be thrust out when the shaft is rotated in the tube. It is essential that these barbs should be projected when the paper is about to be reeled and retracted when the roll is to be stripped from the spindle. This is accomplished by having a pin

i^2 rigidly inserted in the end of the shaft I and passing out through a transverse slot h^{10} in the socket h and a diagonal slot h^2 in a sleeve h^3 fitting over the socket-piece and slidingly keyed thereon. A spring h^4, pressing against the shaft G and the sleeve h^3, holds the sleeve in its normal forward position, in which position the barbs are retracted. The spindle passes through a bearing in a bracket a^3 on the frame, which engages with the sleeve h^3 and stops it slightly before the spindle has traversed to its forward position, thereby throwing the pin over and projecting the barbs. When they are thus projected and the paper is fed, by means which will be presently explained, the forward edge of the paper will be pierced or engaged by the barbs and the roll started. When it is completed, the spindle is stopped, and as it is withdrawn the forward face of the bearing a^3 forms a stripper to strip off the completed roll from the spindle, which is readily done, as the barbs are immediately retracted by the spring when the spindle starts back.

A guide and smoothing roller J is supported by its gudgeons j in spring-pressed sliding bearings j', supported in brackets J', overhanging from the rear of the frame A. This roller will normally rest on the spindle as it is advanced and will be raised up as the roll is formed. A bar j^2 connects the bearings j' and raises or lowers with them. A tilting feed-table K, Fig. 1, is pivoted at k in slotted brackets K' and is provided at its forward edge with rods k', attached to lugs on the sliding bearings j'. Normally the edge of the table registers approximately with the top of the spindle, but as the roll increases the edge is raised by the rods to conform thereto.

The paper is fed by a feeding-roller L, and a spring-pressed idler-roller L' coacting therewith. These are carried in a bracket L^2, attached to the front of the frame, which also supports the severing device. Attached to the projecting gudgeon l is a disk l'. (See Fig. 3.) A friction-wheel M is adapted to engage therewith and with a second disk N. This wheel is suspended by a rod m from a lever m', pivoted to a rigid brace m^2, attached to one of the brackets J'. The other end of the lever is connected by a rod m^3 to the cross-bar j^2, before mentioned, and as the bar rises the friction-wheel is correspondingly lowered. The disk N is carried on the end of a counter-shaft n, mounted in brackets n', attached to the frame, and is held normally against the wheel M by a spring n^3 around the shaft, which has sufficient lateral motion to allow the release of the wheel. This shaft is driven by a belt running from a pulley n^2 thereon to a pulley f^3 on the sleeve F. At about the time the spindle is projected across the feed-way the cross-head striking a rod N' pushes it forward and throws a lever N^2, which presses back the shaft n and releases the friction-wheel M, allowing it to rise as the roller J drops. (See Figs. 1 and 2.) It is readily seen that this mechanism gives a variable-speed feed, dependent upon the increasing size of the forming roll.

The cut-off mechanism consists of a knife O, supported on rods o, which pass through bearings in the brackets L^2 and hold the knife raised by the springs o'. These rods are connected at the lower ends by a bar o^2. A tappet-arm p on a rod P, supported in the brackets p', is adapted to engage the bar o^2 when desired and by depressing it cause the knife to sever the paper. This is accomplished by means of an arm p^2 on the rod P, which engages with a pin p^3 on a disk p^4 when it is rotated. The disk is carried on a short shaft p^5, mounted in the brackets p^6, and carries at its opposite end a ratchet-wheel p^7. An arm p^8, loosely mounted on the shaft, carries a pawl p^9, adapted to engage with the ratchet-wheel. The arm is oscillated by a rod p^{10}, Fig. 1, attached thereto and extending back across the bed to connect with a disk e^2 on the end of the shaft E, Fig. 2. The disk is slotted to allow the connection to be made adjustable toward or away from the center to decrease or increase the throw, and consequently the number of revolutions, of the shaft necessary to cause a complete turn of the shaft p^5 with its disk p^4.

It is desirable to stop the entire feeding and winding mechanism when the spindle is being retracted and projected across the feed-way, and to this end the tripping mechanism before mentioned on the clutch-lever d^2 and means for operating it are provided, as shown in Figs. 3 and 6. The clutch is held in normal engagement with the drum by means of a link r, attached to the top of the lever d^2 and connecting with a lever R, pivoted at r' to the frame and having a spring r^2 at the opposite end extending forward to a convenient attachment on the frame. When the spindle has reached its forward position, a rod S, fixed in the cross-head, strikes the lever d^2 and carries the plunger D forward to cause the sections of the shaft to revolve together, and consequently start the revolving and feeding mechanism. In order that the throwing of the lever may be accurately timed, the rod S is attached to a lever s, pivoted at s' to a brace from the cross-head. A spring S' from the lever to the cross-head keeps the rod normally projected. As the cross-head advances the lever strikes a pivoted stop S^2 on the side of the frame, and the further advancement causes the lever to swing back, the spring stretched, and the rod S drawn back from its normal operative position. An arm s^2 on the stop is attached to a rod s^3, extending back to an arm s^4 of a bent lever S^3, having its forward arm bent down to engage with an adjustable pin s^5 on the end of the drum C. A spring S^4, attached to the arm s^4 and the frame, holds the levers and catch in a normal position for engaging the lever s. When the cross-head

has advanced to the position desired for the clutch to be thrown, the pin s^5, striking the bent end of the lever S^3, swings it back and through the rod and catch S^2 releases the lever s, when the springs S' throws the rod S forward against the lever d^2 and overcoming the spring r^2 forces the clutch-lever d^2 forward. In order that the clutch may again be thrown into engagement with the drum at any desired time, the end of the lever d^2, Fig. 7, is provided with a catch d^4, pivoted at d^5, with which the rod S engages. A spring d^6 holds the catch in a normal upright position. One arm d^7 of the catch engages with a notch in a lever T, pivoted at t, which prevents the catch from being thrown over when the rod S strikes it. One arm t' of the lever T extends forward to engage with a tappet-arm t^2 on the rod P. The tappet-arm striking the arm t' and raising it, releases the catch and allows the spring r^2 to again throw the lever d^2 back.

The operation of the machine as a whole is as follows: The power being applied to the driving-pulley and the drum being clutched in, the cross-head, shaft, and spindle are driven forward until the spindle is across the feedway and the barbs thrust out. Immediately the clutch is thrown over, the drum stopped, and the winding mechanism started, when the tube or roll is completed, the tappet-shaft is thrown, the clutch released, and the paper severed. The drum being thus thrown in again, the spindle is retracted, the tube stripped off, and the machine is ready to repeat the operation.

In the modified form of spindle shown in Figs. 12, 13, 14, and 15 the barbs are to be thrown out by the longitudinal movement of a shaft in place of a rotary one. The barbs x are at the ends of cam-shaped members X pivoted at x' to a stationary strip in the tube. A sliding split-shaft member Y is provided with cam-grooves y, engaging with the members X. A backward movement of this strip projects the barbs and a forward one retracts them. This is accomplished by a pin y^2, extending through a slot y' to engage with the sleeve h^2.

Having thus described my invention, which I am well aware may be easily changed in various details and in which I do not limit myself to the exact construction shown, I claim—

1. In a reeling-spindle, the combination of a tube, a shaft within said tube, barbs or needles pivotally mounted on said shaft with their points resting on the walls of apertures in said tube and adapted to be thrust out through said apertures in a substantially tangential movement, by rocking the shaft.

2. The combination in a reeling-spindle, of a socket or shank, a tube fitted therein, a shaft in said tube slotted to receive bearing-rods, barbs or needles mounted on said rods, adapted to be thrust out through apertures in said tube, a sleeve provided with a diagonal slot, slidingly keyed on said socket, a pin in said shaft extending out through a slot in said shank, and the diagonal slot in said sleeve and a spring pressing said sleeve, substantially as described.

3. The combination in a machine for reeling paper, of mechanism for feeding and severing the paper, a barbed spindle for engaging and reeling the paper, means for projecting said spindle across the feed-passage for the paper and retracting it therefrom, means for projecting and withdrawing the barbs, and means for rotating the spindle.

4. The combination in a machine for reeling paper, of mechanism for feeding and severing the paper, a spindle provided with barbs to pick up the advancing edge of the sheet and bind it to the spindle, means for projecting said spindle across the feeding-passage for the sheet and retracting it therefrom, means for revolving the spindle when so projected, means for withdrawing the barbs, and means for stripping the finished roll in said retracting movement.

5. The combination in a machine for reeling paper, of a barbed winding-spindle, means for feeding and severing the paper, means for projecting and withdrawing the barbs, and means for stripping the finished roll from the spindle.

6. The combination in a machine for reeling paper, of mechanisms for feeding and severing the paper, a reeling-spindle, a vertically-yielding pressure-roll arranged above said reeling-spindle, an automatically tilting feed-table mounted on suitable brackets, and means connecting said feed-table with said pressure-roll whereby the proximate edge of the feed-table will be raised as the roll accumulates which is being reeled.

7. The combination of the reeling-spindle, the yielding pressure-roll, the sliding bearings in which it is mounted, the bar connecting said bearings, the links and lever connecting said bar with a vertically-movable friction-wheel, engaging a disk on the gudgeon of the positive feed-roll and a disk on a driven shaft.

8. The combination of the reeling-spindle, the yielding pressure-roll, means connecting said pressure-roll with a friction-wheel, engaging with a disk on the gudgeon of the positive roll of the feeding-rolls and a disk on a driven shaft spring-pressed against said friction-wheel and means for intermittently disengaging said disk substantially as described.

9. The combination of the longitudinally-reciprocating shaft carrying the spindle, means for rotating the shaft, means for reciprocating said shaft consisting of the cross-head with its depending pointed block engaging with a grooved cam-drum, substantially as described.

10. The combination of the divided main shaft, the double clutch-sleeve and actuating-lever, the spring-controlled means for retaining the sleeve in normal engagement with the clutch-ring on the cam-drum and the spring-

actuated plunger for throwing the lever to engage the sleeve with the clutch-ring on the other part of the shaft.

11. The combination of the double clutch mechanism and its operating-lever, a latch pivoted on said lever adapted to be engaged by the plunger and means for tripping said latch.

12. The combination of the clutch mechanism, and its controlling-lever with a plunger mounted in the cross-head or traveler, a lever connected to said plunger, a spring engaging said lever and cross-head, a trip-stop mounted on said frame adapted to engage said lever, and tripping mechanism operated by a pin in said drum for releasing said stop.

13. The combination of the severing mechanism, and the clutch-operating mechanism with a shaft bearing tappet-arms, for operating such mechanisms, an arm on said shaft engaging with a pin on a disk carried by a second shaft having a ratchet-wheel thereon operated by a pawl on a swinging arm connected by a rod to an adjustable connection on a disk carried by a driven shaft.

14. In combination, a reeling-spindle, feeding and severing mechanism, means for alternately revolving said spindle and operating said mechanisms, and reciprocating said spindle, substantially as described.

15. The combination of a barb-carrying reeling-spindle and feeding and severing mechanisms, means for alternately projecting the barbs, revolving the spindle, feeding the paper and severing; and withdrawing the barbs reciprocating the spindle and stripping the finished roll substantially as described.

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