June 27, 1950 G. M. KWITEK 2,512,900

PAPER WINDING MACHINE SEALING MECHANISM

Filed April 21, 1948 2 Sheets-Sheet 1

Fig. 1

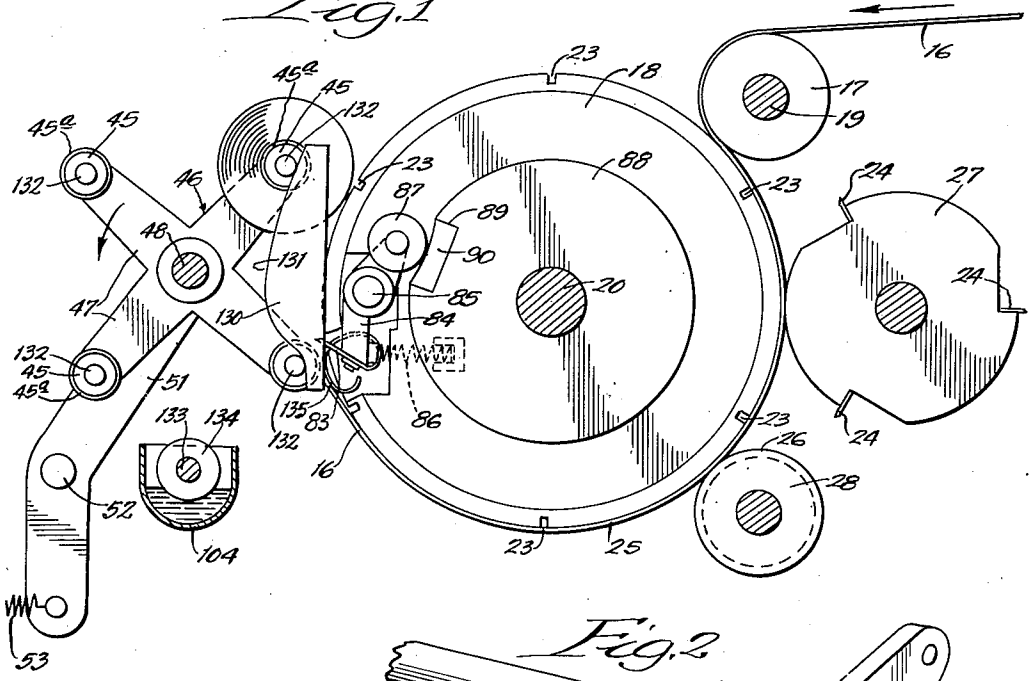


Fig. 2

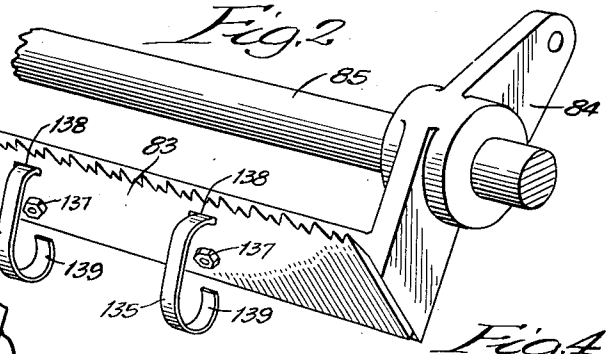


Fig. 3

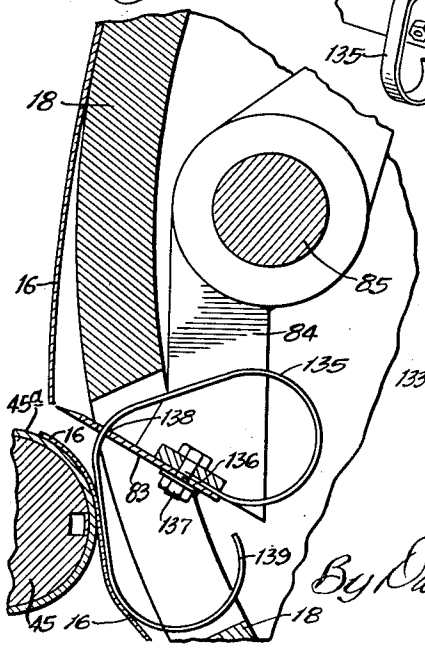
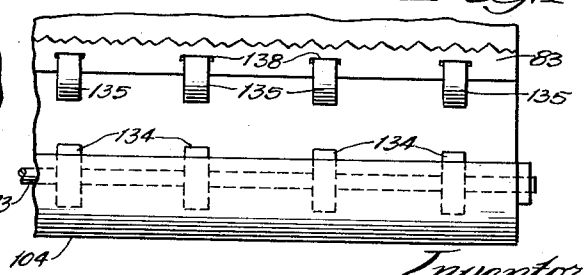


Fig. 4



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PAPER WINDING MACHINE SEALING MECHANISM

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Fig. 5

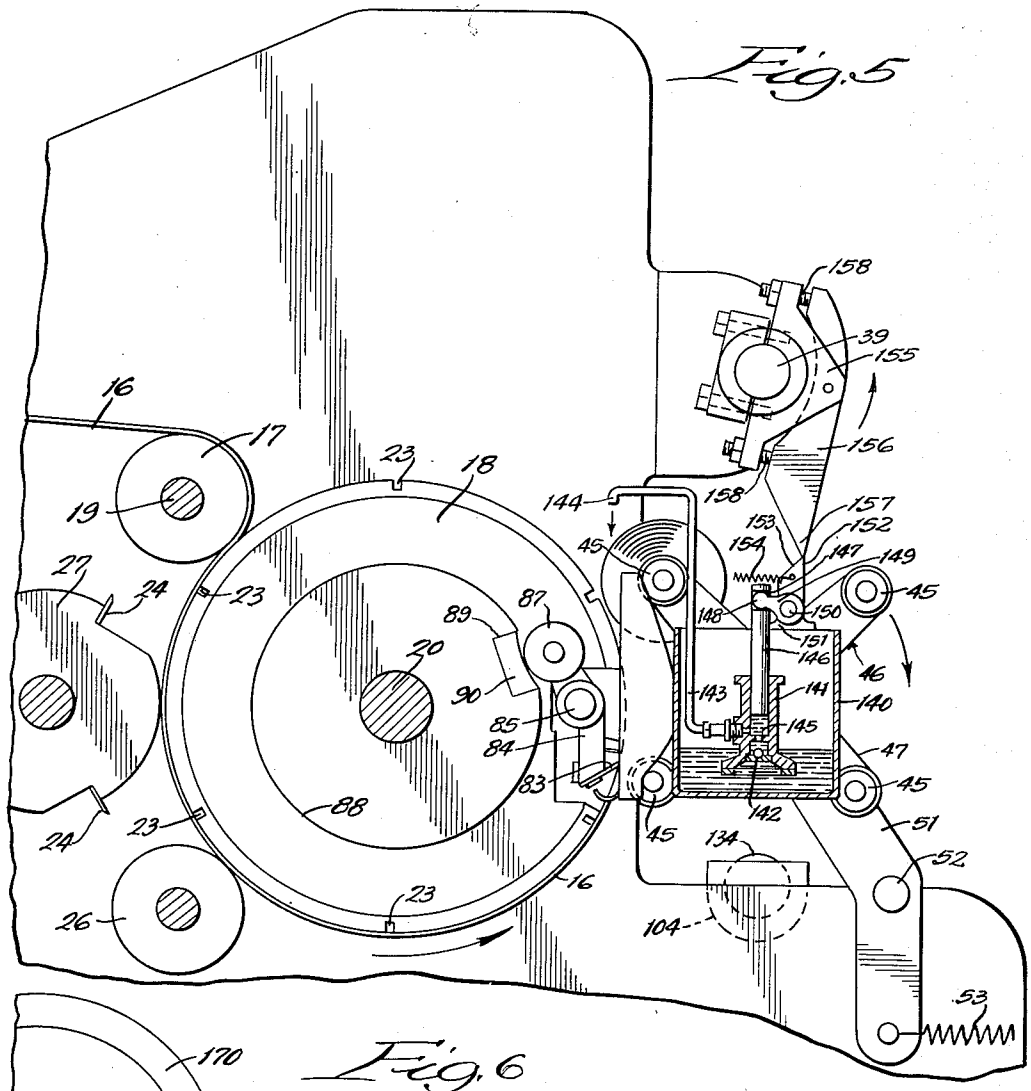
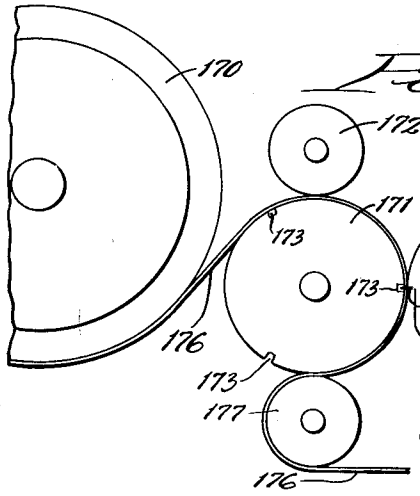


Fig. 6



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Patented June 27, 1950

2,512,900

UNITED STATES PATENT OFFICE

2,512,900

PAPER WINDING MACHINE SEALING MECHANISM

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Application April 21, 1948, Serial No. 22,485

12 Claims. (Cl. 242—56)

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This invention relates to paper winding machine sealing mechanism. The invention is particularly concerned with the sealing of the paper web against an unfilled core while also sealing the other end of the severed core against the filled core or completed paper roll.

It is common practice to feed a web of paper from a parent or mill roll of paper and to slit and perforate the web after which the web is wound on to cardboard or other cores for making rolls of paper towels, toilet paper, etc.

The construction of machines for accomplishing the above purposes are well known. An example of such machines is set out in my Patent No. 2,237,759, which issued April 8, 1941. The machines include a slowly rotating turret or spider carrying several spaced and freely rotatable mandrels for the cores and are equipped with means for rotating the mandrels rapidly which are adjacent the bed roll of the machine. Upon the filling of the cores with the paper, the rotatable turret carries the filled core or cores out of operative position and brings a new, unfilled core into operative position for receiving the slit and perforated web. A pivotally mounted knife is employed for severing the web between the filled core and unfilled core.

An object of the present invention is to equip such machine or machines with effective means for sealing both ends of the severed web immediately after their severance so that the upper or outer end of the web is sealed to the completed paper roll while the lower or inner end of the severed web is sealed or attached to the new or unfilled core. A further object is to equip such a winding machine with novel sealing mechanism whereby spaced rings of adhesive upon the unfilled core are brought into alignment with spaced pressure applying means for urging the web into contact with the adhesive rings at such points. Yet another object is to provide sealing mechanism consisting of flexible and yieldable spring transfer fingers aligned with the adhesive rings and carried by the cutter or knife for engagement with the web at the spaced or aligned points when the web is severed. A still further object is to provide means effective for applying adhesive to the paper roll which is almost completely formed and in timed relation with the web severing mechanism so that the end of the web is drawn into overlapping relation with the adhesive on the almost completely filled roll whereby the free end of the completed roll is securely held by the adhesive. Yet another object is to provide paper winding mechanism in which a cam is employed in conjunction with

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the turret and in cooperation with the sealing means described, the cam being effective for retaining the outer surface of the filling roll in abutting relation to the outer surface of the bed roll. Other specific objects and advantages will appear as the specification proceeds.

The invention is illustrated in a single embodiment by the accompanying drawings, in which—

Fig. 1 is a broken side view in elevation of the winding machine equipped with apparatus embodying my invention; Fig. 2, a broken perspective view of the knife structure equipped with the spring transfer fingers embodying my invention; Fig. 3, an enlarged sectional detail view showing the operation of the knife and sealing fingers; Fig. 4, a detail sectional view with the winding mandrel and core removed and showing the alignment of the adhesive-applying discs with the spring transfer fingers; Fig. 5, a vertical sectional view of a portion of the paper winding machine equipped with mechanism for applying adhesive to the almost completed paper roll so that the severed web will be drawn into an overlapping relation with the adhesive; and Fig. 6, a diagrammatic view showing a modified form of structure in which a secondary bed roll is employed in conjunction with the main bed roll, the slitting and perforating being done on the secondary bed roll.

Since the present invention is applied to an existing machine which is well known in the art, a detailed description of the existing machine is believed herein to be unnecessary. For a full description of the existing machine reference is made to my Patent No. 2,237,759 and to facilitate references herein to the machine, the numerals employed in the patent for designating certain elements will be employed herein, new references being applied to the sealing mechanism embodying my invention and which are added to the existing machine.

In the illustration given, the paper web **16** is drawn forwardly by means of a pull or feed roll **17** and the paper web is trained over the feed roll and under and around the bed roll **18**. The feed roll **17** is mounted upon a feed roll shaft **19** while the bed roll is mounted upon a bed roll shaft **20**.

The bed roll **18** is provided at equidistantly spaced points with longitudinally extending slots **23** for the perforating blades **24**. The bed roll is further provided with a plurality of annular equidistantly spaced grooves **25** for the reception of the paper web-slitting knives **26**. The

perforating knives 24 are rigidly secured to a perforating roll 27 while the slitting knives 26 are rigidly carried by a slitting roll 28. The perforating roll 27 is driven in proper timed relation to the bed roll 18.

The rotatable mandrel turret 26 is equipped with arms 27 which carry sockets receiving the mandrels 45 adapted to receive the unfilled cores 45a. The mandrels are supported within rotatably mounted sockets which are rotated when they are adjacent the bed roll 18 by means of mechanism shown in my Patent No. 2,237,759. Means are also provided for slowly rotating the shaft 48 which carries the turret 46 so as to bring new cores into a position adjacent the bed roll 18.

The shaft 47 is supported upon a bell crank support 51 pivotally supported upon shaft 52 and having its lower arm engaged by a spring 53. The spring 53 normally urges the upper arm 51 of the bell crank inwardly toward the bed roll 18.

Movement of the turret toward the bed roll is controlled by the fixed cam 130 which has an outer arcuate surface 131 engageable with the extreme reduced end portion 132 of the mandrel 45. As indicated more clearly in Fig. 1, the end portion of the mandrel 45 follows the arcuate outer surface 131 of the cam and directs the turret outwardly as the core is filled so that the outer portion of the filling roll on the core abuts and follows the curved surface of the bed roll 18.

The existing winding machine is also equipped with a knife or cutter 83 which is mounted upon a bell crank 84 supported upon the shaft 85. The upper arm of the bell crank is provided with a roller 87 which bears against a timing wheel 88 mounted upon the shaft 20. A spring 86 urges the lower arm of the bell crank 84 outwardly. The timing wheel 88 is provided with a cavity 89 into which the roller 87 may drop and thus allow the spring 86 to move swiftly outwardly to sever the web 16. The cavity 89, however, is filled with a head 90 which is periodically moved laterally in timing relation by mechanism shown in detail in my Patent No. 2,237,759, to permit the roller 87 to drop and the knife to be moved outwardly under the force of spring 86.

The machine as described is equipped with a tank 104 for receiving adhesive and a roll is provided for transferring adhesive to the core as it is advanced toward the bed roll 18.

In order to incorporate my invention in the existing machine described, I provide the driven shaft 133 with a plurality of discs 134, as shown more clearly in Fig. 4. The discs 134 are spaced apart for applying a ring of glue to the core carried by the mandrel 45 and just before it reaches the position adjacent the bed roll 18. Preferably each core is provided with a pair of rings of adhesive.

Aligned with the adhesive-applying discs 134 are the spring transfer fingers 135, as shown more clearly in Figs. 2, 3 and 4. The spring transfer fingers may be of any suitable shape. I prefer, however, to employ fingers of the shape shown more clearly in Figs. 1 and 3. The spring has its inner end 136 apertured and secured to the knife 83 by a bolt 137. The spring then extends downwardly and then upwardly and through a slot 138 in the knife 83. Extending through the slot 138, the spring extends downwardly and has a free end portion 139 turned inwardly, as shown more clearly in Fig. 3. The spring is supported by engagement with the knife 83 and has its lower curved portion adapted for

firm wiping engagement with the severed end of the web 16 so as to press the web at points directly over the adhesive rings formed by the discs 134.

While I have shown the spring fingers for exerting the pressure directly over the adhesive rings, it will be understood that other means aligned with the adhesive rings may be employed. If desired, compressed air or other fluid may be discharged through the bed roll 18 against the inner sides of the web 16 so as to press the web forwardly against the adhesive rings. It will be obvious that various means may be employed for this purpose. I prefer spring transfer fingers because of their yieldable quality and their effective wiping action in securing the severed end of the web firmly to the adhesive rings on the new core. Further, by mounting the spring fingers upon the knife, the action of the fingers is extremely rapid and in timed relation with the severing of the web so that in an instant the severed end of the web is firmly attached to the rotating core on mandrel 45.

Simultaneously with the severing of the web and the attachment of the lower end of the web to the new core, I provide means for attaching the upper severed end of the web to the filled or almost filled core above. In the specific illustration given in Fig. 5, I provide a fixed container 140 carried by the frame. Within the container 140 which is partially filled with adhesive, I provide a pump cylinder 141 having a ball-guarding opening 142 communicating with the adhesive in the container. A conduit 143 leads from the lower side of the cylinder 141 to a discharge point 144 just above the inner side of the almost completed roll. If desired, a perforated plate 145 may be provided in the pump just above the inlet of the conduit 133. A pump piston 146 extends above the container 140 and is provided with a laterally extending slot 147 receiving the ball end 148 of an actuating arm 149. The arm 149 is fixed to a shaft 150 mounted upon a bracket 151 carried by the stationary frame of the machine. Also fixed to the shaft 150 is a trigger arm 152 which extends upwardly and is provided with an inclined face 153. A spring 154 normally urges the arm 152 toward the bed roll.

Upon the shaft 39 of the machine I secure a bracket 155 to which is pivotally secured a cam arm 156. The cam arm 156 is preferably provided at its lower end with a point 157, as shown more clearly in Fig. 5. Adjustment screws 158 may be provided at each end of the bracket 155 to adjust the position of the cam member 156.

With the structure shown in Fig. 5, the cam member 156 is rotated slowly by shaft 39 so as to engage the member 152 at the time when a roll of paper is just being completed on the mandrel moving upwardly from the bed roll 18. As the arm 152 is moved outwardly, it raises the plunger 146 which draws adhesive into the chamber of the cylinder 141. As the member 157 clears the upper edge of the member 152, the member 152 is released and spring 154 quickly draws the arm 152 inwardly toward the bed roll thereby forcing the plunger 146 quickly downwardly. The plate 145 with its tiny constriction prevents the escape of adhesive downwardly and the adhesive flows laterally through conduit 143 and is discharged in a measured amount upon the completed roll or rolls adjacent the inner side thereof, as indicated in Fig. 5.

The severing of the web 16 by the knife 83 is timed with respect to the deposit of the glue

so that the severed upper end of the web which is drawn upward by the rotating upper mandrel 45 overlaps the spot or spots of adhesive and forms a seal with the adhesive. In other words, the application of adhesive to the roll near the end thereof is overlapped by the free upper end of the severed web and this end is caused to adhere to the body of the completed roll by means of the adhesive. In the final sealing operation, the cam 131 is effective in holding the severed upper end of the web in position by reason of the holding of the completed roll in abutting relation to the surface of the bed roll 18, as shown more clearly in Fig. 1. Thus, the upper roll and the bed roll are caused by the cam to serve as a guide or confining means for the severed end of the web until it is brought against the spot or spots of adhesive.

In the modification shown in Fig. 6, the main bed roll 170 is constructed like the bed roll 18 except that it is free of the grooves and slots employed with slitting and perforating mechanism. In the modification, a secondary bed roll 171 is provided which is equipped with circumferential grooves cooperating with the slitter 172 for slitting the web. The secondary bed roll 171 is also equipped with the slots 173 cooperating with the members 174 on the perforator 175. The web 176 is advanced by the draw roll 177 and thence about the secondary roll for the slitting and perforating operations. From the secondary bed roll 171, the web passes to the main bed roll 170.

While in the foregoing specification, I have shown specific structures for the purposes outlined and useful in connection with paper winding machines, the structures being shown in considerable detail, it will be understood that such details of structure may be varied widely by those skilled in the art without departing from the spirit of my invention.

I claim:

1. In a paper winding machine having a bed roll about which paper passes and core-equipped mandrels supported for movement toward and away from said roll, means for applying adhesive upon a core to be filled, means for severing the web between an unfilled core and an almost filled roll, and means synchronized with said severing means for applying adhesive to said almost filled roll and for pressing the severed end of the web against the adhesive of said unfilled core.

2. In a paper winding machine having a bed roll about which paper passes and core-equipped mandrels supported for movement toward and away from said roll, means for applying adhesive upon a core to be filled, means for severing the web between an unfilled core and an almost filled roll, means synchronized with said severing means for applying adhesive to said almost filled roll and for pressing the severed end of the web against the adhesive of said unfilled roll, and cam means for maintaining the outer surface of the paper roll on the almost filled core adjacent said bed roll to guide the severed end into overlapping relation with the adhesive thereon.

3. In a paper winding machine having a bed roll about which a paper web passes, core-equipped winding mandrels supported for movement in spaced relation toward and away from said roll, means for applying spaced rings of adhesive upon a core to be filled, a cutter supported within the bed roll for severing the web between a filled roll and an unfilled core, and means aligned with said adhesive rings for pressing the severed web end against said adhesive rings.

4. In a paper winding machine having a bed roll about which the paper web passes and core-equipped winding mandrels supported for movement in spaced relation toward and away from said web, spaced discs rotatably mounted for applying rings of adhesive upon a core to be filled, a knife movably mounted for engagement with said web to sever it, and means carried by said knife and aligned with said adhesive rings for pressing the severed web end against said adhesive rings.

5. In a paper winding machine having a bed roll about which the paper web passes and core-equipped winding mandrels supported for movement in spaced relation toward and away from said web, spaced discs rotatably mounted for applying rings of adhesive upon a core to be filled, a knife movably mounted for engagement with said web to sever it, and means carried by said knife and aligned with said adhesive rings for pressing the severed web end against said adhesive rings, said last mentioned means comprising spring fingers carried by said knife and engageable with said severed web to press against the same at points aligned with said adhesive rings.

6. In a paper winding machine, spaced discs for applying rings of adhesive to a core, spring fingers aligned with said discs, and means for urging said spring fingers forwardly to bring a paper web into engagement with said adhesive rings.

7. In a paper winding machine equipped with means for rotating a core, means for forming spaced adhesive rings upon said core, and pressure means engageable with a paper web and in alignment with said rings for pressing said web against said adhesive rings, said means comprising spring fingers in the form of loops and supported by means of an inwardly turned end portion of each spring finger.

8. In combination with mechanism for applying spaced bands of adhesive upon a core and with means for drawing a paper web to a point adjacent said core, a knife mounted for movement into engagement with said web to sever the same, and spring fingers carried by said knife and supported thereby in alignment with said adhesive bands for pressing the web against said bands.

9. In combination with mechanism for applying spaced bands of adhesive upon a core and with means for drawing a paper web to a point adjacent said core, a knife mounted for movement into engagement with said web to sever the same, and spring fingers carried by said knife and supported thereby in alignment with said adhesive bands for pressing the web against said bands, said knife being provided with slots at points spaced inwardly from the edge thereof and said spring fingers being fixed to said knife and having looped portions extending through said slots and forwardly thereof for engagement with said paper web.

10. In a paper winding machine having a bed roll about which the paper web passes and having a core-equipped winding mandrel for drawing the web thereon to form a paper roll, a pump equipped with a plunger, means driven by said machine during the filling of said core to form the paper roll for reciprocating said plunger

to discharge adhesive upon the nearly completed roll, and a cutter operated in timed relation with said pump for severing the web at a point whereby the free end thereof overlaps the adhesive on the filled paper roll.

11. In a paper winding machine having a bed roll about which the paper web passes, a core-equipped winding mandrel for drawing the web thereon to form a paper roll, and severing means for periodically severing the web, an adhesive pump device having discharge opening adjacent the almost completed paper roll, and actuating means operated by said means in timed relation with said cutter for applying said adhesive at a point on said paper roll which will be overlapped by the severed web.

12. In a paper winding machine having a bed roll about which the paper web passes, a core-equipped winding mandrel for drawing the web thereon to form a paper roll, and severing means for periodically severing the web, an adhesive pump device having discharge opening adjacent the almost completed paper roll, actuating means operated by said means in timed relation with said cutter for applying said adhesive at a point on said paper roll which will be overlapped by the severed web, and a cam for maintaining said winding mandrel in a position in which the surface of the almost completed roll lies adjacent said bed roll to maintain the severed end of the web against said roll until the web end overlaps said adhesive.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,986,680	Marcalus	Jan. 1, 1935
2,272,940	Gerard	Feb. 10, 1942