Sept. 19, 1967 F. G. CONRAD, JR 3,342,434

WEB WINDING APPARATUS

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Fig. 1.

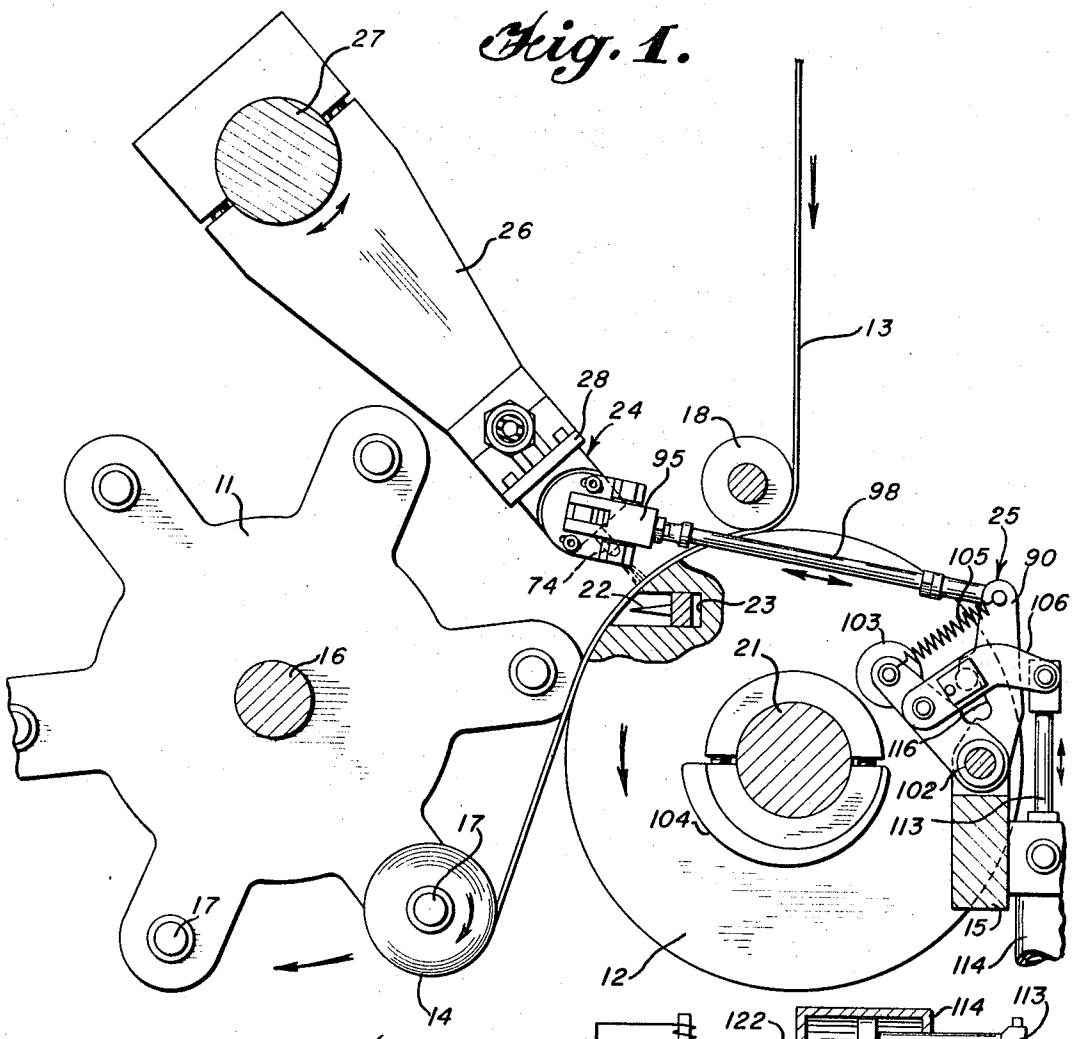
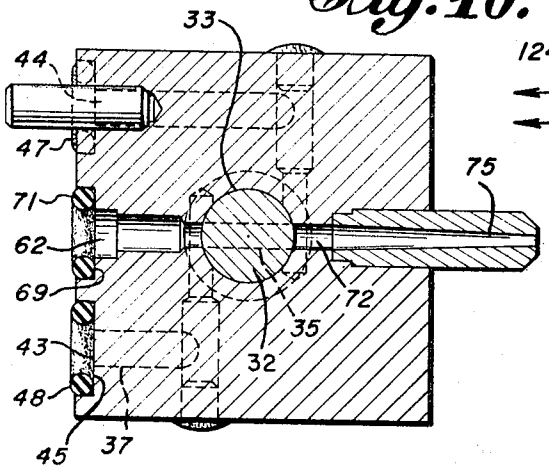


Fig. 10.



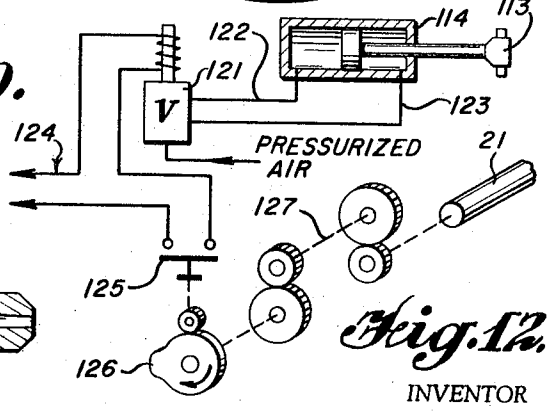


Fig. 12.

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WEB WINDING APPARATUS

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Fig. 3.

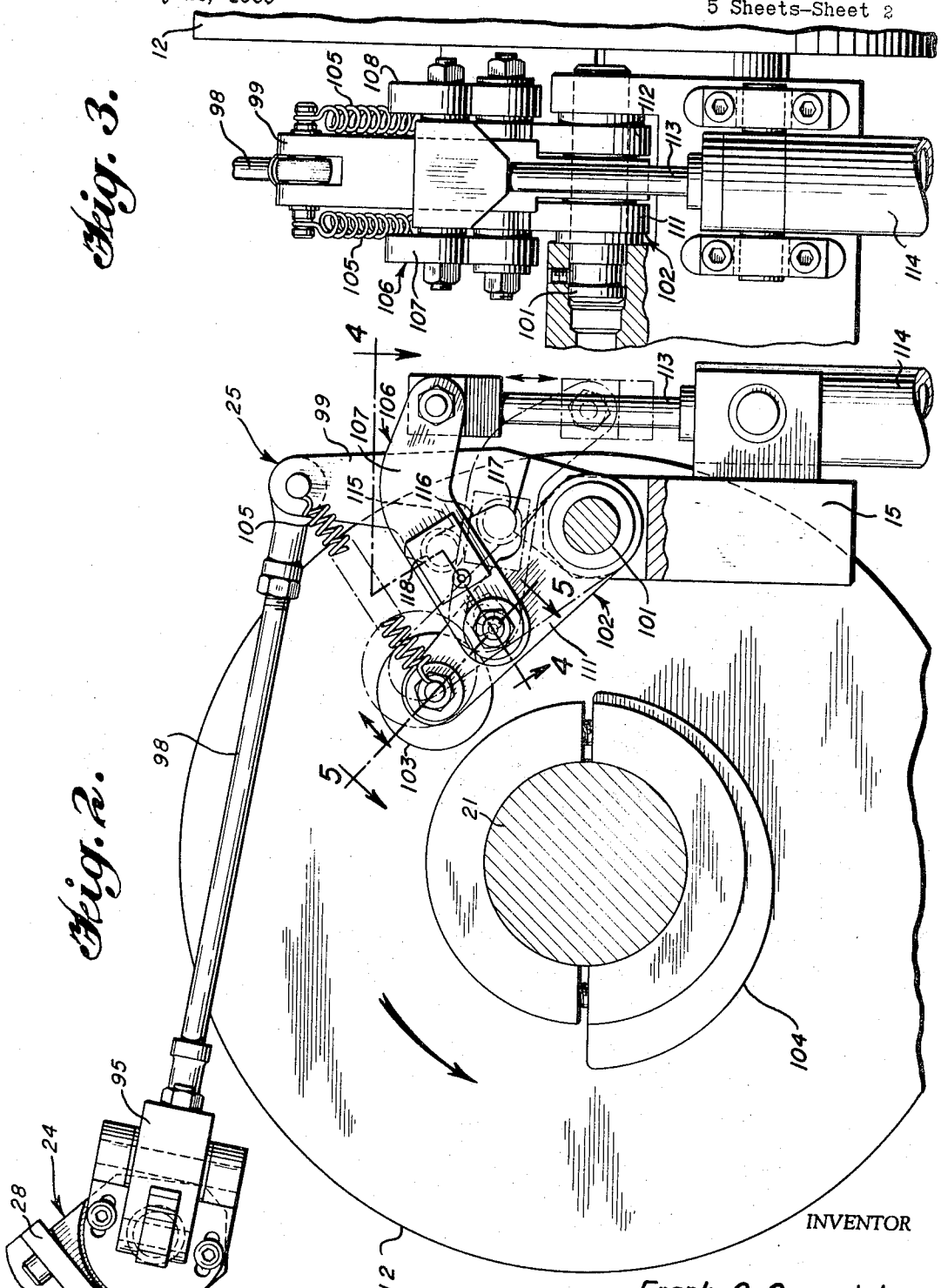


Fig. 2.

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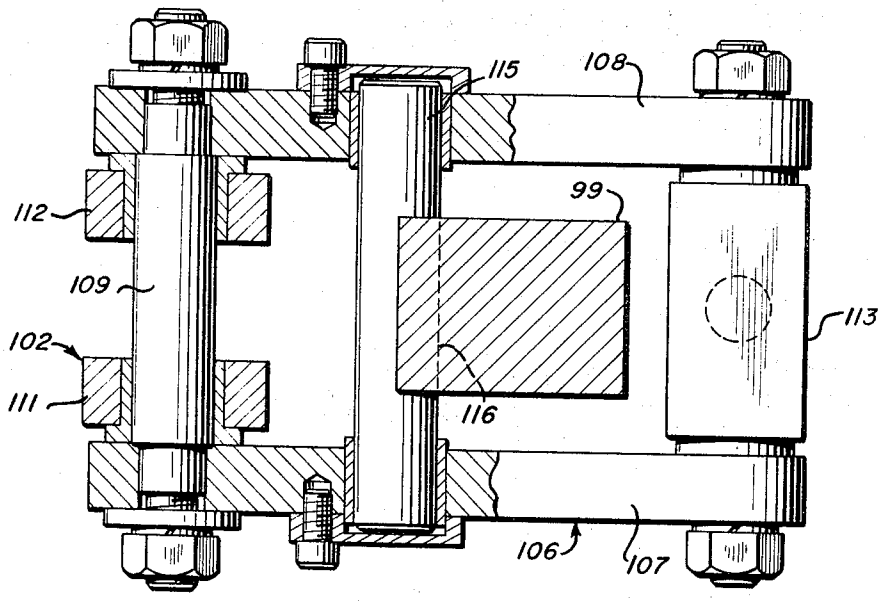
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WEB WINDING APPARATUS

Filed July 23, 1965 5 Sheets-Sheet 3

Fig. 4.



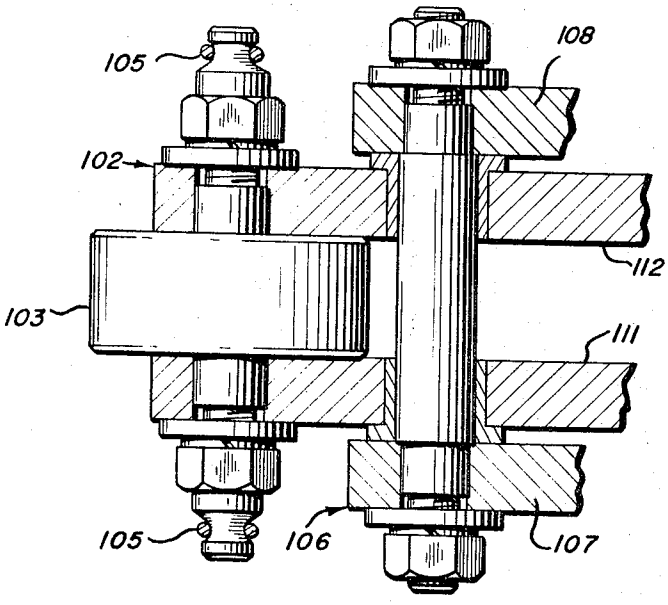


Fig. 5.

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WEB WINDING APPARATUS

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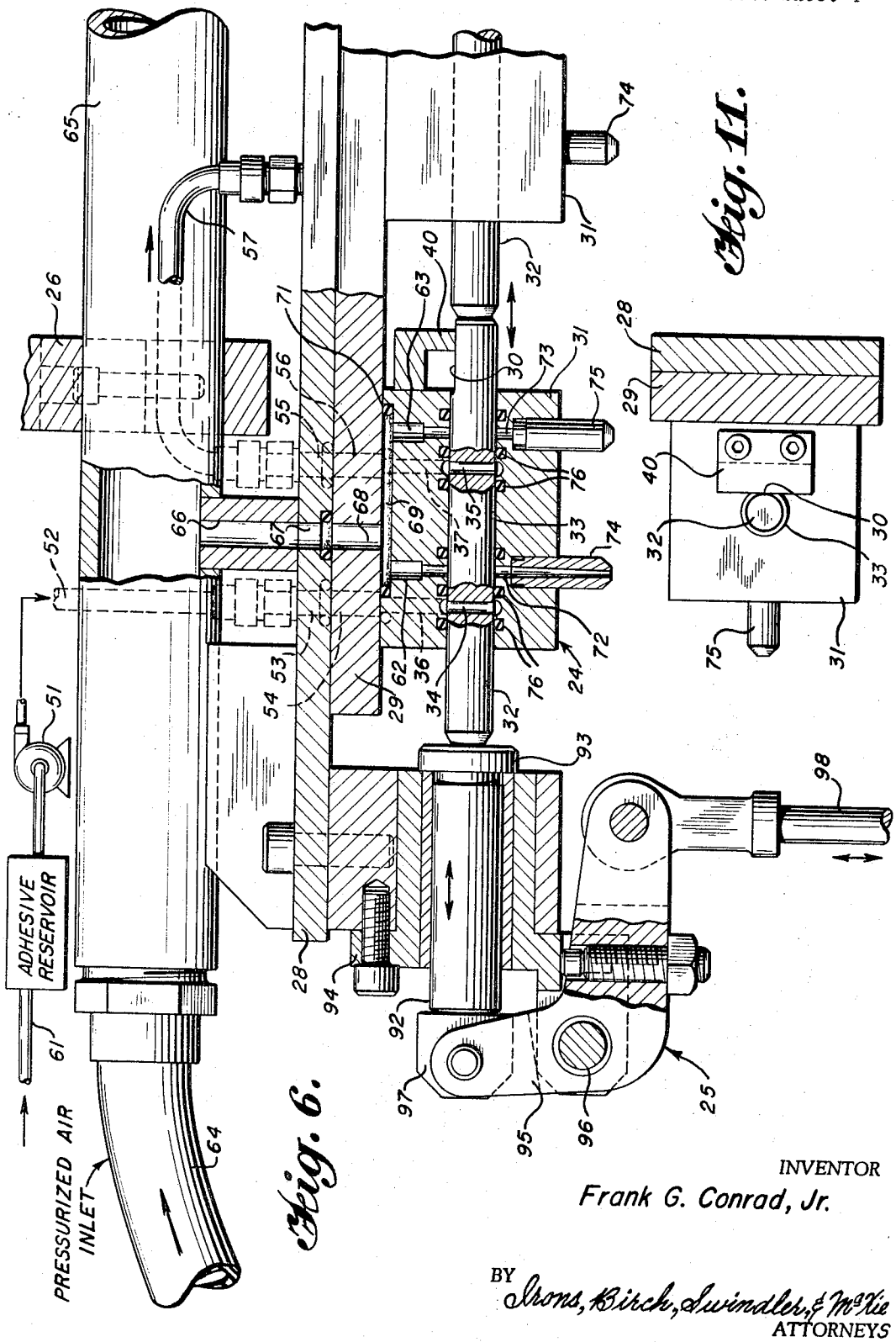


Fig. 6.

Fig. 11.

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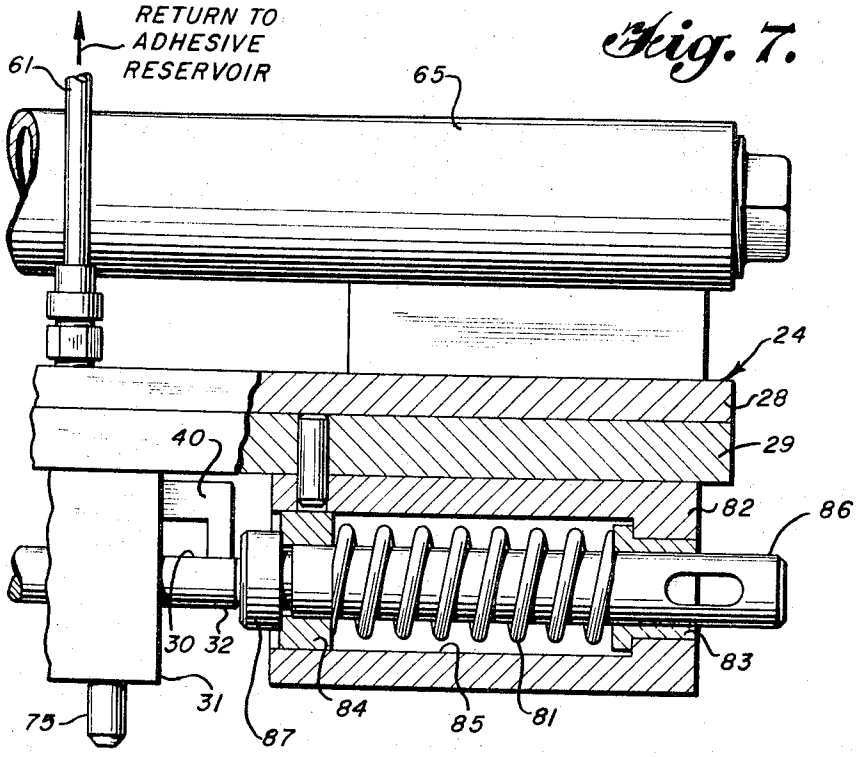
BY Irons, Birch, Swindler, & McKie
ATTORNEYS

Sept. 19, 1967 F. G. CONRAD, JR 3,342,434

WEB WINDING APPARATUS

Filed July 23, 1965 5 Sheets-Sheet 5

Fig. 7.



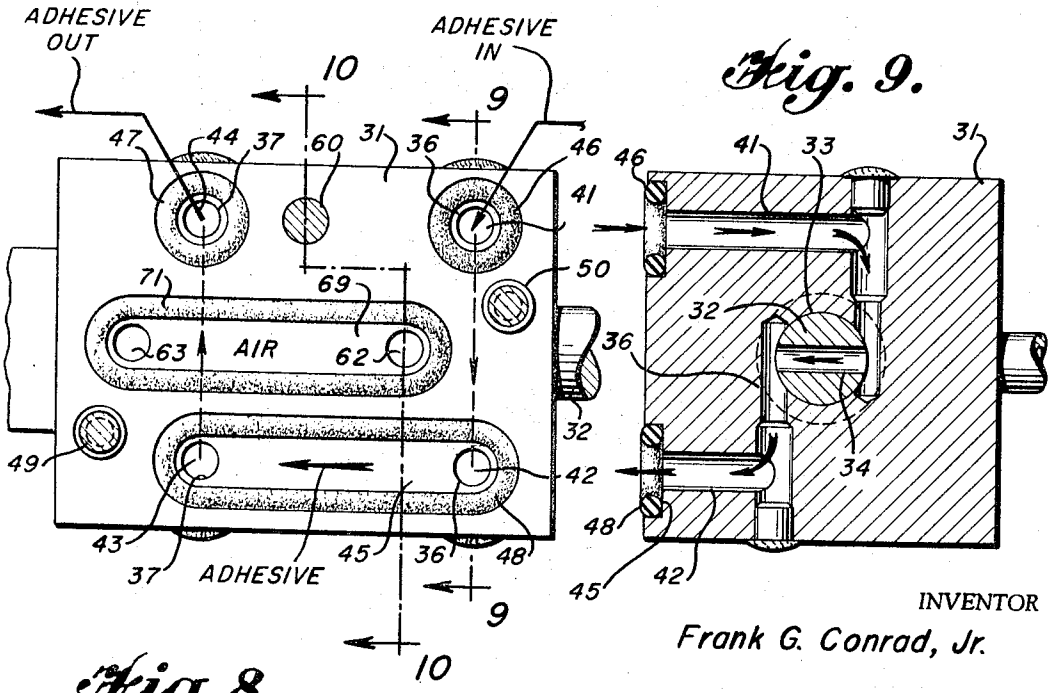


Fig. 8.

Fig. 9.

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3,342,434

WEB WINDING APPARATUS

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Filed July 23, 1965, Ser. No. 474,410
20 Claims. (Cl. 242—67.1)

This invention relates to an apparatus for winding webs into rolls, and more particularly for adhesively attaching the outer end of the web to the body of the roll at the end of each web winding operation.

The desirability of adhesively attaching the tail end of a roll of web material to the body of the roll has been long recognized in the art. Rolls of such material as toilet tissue and paper towels may be handled with greater facility and present a distinctly better appearance if the tail end of the roll is securely affixed to the roll body.

There have been developed a number of devices and systems for tying the roll end by dispensing small quantities of glue onto the web material near the end of the roll winding operation. Considerable difficulty has been experienced in making such devices and systems dependable in view of the high speed of the web at the time the glue is deposited. Among the disadvantages of the prior art devices are inaccuracy of the timing of the glue dispensing step, excessive maintenance time and expense due to various malfunctions including clogging of glue passages. Malfunctions in the dispensing equipment have resulted in costly delays in production and the replacement of major components even though the defect is confined to a small portion of the component.

To overcome the disadvantages of the prior art, an object of this invention is to provide an improved apparatus for winding a web into a roll and for adhesively attaching the tail end of the web to the body of the roll.

Another object of the invention is to provide such an apparatus with an improved and more reliable mechanical mechanism for actuating the glue dispenser.

A further object of the invention is to provide an improved glue dispensing apparatus which is less subject to clogging and interruption at critical points and is characterized by parts which individually may be easily removed and replaced.

In general, the invention relates to an improved web winding apparatus comprising in combination a frame, means supported by the frame for winding the web into a roll, a system for dispensing glue to attach the outer end of the web to the roll and means for activating the glue dispenser. The invention contemplates improvements in the glue dispensing system and in the means for activating the glue dispenser.

Generally, the improved glue dispensing system for attaching the outer end of the web to the roll comprises valve block means containing a longitudinal opening, metering rod means longitudinally movable in said opening between a charging position and a dispensing position and containing spaced transverse passageways, said rod means normally being retained in said charging position, said valve block means containing a plurality of longitudinally spaced transverse glue passageways having inlet and outlet portions communicating respectively with opposite ends of said rod passageways when the rod is in said charging position, a glue pump connected to a first of said inlet portions on one end of said valve block means, each succeeding one of said inlet portions being connected to the next preceding outlet portion to connect said rod passageways in series with said glue pump, said valve block means containing a plurality of

transverse air passageways spaced between said glue passageways in alignment with said rod passageways when said rod means is in said dispensing position, means to connect one end of said air passageways to a source of compressed air, and nozzle means connected to the other end of said air passageways in position to direct glue onto said web.

Preferably, the valve block means of the glue dispenser includes a plurality of separately removable blocks, with the metering rod means including a plurality of metering rods each mounted in one of the valve blocks, the rods being in axial alignment and end to end abutment with each other.

Generally, the improved glue dispenser comprises cam means synchronized with the winding means to deliver a plurality of mechanical impulses in each web wind, a cam follower operated by the cam means, a mechanical linkage directly connecting the cam follower to the glue dispenser, said mechanical linkage including a control member movable alternately to active and inactive positions, said control member normally being in the inactive position disabling the cam follower from transmitting the impulses to the mechanical linkage, said control member while in the active position providing a positive link in the mechanical linkage and maintaining the cam follower in the path of the cam means so that the linkage actuates the glue dispenser in response to an impulse from the cam means, and control means to move the control member from the inactive position to the active position near the end of each web wind.

The invention having been generally described a preferred specific embodiment will now be set forth in detail with reference to the accompanying drawings in which:

FIGURE 1 is a schematic front elevational view partially in section illustrating a winding machine according to this invention;

FIGURE 2 is a detail of the mechanism for activating the glue dispenser;

FIGURE 3 is an end view of the mechanism shown in FIGURE 2;

FIGURE 4 is a sectional view taken along the line 4—4 of FIGURE 2;

FIGURE 5 is a sectional view taken along the line 5—5 of FIGURE 2;

FIGURE 6 is a detail partially in section of the improved glue dispensing apparatus;

FIGURE 7 is a detail partially in section of the rear end of the glue dispenser;

FIGURE 8 is a plan view of one of the individual valve blocks of the glue dispenser;

FIGURE 9 is a section taken along the line 9—9 of FIGURE 8;

FIGURE 10 is a section taken along the line 10—10 of FIGURE 8;

FIGURE 11 is an end view of one of the valve blocks of the glue dispenser; and

FIGURE 12 is a schematic view of the control means for activating the mechanical linkage which operates the glue dispenser.

With reference to FIGURE 1 the web winding apparatus of the present invention includes a turret 11 and a bed roll 12 which are conventional and cooperate in a conventional manner to wind a web 13 into a roll 14. Examples of the types of rolls formed are toilet tissue and paper towel rolls. The entire apparatus is supported by a frame 15 only a small portion of which is shown.

The turret 11 is rotatable by a shaft 16 and carries a plurality of rotatable spindles 17 on which the rolls 14 of web material are wound. The apparatus is shown with one spindle in the winding position with a winding operation being performed. Before reaching the respective spin-

dle 17 the web 13 is fed past a guide roll 18 and around a portion of the periphery of the bed roll 12 which is rotatable by a shaft 21. A knife 22 is mounted in a slot 23 in the bed roll to sever the web immediately before the end of each winding operation. The severing operation is accomplished automatically in accordance with well known procedures.

The web winding apparatus also includes a glue dispensing system generally 24 and a mechanical mechanism generally 25 for activating the glue dispensing system.

The glue dispensing system 24 includes an arm 26 mounted for oscillation on a shaft 27 which is secured to the frame 15. Connected to the arm 26 is a mounting bar 28 to which is attached a header plate 29 (FIGURE 6). Mounted against the bottom surface of the header plate 29 are a plurality of valve blocks 31 in axial alignment with each other. Conventionally a long roll or "log" of the web material is formed which is later cut radially into many individual sections. There are as many valve blocks 31 as there are roll sections. A metering rod 32 extends in sliding relation through an axial opening 33 in each of the blocks 31. The alignment of the valve blocks 31 is such that the metering rods 32 are in axial alignment with each other in end to end abutting relation. The rear end of each metering rod 32 has a flattened upper surface 30 in engagement with a guide member 40 affixed to the rear surface of the valve block 31.

Each of the valve blocks 31 is individually and removably connected to the header plate 29 by bolts 49 and 50 and a positioning pin 60 (FIGURE 8). In the event a defect should develop in any one of the valve blocks it can be immediately and quickly removed and replaced.

The metering rod 32 has two positions within the opening 33 and is movable alternatively between the two positions. The first position is a charging position which is the normal position of the metering rod throughout most of the winding operation. Each metering rod 32 has a pair of transverse passageways 34 and 35 extending diametrically through the rod at axially spaced locations. In the charging position the transverse openings 34 and 35 are in alignment with correspondingly spaced glue passageways 36 and 37 in the valve block 31. As shown in FIGURE 9, the glue passageway 36 has an inlet portion 41 communicating with one end of the transverse rod passageway 34 and an outlet portion 42 communicating with the other end of the passageway 34. Similarly, as shown in FIGURE 10, the glue passageway 37 has an inlet portion 43 and an outlet portion 44 communicating with the opposite ends of the rod passageway 35. The outlet portion 42 of the glue passageway 36 is connected with the inlet portion 43 of the glue passageway 37 by an elongated slot 45 in the upper face of the valve block 31. The top of slot 45 is closed by the abutting bottom face of the header plate 29.

The entrance to the inlet portion 41 of the glue passageway 36 is sealed by an O-ring 46. Similarly, the exit of the outlet portion 42 of the glue passageway 37 is sealed by an O-ring 47. An elongated O-ring 48 extends around the periphery of the slot 45 to provide a seal around the exit of the outlet portion 42 and the entrance into the inlet portion 43.

Glue is constantly supplied to the glue passage by a glue pump 51 through a conduit 52 and a pair of aligned ducts 53 and 54 in the mounting bar 28 and header plate 29 respectively. Glue leaving the glue passage 37 passes through a corresponding pair of aligned ducts 55 and 56 in the mounting bar 28 and the header plate 29 respectively. The glue then passes through a conduit 57 into the next succeeding valve block 31. At each valve block there is a set of glue ducts through the mounting bar 28 and the header plate 29 identical to those previously described. It is thus apparent that the glue pump 51 is connected to each of the passageways 34 and 35 in the various metering rods 32 in series from the passageway 34 in the

first metering rod to the passageway 35 in the last metering rod. The last of the line of valve blocks 31 is shown in FIGURE 7. From the last glue passageway 37, the glue moves through the conduit 61 to an adhesive reservoir which supplies the glue pump 51.

The metering rods 32 are slidable as a unit in the openings 33 from the charging position to a dispensing position where each of the passages 34 and 35 are aligned with spaced air passageways 62 and 63 which extend through each valve block 31 at positions spaced axially from the glue passageways 36 and 37. The air is supplied from a source not shown through the air line 64 into an elongated air manifold 65 which extends the full length of the line of valve blocks 31. From the manifold 65 the air passes to each of the valve blocks 31 through a feeder line 66 and air ducts 67 and 68 in the mounting bar 28 and header plate 29 respectively. An elongated air slot 69 in the upper face of each valve block 31 communicates with the air duct 68 and with each of the air passageways 62 and 63 in the valve block. A seal is provided around the outer periphery of the air slot 69 by an O-ring 71 which engages the bottom of the slot and the surface of the header plate 29. The air passageways 62 and 63 have outlet portions 72 and 73 which terminate in nozzles 74 and 75. Thus, when the metering rods 32 are moved to the dispensing position where the rod passages 34 and 35 are in alignment with the air passageways 62 and 63, the glue which is in the passages 34 and 35 is blown by the compressed air out of the nozzles 74 and 75. A predetermined measured quantity of glue is dispensed from each nozzle in accordance with the volume of the passages 34 and 35.

A plurality of O-ring seals 76 are provided in recesses in each valve block 31 communicating with the opening 33. A pair of seals 76 is positioned closely spaced from and on opposite sides of each of the glue passageways and air passageways of the valve block 31.

If desired each metering rod 32, instead of having two passageways 34 and 35, may have only one or more than two such passageways. The number of glue passageways, air passageways and nozzles in each valve block would be changed accordingly. In any case, the glue pump would be connected in series with the various glue passageways and rod passageways from one end of the glue dispensing apparatus to the other.

The metering rods 32 are normally held in the charging position by a compression spring 81 as shown in FIGURE 7. The spring is situated in a spring housing 82 affixed to the header plate 29. One end of the spring abuts a bushing 83 at the rear of the spring housing. The other end of the spring abuts the sleeve 84 slidably mounted within a cylinder 85 in the spring housing 82. Extending axially through the spring 81 and the sleeve 84 is a stem 86 having an enlarged front end 87 which engages the rear end of the last metering rod 32. When an axial force is exerted against the stem end 87 by the last metering rod 32 the stem 86 and the sleeve 84 slide together to compress the spring 81.

The axial force to move the metering rods 32 from the charging position to the dispensing position is supplied by the activating mechanism generally 25. Such mechanism includes a stem 92 (FIGURE 6) having an enlarged head 93 which engages the front end of the first metering rod 32. The stem 92 is slidable axially in an opening in a mounting bracket 94 which is affixed to the mounting bar 28. The stem 92 is actuated by a bell crank lever 95 which is pivoted about a pin 96 connected to the mounting bracket 94. At one end of the bell crank lever 95 in engagement with the stem 92 is an abutment member 97. Pivotally connected to the opposite end of the bell crank lever 95 is one end of a link 98. The opposite end of the link 98 is pivotally connected to the one end of an arm 99 (FIGURE 2) the other end of which is pivoted by the pin 101 to the frame 15. Also pivoted to the pin 101 at a position angularly spaced from the arm 99 is a second arm 102 which includes a pair of spaced bars 111 and 112

(FIGURE 5). Mounted on the other end of hte arm **102** between the bars **111** and **112** is a cam follower **103** which cooperates with a cam **104** on the shaft **21** of the bed roll **12**. The cam follower **103** is normally retained out of the path of the cam **104** by a pair of tension-springs **105** connected between the outer ends of the arms **102** and **99**. Normally, the cam follower **103** occupies the position shown in dotted lines in FIGURE 2. The cam follower **103** may be moved to the position shown in solid lines in FIGURE 2 in the path of the cam **104** by a control member **106**. Control member **106** includes a pair of spaced bars **107** and **108** (FIGURE 4) each having one end pivotally connected to a pin **109** which extends through the sidebars **111** and **112** of arm **102**. The opposite end of the control member **106** is pivotally connected to the end of a piston rod **113** (FIGURE 2) which is actuated by a pneumatic cylinder **114**. Intermediate the ends of the control member **106** extending transversely between the valves **107** and **108** is an abutment pin **115** which cooperates with an inclined cam surface **116** on the arm **99**.

When the piston rod **113** is in the position shown in dotted lines in FIGURE 2 the abutment pin **115** occupies the position at the bottom end of the cam surface **116** against the shoulder **117**. When the control member **106** is in this position the springs **105** pull the cam follower **103** to the dotted line position in FIGURE 2 out of the path of the cam **104**. When the piston rod **113** is moved by the cylinder **114** to the full line position, as shown in FIGURE 2, the abutment pin **115** moves along the cam surface **116** until it comes to rest against the shoulder **118**. During this movement the abutment pin **115** is moved by the cam surface **116** so as to rotate the arm **102** in a counterclockwise direction, as shown in FIGURE 2, to move the cam follower **103** to the position shown in solid lines where it is in the path of the cam **104**.

As shown schematically in FIGURE 12, the pneumatic cylinder **114** is controlled by a solenoid operated valve **121** which is connected to the opposite ends of the cylinder **114** by air lines **122** and **123**. The solenoid valve **121** is actuated by an electric circuit **124** which includes a switch **125** operated by a cam **126**. The cam **126** is rotated through a gear reduction transmission **127** by the shaft **21** of the bed roll **12**. The gear reduction is such that the cam **126** makes one complete revolution for every full winding cycle in which a roll **14** is completely formed on the spindle **17**.

The operation of the web winding apparatus according to the invention will now be described. It will be assumed that the web winding apparatus is in the process of forming a roll **14** from a web **13** as shown in FIGURE 1. During the winding operation the bed roll **12** is rotating which cause the cam **104** to make one revolution with every revolution of the bed roll and the cam **126** to be in the course of one full revolution with the entire winding operation which forms the complete roll **14**. The glue pump **51** is continuously operated and throughout the major portion of the winding operation glue is circulated through each of the metering rod passageways **34** and **35** in series. Since the rod passageways are connected in series the entire force of the glue pump will be exerted to clear any point in the entire glue circuit which should tend to become clogged. Such pressure keeps each of the passageways **34** and **35** flushed out cleanly.

During the major portion of the winding operation the cam follower **103** is retained in an inactive position out of the path of the cam **104** by the springs **105**. Near the end of the web winding operation, the cam **126** closes the switch **125** which causes the cylinder **114** to move the piston rod **113** to rotate the control member **106** from its inactive position to its active position which moves the cam follower **103** into the path of movement of the cam **104**. In the next revolution of the cam **104** the cam follower **103** is engaged by the cam and rotates the arm **102** in a clockwise direction. Since the control member **106** is in the active position a direct mechanical linkage is provided by the cam follower **103**, the arm **102**, the control member **106**, the arm **99**, the link **98**, the bell crank lever **95** and the actuating stem **92** to connect the cam **104** with the metering rods **32** of the glue dispensing system.

Thus the metering rods **32** are moved from the charging position to the dispensing position and the glue in the rod passages **34** and **35** is forced through the nozzles **74** and **75** by the compressed air. As shown in FIGURE 1, the nozzles are positioned to direct the two spots of glue onto the surface of the web **13**. Because of the direct and solid mechanical connection between the cam follower and the metering rod there is substantially no time delay between the mechanical impulse exerted by the cam follower and the operation of the glue dispenser. The mechanical linkage is simple, yet very dependable. It is also inexpensive to fabricate and maintain.

An instant after the operation of the glue dispenser the knife **22** is operated by a mechanism, not shown, to sever the end of the web. As the tail end of the web is wound onto the roll **14** the glue spots are pressed against the body of the roll to adhesively attach the tail end of the web to the roll.

Continued rotation of the cam **126** releases the switch **125** and the entire system returns to its normal condition. The turret **11** is then indexed to move the next spindle **17** to the winding position and the next winding cycle is ready to begin.

There has been illustrated and described what is considered to be a preferred embodiment of the invention. It will be understood that various modifications may be made by persons skilled in the art without departing from the scope of the invention which is defined solely by the appended claims.

What is claimed is:

1. In a web winding apparatus the combination of:
- a frame,
- means supported by the frame for winding the web into a roll,
- a system for dispensing glue to attach the outer end of the web to the roll,
- means for activating said glue dispenser comprising:
  - cam means synchronized with said winding means to deliver a plurality of mechanical impulses in each web wind,
  - a cam follower operated by said cam means,
  - a mechanical linkage directly connecting said cam follower to said glue dispenser,
  - said mechanical linkage including a control member movable alternately to active and inactive positions, said control member normally being in said inactive position disabling said cam follower from transmitting said impulses to said mechanical linkage, said control member while in said active position providing a positive link in said mechanical linkage and maintaining said cam follower in the path of said cam means so that said linkage actuates said glue dispenser in response to an impulse from said cam means, and
  - control means to move said control member from said inactive position to said active position near the end of each web wind.

2. An apparatus according to claim **1** further comprising means normally retaining said cam follower out of the path of said cam means.

3. An apparatus according to claim **2** wherein said mechanical linkage includes:
- first and second arms each having one end pivotally connected to said frame, said first arm being pivotally linked at its other end to said glue dispenser, said second arm being connected at its other end to said cam follower,

said control member being connected to one of said arms and engaging the other of said arms when in said active position.

4. An apparatus according to claim 3 wherein said control member is pivotally connected to said one arm.

5. An apparatus according to claim 4 wherein said first and second arms are mounted at angularly spaced positions on a common pivotal axis, said angular spacing being increased to move said cam follower into the path of said cam means when said control member is moved to said active position from said inactive position, said second arm normally being retained with said cam follower out of said path.

6. An apparatus according to claim 4 wherein said other arm has a cam surface in engagement with said control member, said control means moving said control member along said cam surface to pivot said first arm to a position where said cam follower is in the path of said cam means, said first arm normally being retained with said cam follower out of said path.

7. In a web winding apparatus the combination of:

a frame,

means supported by the frame for winding the web into a roll,

a system for dispensing glue to attach the outer end of the web to the roll comprising:

valve block means containing a longitudinal opening,

metering rod means longitudinally movable in said opening between a charging position and a dispensing position and containing spaced transverse passageways, said rod means normally being retained in said charging position,

said valve block means containing a plurality of longitudinally spaced transverse glue passageways having inlet and outlet portions communicating respectively with opposite ends of said rod passageways when the rod is in said charging position,

a glue pump connected to a first of said inlet portions on one end of said valve block means, each succeeding one of said inlet portions being connected to the next preceding outlet portion to connect said rod passageways in series with said glue pump,

said valve block means containing a plurality of transverse air passageways spaced between said glue passageways in alignment with said rod passageways when said rod means is in said dispensing position,

means to connect one end of said air passageways to a source of compressed air, and

nozzle means connected to the other end of said air passageways in position to direct glue onto said web, and

means synchronized with said winding means for activating the glue dispensing system to move said metering rod means to said dispensing position at a predetermined time near the end of each web wind.

8. A web winding apparatus as recited in claim 7 wherein said valve block means comprises a plurality of separately removable blocks, said rod means comprises a plurality of rods each mounted in one of said blocks, said rods being in axial alignment and end to end abutment with each other.

9. In a web winding apparatus the combination of:

a frame,

means supported by the frame for winding the web into a roll,

a system for dispensing glue to attach the outer end of the web to the roll comprising:

a plurality of valve blocks each containing a longitudinal opening,

a plurality of metering rods mounted in said openings, each of said metering rods containing at least one spaced transverse passageway,

a header member containing a plurality of glue ducts and a plurality of air ducts, said blocks being individually and removably mounted in sealed relation against said header member with said metering rods in longitudinal alignment in mutual end to end abutting relation,

said metering rods being longitudinally movable as a unit in said openings between a charging position and a dispensing position, said metering rods normally being retained in said charging position,

each of said valve blocks containing at least one transverse glue passageway having an inlet portion and an outlet portion communicating respectively with opposite ends of respective ones of said rod passageways when the rods are in charging position,

a glue pump connected through said glue ducts to said inlet portions,

each of said valve blocks containing at least one transverse air passageway spaced from the respective glue passageway in alignment with the respective rod passageway when the rods are in dispensing position,

means to connect one end of said air passageways through said air ducts to a source of compressed air, and

a plurality of nozzles connected to the other end of said air passageways in position to direct glue onto said web, and

means synchronized with said winding means for activating the glue dispensing system to move said metering rod means to said dispensing position at a predetermined time near the end of each web wind.

10. A web winding apparatus according to claim 9 wherein said means for activating the glue dispensing system comprises:

cam means synchronized with said winding means to deliver a plurality of mechanical impulses in each web wind,

a cam follower operated by said cam means,

a mechanical linkage directly connecting said cam follower to said metering rod, said mechanical linkage including a control member movable alternately to active and inactive positions, said control member normally being retained in said inactive position disabling said cam follower from transmitting said impulses to said mechanical linkage, said control member while in said active position providing a positive link in said mechanical linkage and maintaining said cam follower in the path of said cam means so that said linkage moves said metering rod to said dispensing position in response to an impulse from said cam means, and

control means to move said control member from said inactive position to said position near the end of each web wind.

11. In a web winding apparatus the combination of:

a frame,

means supported by the frame for winding the web into a roll,

a system for dispensing glue to attach the outer end of the web to the roll comprising:

a plurality of valve blocks each containing a longitudinal opening,

a plurality of metering rods mounted in said openings, each of said metering rods containing a pair of spaced transverse passageways,

a header member containing a plurality of glue ducts and a plurality of air ducts, said blocks being individually and removably mounted in sealed relation against said header member with

said metering rods in longitudinal alignment in mutual end to end abutting relation,

said metering rods being longitudinally movable as a unit in said openings between a charging position and a dispensing position, said metering rods normally being retained in said charging position,

each of said valve blocks containing a pair of longitudinally spaced transverse glue passageways each having inlet and outlet portions communicating respectively with opposite ends of respective ones of said rod passageways when the rods are in charging position,

a glue pump connected through said glue ducts to said inlet portions,

each of said valve blocks containing a plurality of transverse air passageways spaced between said glue passageways in alignment with said rod passageways when the rods are in dispensing position,

means to connect one end of said air passageways through said air ducts to a source of compressed air, and

a plurality of nozzles connected to the other end of said air passageways in position to direct glue into said web, and

means synchronized with said winding means for activating the glue dispensing system to move said metering rod means to said dispensing position at a predetermined time near the end of each web wind.

12. A web winding apparatus according to claim **11** wherein said means for activating the glue dispensing system comprises:

cam means synchronized with said winding means to deliver a plurality of mechanical impulses in each web wind,

a cam follower operated by said cam means,

a mechanical linkage directly connecting said cam follower to said metering rod, said mechanical linkage including a control member movable alternately to active and inactive positions, said control member normally being retained in said inactive position disabling said cam follower from transmitting said impulses to said mechanical linkage, said control member while in said active position providing a positive link in said mechanical linkage and maintaining said cam follower in the path of said cam means so that said linkage moves said metering rod to said dispensing position in response to an impulse from said cam means, and

control means to move said control member from said inactive position to said active position near the end of each web wind.

13. In a web winding apparatus the combination of:

a frame,

means supported by the frame for winding the web into a roll,

a system for dispensing glue to attach the outer end of the web to the roll comprising:

a plurality of valve blocks each containing a longitudinal opening,

a plurality of metering rods mounted in said openings, each of said metering rods containing at least one transverse passageway,

a header member containing a plurality of glue ducts and a plurality of air ducts, said blocks being individually and removably mounted in sealed relation against said header member with said metering rods in longitudinal alignment in mutual end to end abutting relation,

said metering rods being longitudinally movable as a unit is said openings between a charging position and a dispensing position, said metering

rods normally being retained in said charging position,

each of said valve blocks containing at least one transverse glue passageway having an inlet portion and an outlet portion communicating respectively with opposite ends of respective ones of said rod passageways when the rods are in said charging position,

a glue pump connected through one of said glue ducts to a first of said inlet portions in a first of said valve blocks, each succeeding one of said inlet portions being connected to the next preceding outlet portion to connect all of said rod passageways in series with said glue pump,

each of said valve blocks containing at least one transverse air passageway spaced from the respective glue passageway in alignment with the respective rod passageway when the rods are in said dispensing position,

means to connect one end of said air passageways through said air ducts to a source of compressed air, and

a plurality of nozzles connected to the other end of said air passageways in position to direct glue onto said web, and

means synchronized with said winding means for activating the glue dispensing system to move said metering rod means to said dispensing position at a predetermined time near the end of each web wind.

14. A web winding apparatus according to claim **13** wherein said means for activating the glue dispensing system comprises:

cam means synchronized with said winding means to deliver a plurality of mechanical impulses in each web wind,

a cam follower operated by said cam means,

a mechanical linkage directly connecting said cam follower to said metering rod, said mechanical linkage including a control member movable alternately to active and inactive positions, said control member normally being retained in said inactive position disabling said cam follower from transmitting said impulses to said mechanical linkage, said control member while in said active position providing a positive link in said mechanical linkage and maintaining said cam follower in the path of said cam means so that said linkage moves said metering rod to said dispensing position in response to an impulse from said cam means, and

control means to move said control member from said inactive position to said active position near the end of each web wind.

15. In a web winding apparatus the combination of:

a frame,

means supported by the frame for winding the web into a roll,

a system for dispensing glue to attach the outer end of the web to the roll comprising:

a plurality of valve blocks each containing a longitudinal opening,

a plurality of metering rods mounted in said openings, each of said metering rods containing a pair of spaced transverse passageways,

a header member containing a plurality of glue ducts and a plurality of air ducts, said blocks being individually and removably mounted in sealed relation against said header member with said metering rods in longitudinal alignment in mutual end to end abutting relation,

said metering rods being longitudinally movable as a unit in said openings between a charging position and a dispensing position, said metering rods normally being retained in said charging position,

each of said valve blocks containing a pair of longitudinally spaced transverse glue passageways each having inlet and outlet portions communicating respectively with opposite ends of respective ones of said rod passageways when the rods are in said charging position,

a glue pump connected through one of said glue ducts to a first of said inlet portions in a first of said valve blocks, each succeeding one of said inlet portions being connected to the next preceding outlet portion to connect all of said rod passageways in series with said glue pump,

each of said valve blocks containing a plurality of transverse air passageways spaced between said glue passageways in alignment with said rod passageways when the rods are in said dispensing position,

means to connect one end of said air passageways through said air ducts to a source of compressed air, and

a plurality of nozzles connected to the other end of said air passageways in position to direct glue onto said web, and

means synchronized with said winding means for activating the glue dispensing system to move said metering rod means to said dispensing position at a predetermined time near the end of each web wind.

16. A web winding apparatus according to claim **15** wherein each of said valve blocks has a surface in engagement with a corresponding surface on said header member, the inlet and outlet portions open through said block surface, and said block surface has formed therein a glue slot connecting one of the outlet portions with one of the inlet portions in the respective block.

17. A web winding apparatus according to claim **16** wherein the pair of air passageways in each block are served by a single one of said air ducts and said block surface has a second slot formed therein connecting the pair of air passageways.

18. A web winding apparatus according to claim **15** wherein said means for activating the glue dispensing system comprises:

cam means synchronized with said winding means to deliver a plurality of mechanical impulses in each web wind,

a cam follower operated by said cam means,

a mechanical linkage directly connecting said cam follower to said metering rod, said mechanical linkage including a control member movable alternately to active and inactive positions, said control member normally being retained in said inactive position disabling said cam follower from transmitting said impulses to said mechanical linkage, said control member while in said active position providing a positive link in said mechanical linkage and maintaining said cam follower in the path of said cam means so that said linkage moves said metering rod to said dispensing position in response to an impulse from said cam means, and

control means to move said control member from said inactive position to said active position near the end of each web wind.

19. A web winding apparatus according to claim **18** wherein each of said valve blocks has a surface in engagement with a corresponding surface on said header member, the inlet and outlet portions open through said block surface, and said block surface has formed therein a glue slot connecting one of the outlet portions with one of the inlet portions in the respective block.

20. In a web winding apparatus the combination of:

a frame,

means supported by the frame for winding the web into a roll,

a system for dispensing glue to attach the outer end of the web to the roll comprising:

valve block means containing a longitudinal opening,

metering rod means longitudinally movable in said opening between a charging position and a dispensing position and containing spaced transverse passageways, said metering rod means normally being retained in said charging position,

said valve block means containing a plurality of longitudinally spaced transverse glue passageways having inlet and outlet portions communicating respectively with opposite ends of said rod passageways when said rod means is in charging position,

a glue pump connnected to a first of said inlet portions on one end of said valve block means, each succeeding one of said inlet portions being connected to the next preceding outlet portion to connect said rod passageways in series with said glue pump,

said valve block containing a plurality of transverse air passageways spaced between said glue passageways in alignment with said rod passageways when said rod means is in dispensing position,

means to connect one end of said air passageways to a source of compressed air, and

nozzle means connected to the other end of said air passageways in position to direct glue onto said web, and

means for activating the glue dispensing system comprising:

cam means synchronized with said winding means to deliver a plurality of mechanical impulses in each web wind,

a cam follower operated by said cam means,

a mechanical linkage directly connecting said cam follower to said metering rod means, said mechanical linkage including a control member movable alternately to active and inactive positions, said control member normally being retained in said inactive position disabling said cam follower from transmitting said impulses to said mechanical linkage, said control member while in said active position providing a positive link in said mechanical linkage and maintaining said cam follower in the path of said cam means so that said linkage moves said metering rod means to said dispensing position in response to an impulse from said cam means, and

control means to move said control member from said inactive position to said active position near the end of each web wind.

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