March 8, 1938. P. D. PARSONS 2,110,815

ROLL WRAPPING MACHINE

Filed March 25, 1936 13 Sheets-Sheet 1

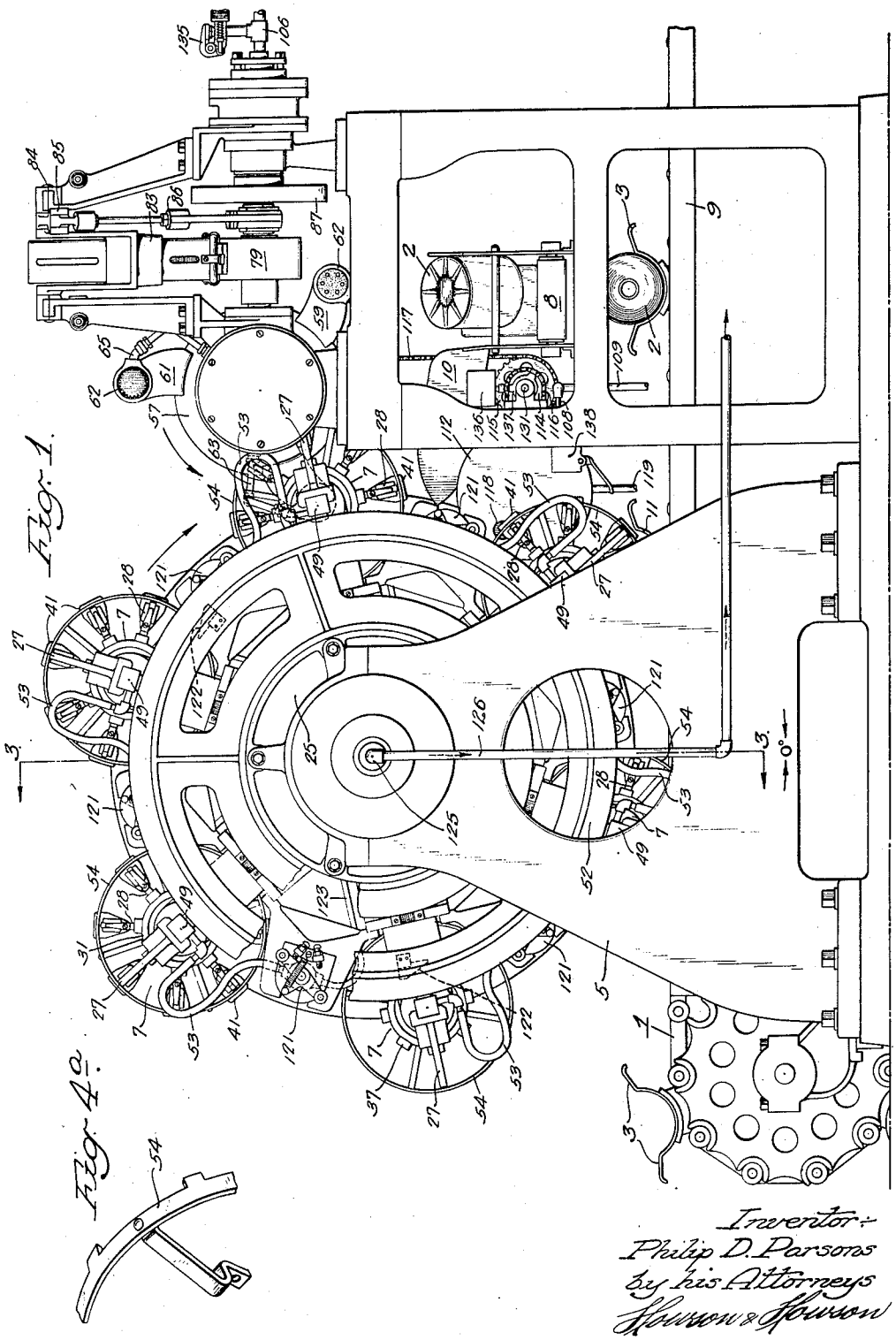


Fig. 1.

Fig. 4a.

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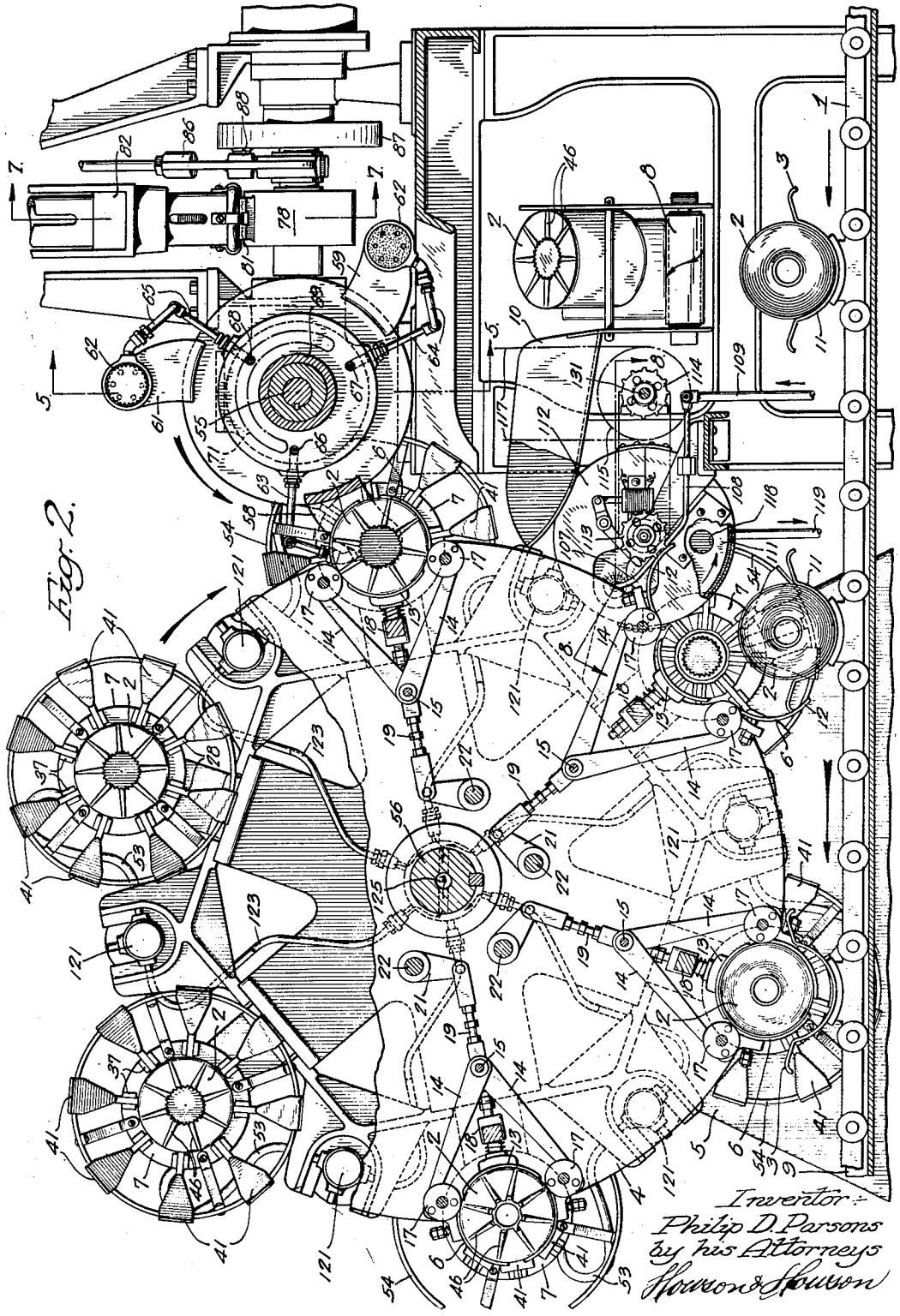


Fig. 2.

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ROLL WRAPPING MACHINE

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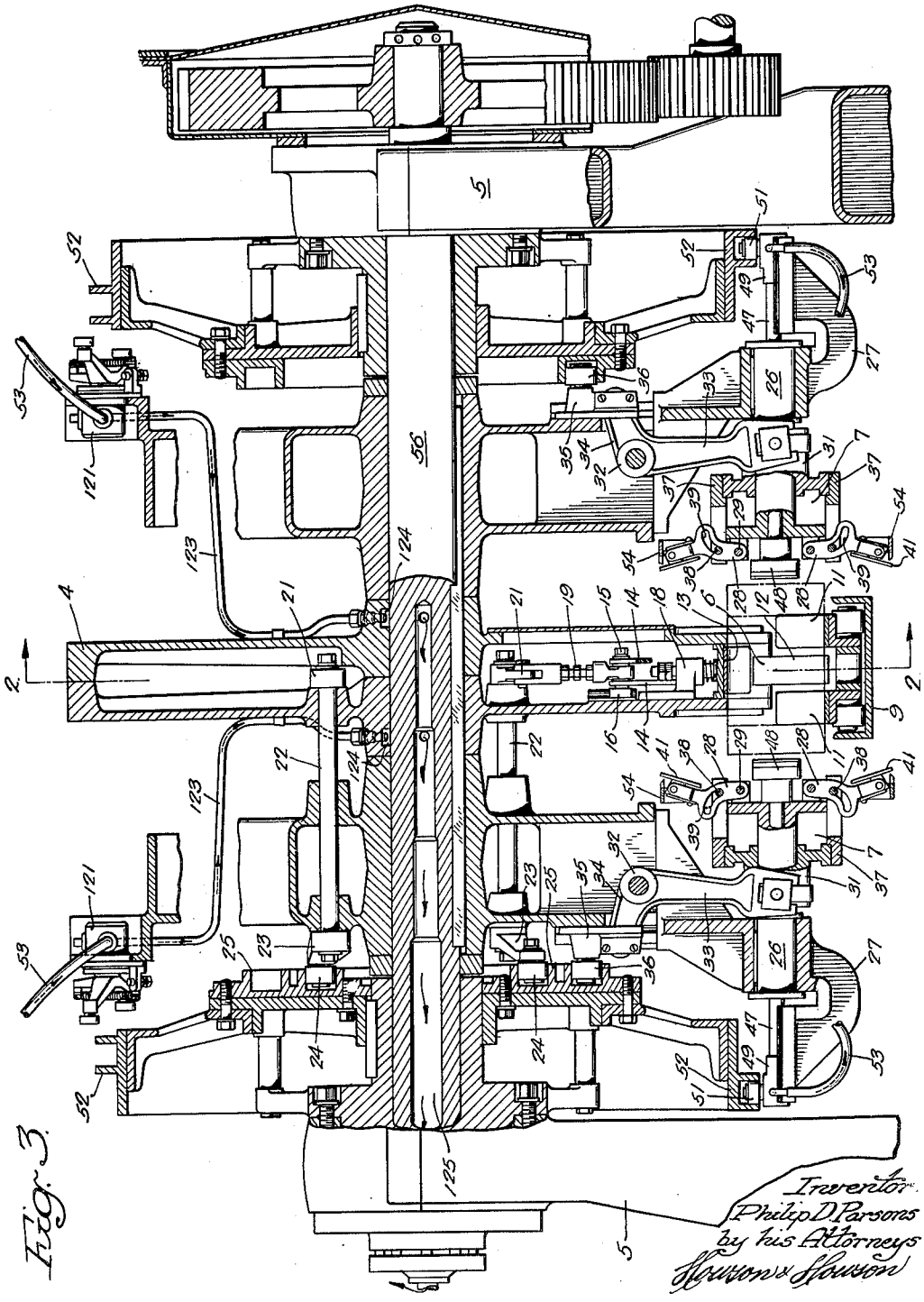


Fig. 3.

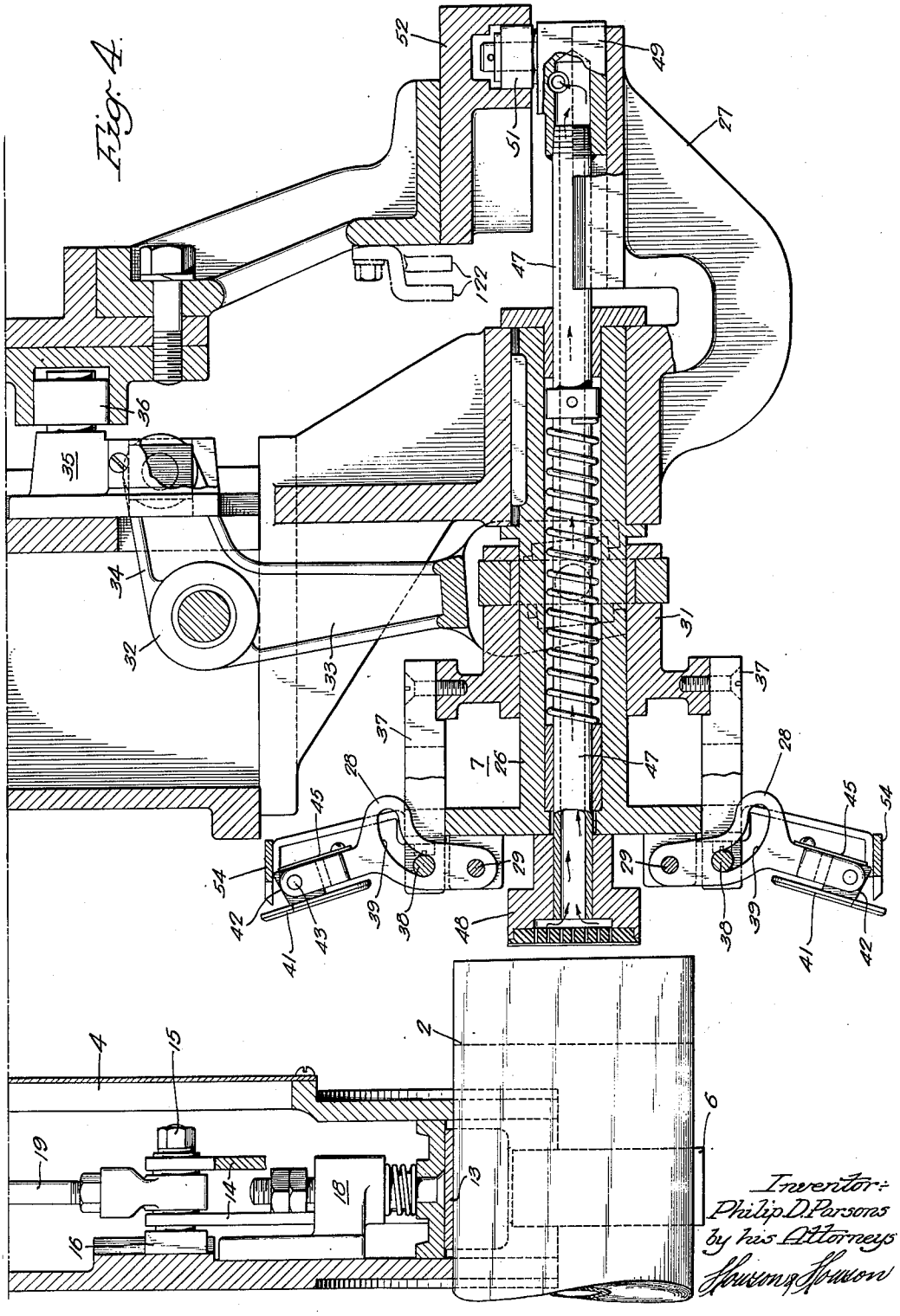
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ROLL WRAPPING MACHINE

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Fig. 4.



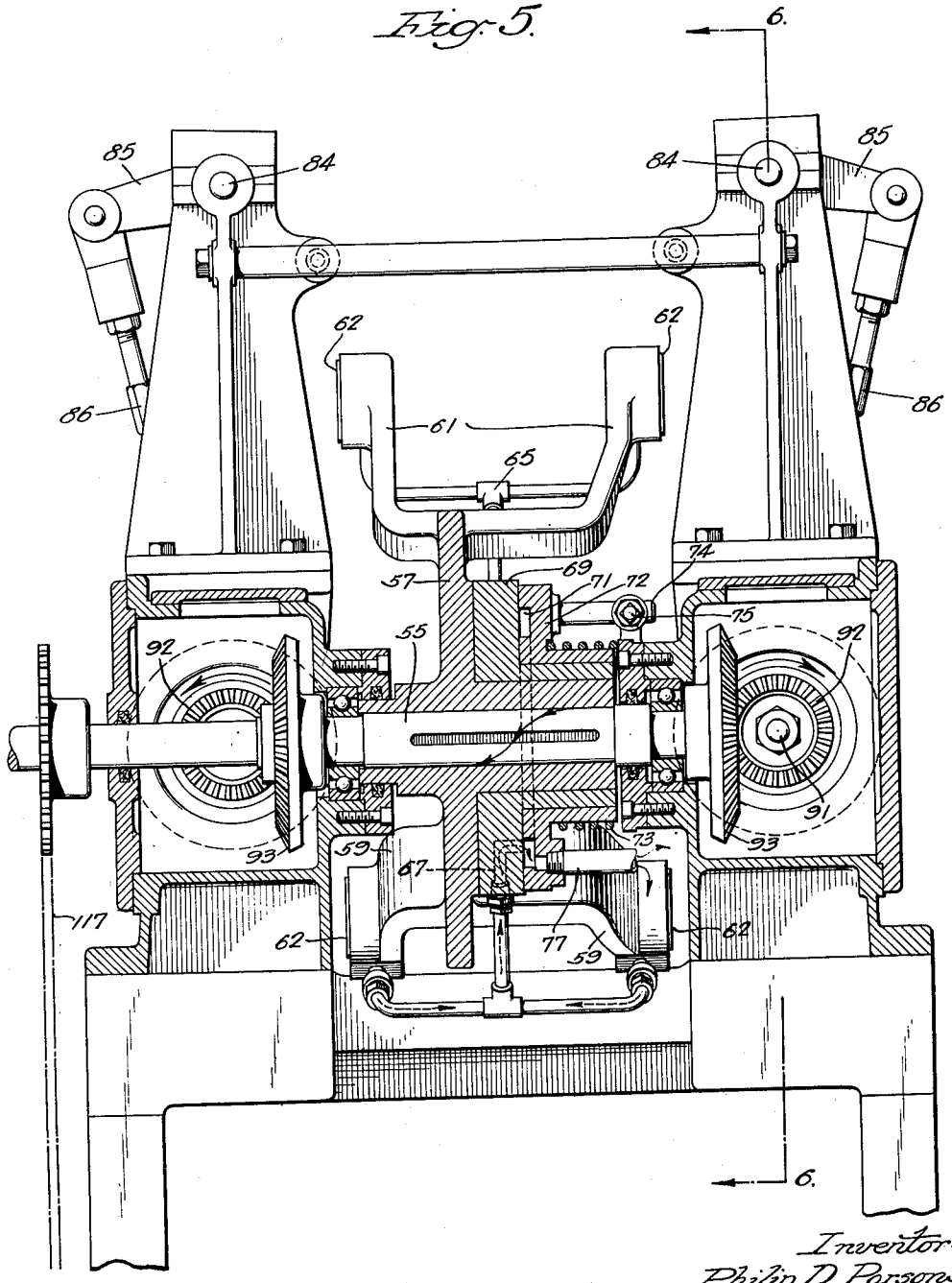
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Fig. 5.



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Fig. 24.

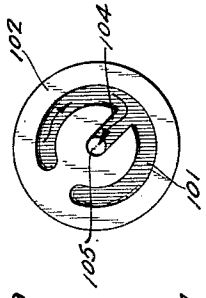


Fig. 23.

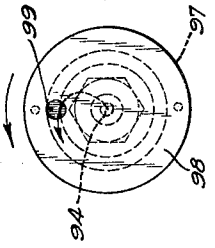


Fig. 6.

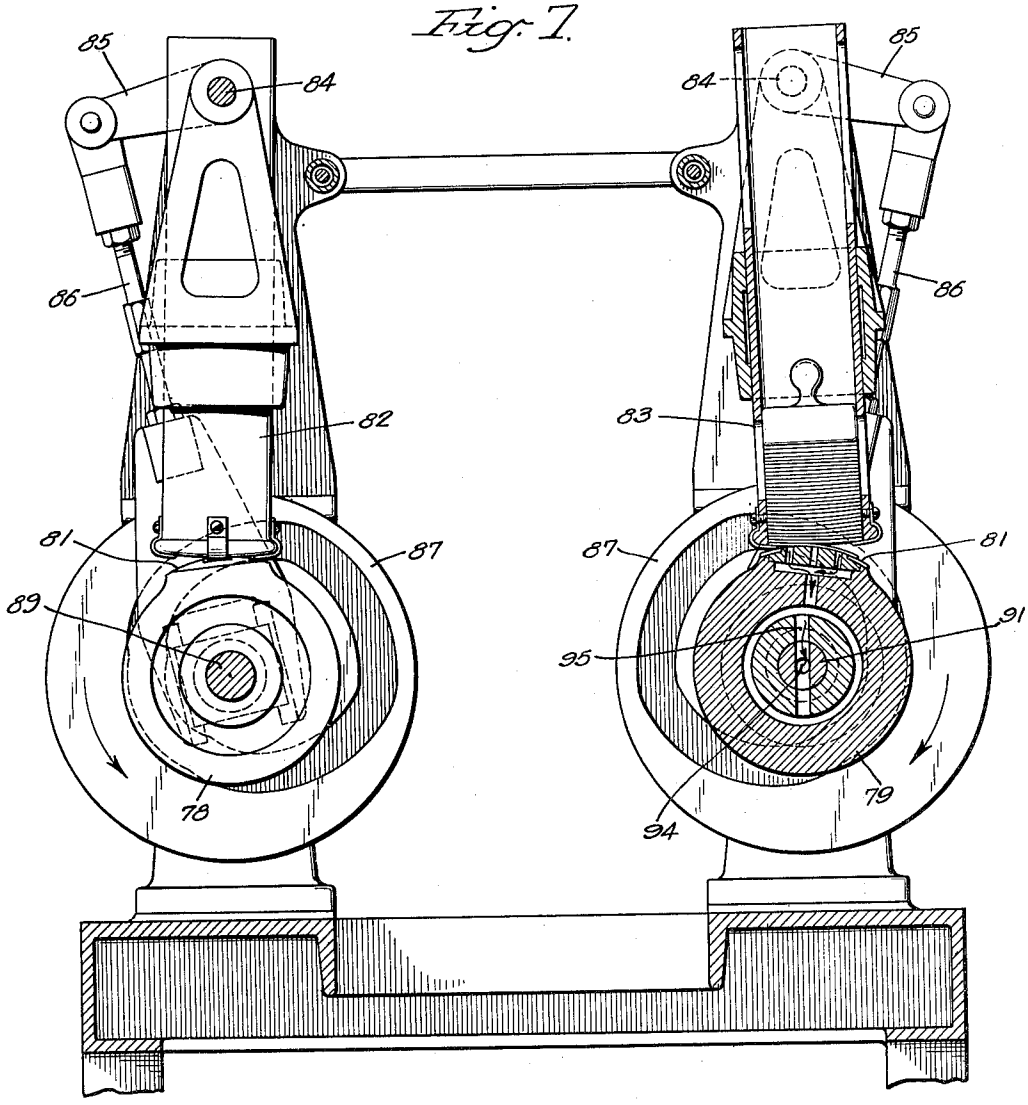
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Fig. 1.



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Fig. 8.

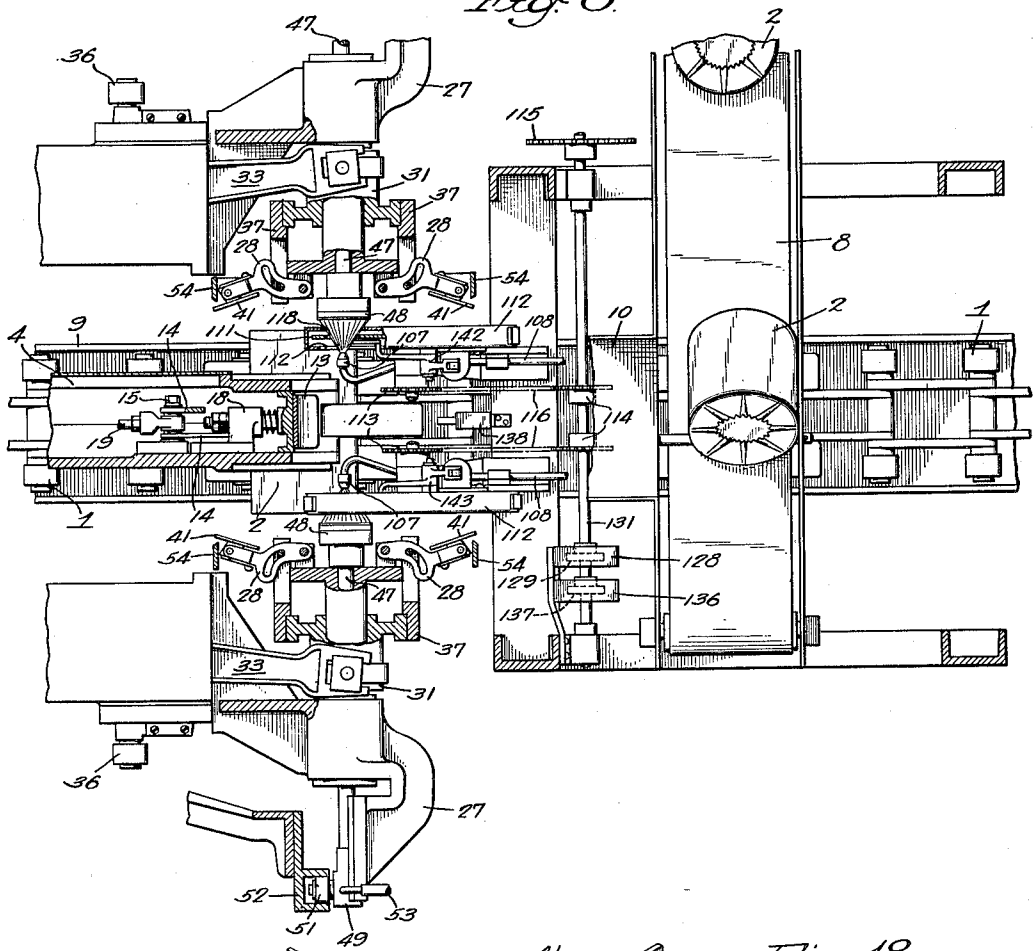


Fig. 17.

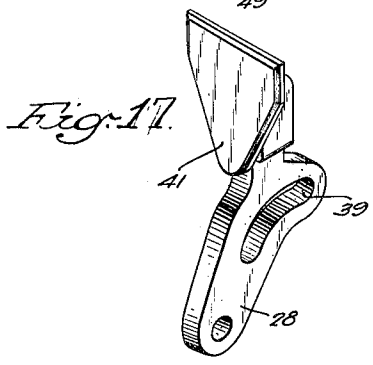
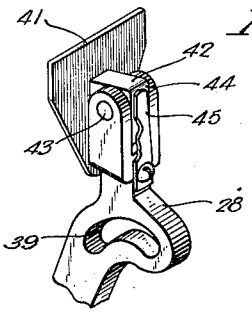


Fig. 18.



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Fig. 9.

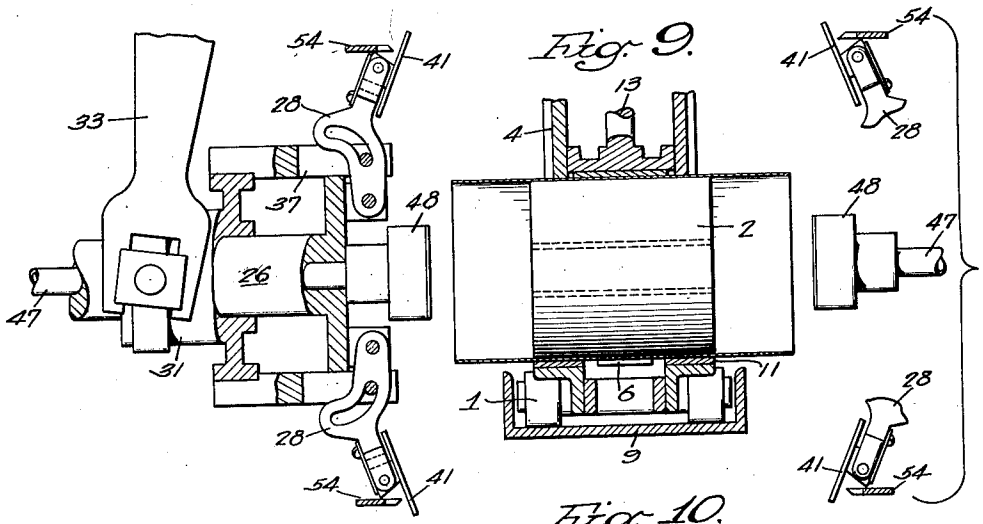


Fig. 10.

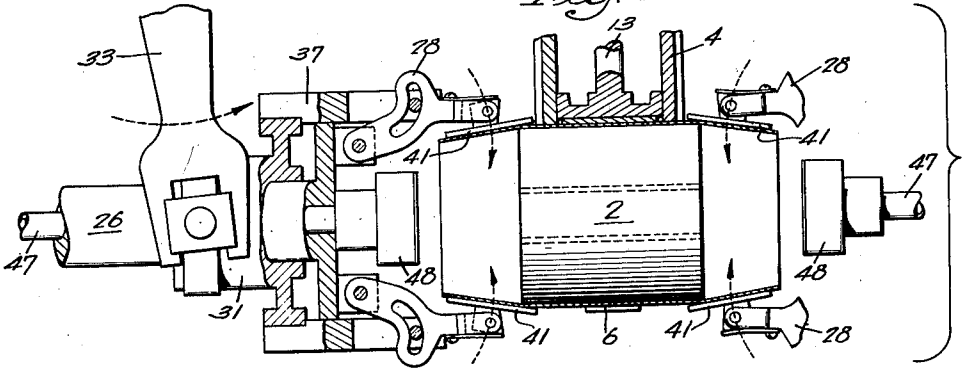
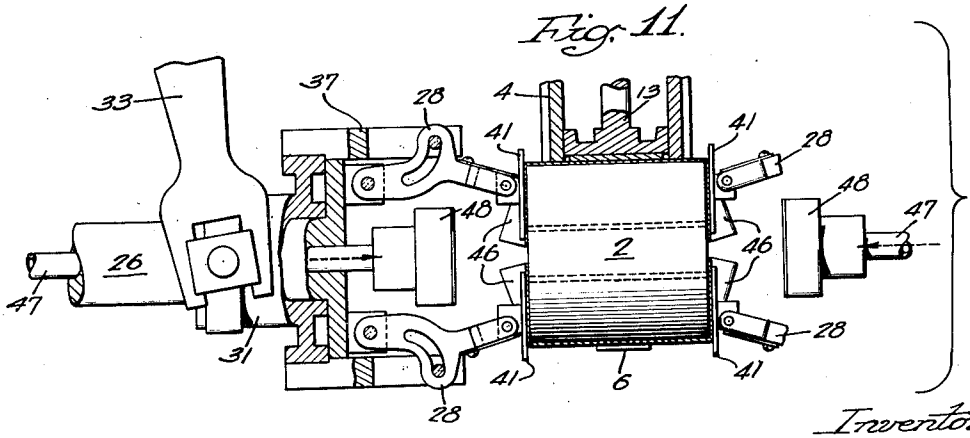


Fig. 11.



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Fig. 12.

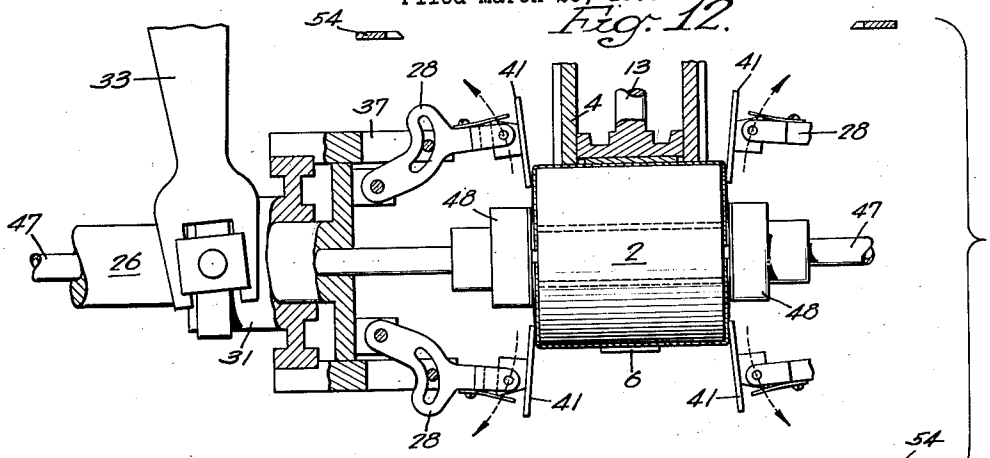


Fig. 13.

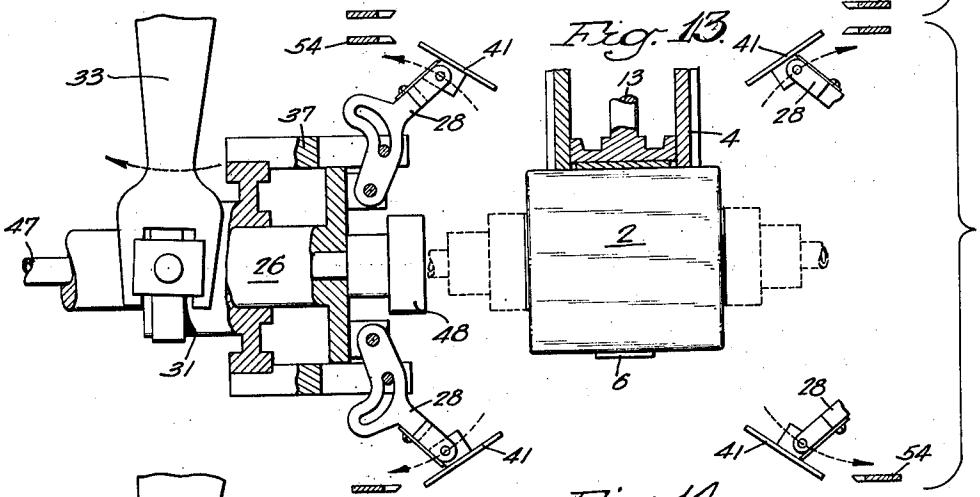
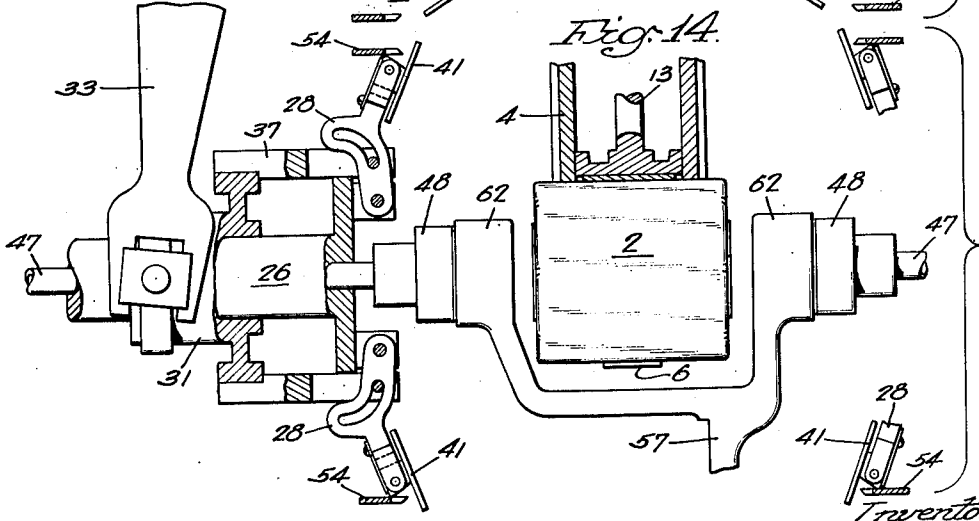


Fig. 14.



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Fig. 15.

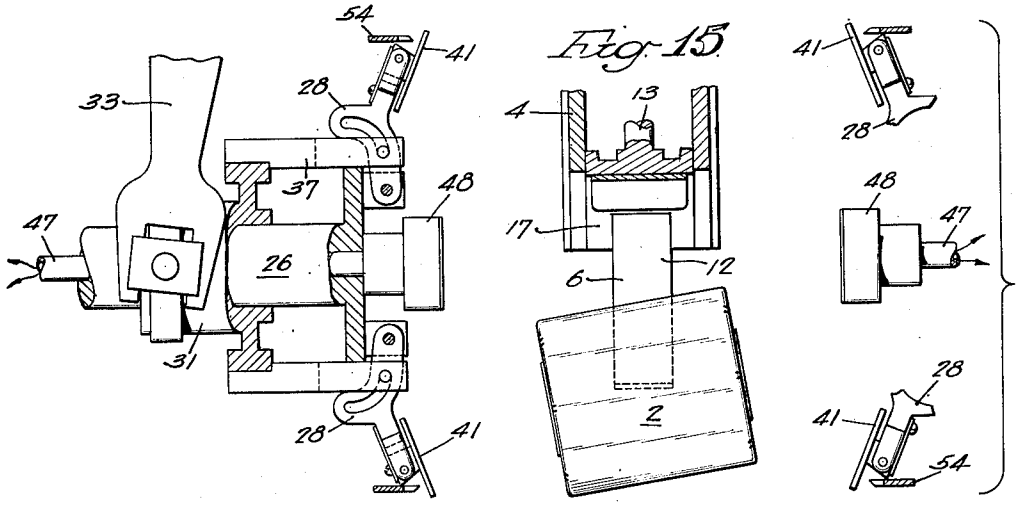


Fig. 16.

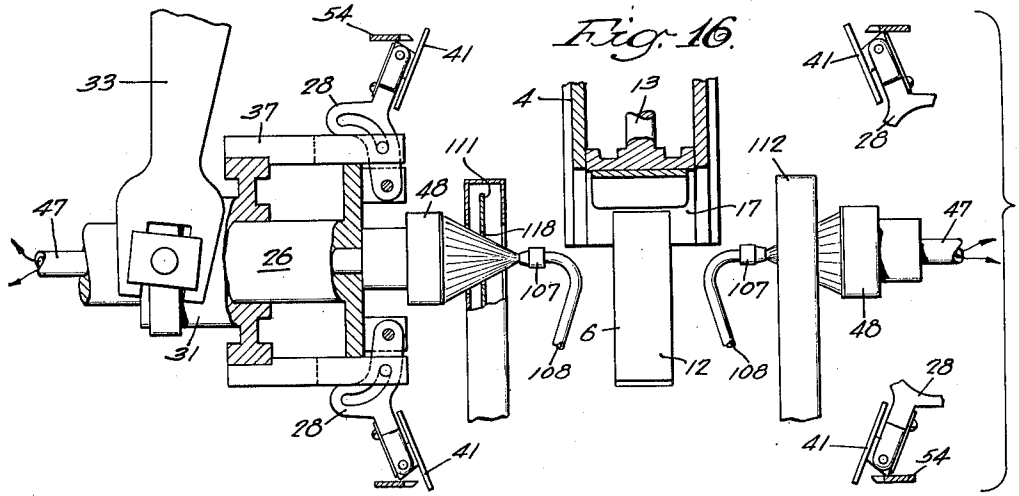


Fig. 19.

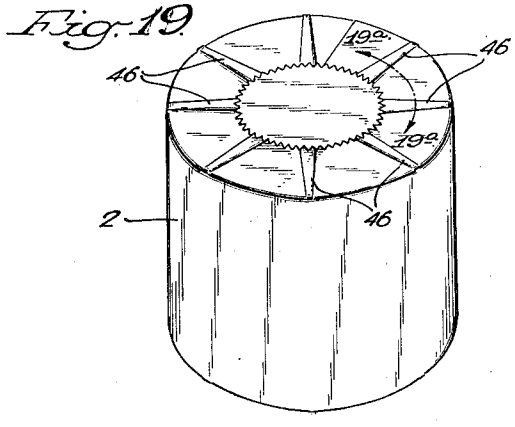


Fig. 19a.



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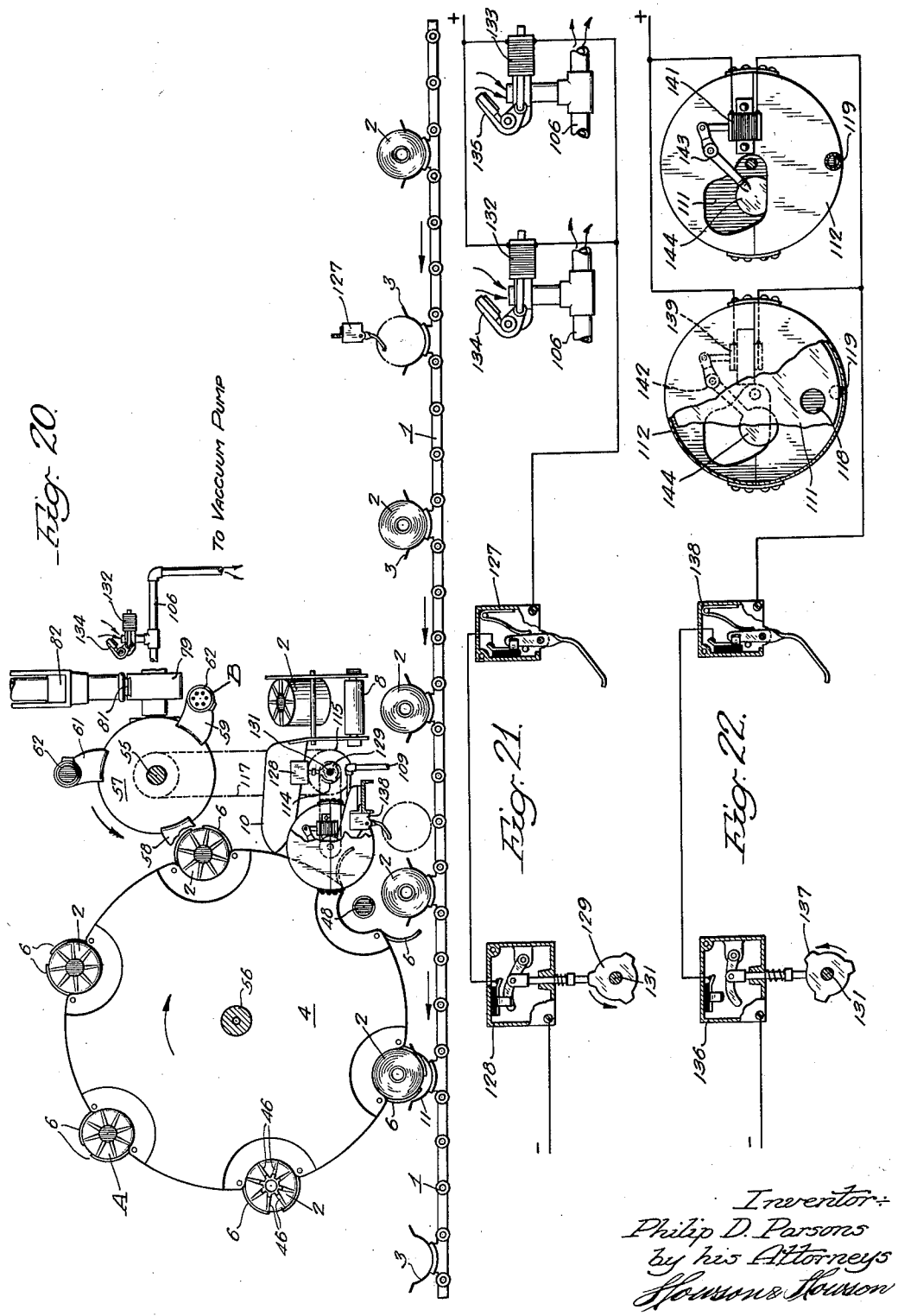


Fig. 20.

Fig. 21.

Fig. 22.

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ROLL WRAPPING MACHINE

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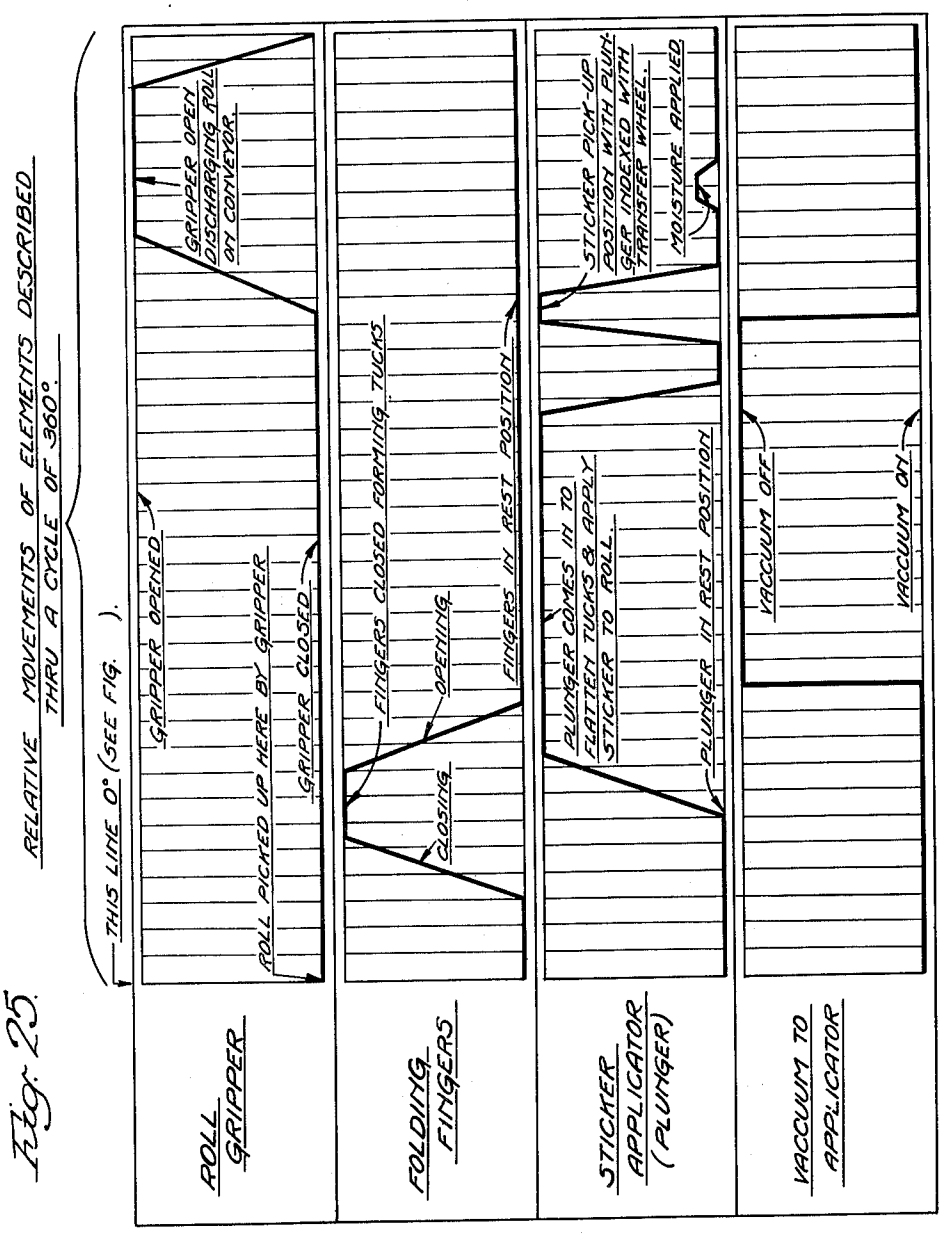


Fig. 25.

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Patented Mar. 8, 1938 2,110,815

UNITED STATES PATENT OFFICE

2,110,815

ROLL WRAPPING MACHINE

Philip D. Parsons, Swarthmore, Pa., assignor to Scott Paper Company, Chester, Pa., a corporation of Pennsylvania

Application March 25, 1936, Serial No. 70,866

19 Claims. (Cl. 93—2)

This invention relates to roll wrapping machines of the general character disclosed in my pending application Serial Number 12,075, filed March 20, 1935, and the principal object of the invention is to provide a machine of this general character that shall be capable of producing a materially improved form of wrapping, and further that shall constitute a material improvement over the prior machine by reason of relative simplicity of form and efficiency of operation.

The invention further resides in certain novel and improved mechanical features and details hereinafter fully described and illustrated in the attached drawings, in which:

Figure 1 is a side elevation of a machine made in accordance with my invention;

Fig. 2 is a longitudinal sectional view on the line 2—2, Fig. 3;

Fig. 3 is a transverse section on the line 3—3, Fig. 1;

Fig. 4 is a fragmentary enlarged sectional view showing details of one of the folding heads;

Fig. 4a is a fragmentary view in perspective illustrating a detail of the mechanism;

Fig. 5 is a section on the line 5—5, Fig. 2;

Fig. 6 is a section on the line 6—6, Fig. 5;

Fig. 7 is a sectional view on the line 7—7, Fig. 2;

Fig. 8 is a section on the line 8—8, Fig. 2;

Figs. 9 to 16, inclusive, are sectional views illustrating the mode of operation of the folding heads;

Figs. 17 and 18 are respectively front and rear perspective views of one of the folding fingers;

Fig. 19 is a view in perspective showing the character of the finished wrapping;

Fig. 19a is a line diagram illustrating the form of the wrapper-fold;

Figs. 20, 21 and 22 are diagrammatic sectional views illustrating the details of the control mechanism;

Figs. 23 and 24 are sectional views looking in opposite directions on the lines 23—23 and 24—24, Fig. 6, and

Fig. 25 is a diagram showing the relative movements of the elements of the mechanism through one complete cycle of operation.

The embodiment of my invention illustrated in the drawings is adapted for wrapping rolls of toilet paper, but it will be apparent that the machine in principle may readily be adapted for wrapping other cylindrical commodities or containers. In general, the mechanism comprises a conveyer 1, the function of which is to feed the partially wrapped rolls 2 to the folding and label-applying mechanism constituting the subject-matter of the present invention. Prior to being deposited upon the conveyer 1, the rolls have had applied thereto a wrapper which completely embraces the roll in the circumferential direction and which being of greater length than the roll projects to a predetermined extent beyond each end face thereof. Mechanism for so partially wrapping the rolls is illustrated in U. S. Patent No. 2,005,846. As illustrated, the conveyer 1 is provided at uniformly spaced intervals with cradles 3 which support the rolls in horizontal position.

The conveyer operates in synchronized relation with a rotary structure or drum 4 which is mounted on a horizontal axis in a suitable frame 5 in a position above the conveyer, as illustrated. This drum carries in an intermediate position between its ends a circumferentially arranged series of gripping devices designated generally by the reference numeral 6 which operate automatically as the drum rotates to pick up the rolls from the cradles 3 and to hold the rolls in fixed position on the drum. The drum further comprises two circumferential series of folding-heads 7, the heads of each series corresponding in number to and being axially aligned with and at opposite sides respectively of the gripping devices 6. As the drum rotates, these heads 7 operate automatically to fold the projecting ends of the wrapper against the end of the roll in a manner hereinafter specifically described and also to apply to the folded wrapper ends a sticker or seal which completes the wrapping operation and effectively seals the package. Subsequently the individual packages are released by the gripping devices 6 and are permitted to fall from the drum into a chute 10, see Fig. 2, through which they are conducted to a conveyer 8.

As shown in Figs. 2 and 3, the upper run of the conveyer 1, which conveyer in the present instance is of the chain type, travels in and is supported by a channel rail 9 so that the cradles 3 maintain a definite relation with the rotary drum 4 and with the gripping devices 6 carried thereby. The cradles 3 comprise spaced roll-supporting elements 11, 11, see also Figs. 2 and 3, the spacing of these elements permitting passage therebetween of the pickup fingers 12, 12 of the gripping devices 6.

The fingers 12, 12, which are adapted jointly to embrace the roll and to hold the roll securely seated against a shoe 13 forming an element of the gripping device 6, are actuated to take up the rolls from the conveyer 1 and to eventually release the rolls by rods 14, 14 which are pivotally secured at 15 to a cross head 16 mounted for radial reciprocation on the drum. The outer ends of the arms 14, 14 are connected to rotatable cylinders 17, 17 respectively which carry the fingers 12, the arrangement being such that when the cross head 16 is moved toward the axis of the drum, the resulting retraction of the arms 14, 14 causes a partial rotation of the cylinders 17, moving the fingers 12, 12 away from each other, whereas a reverse movement of the cross

head 16 causes the fingers by reverse action to be brought together into the roll-gripping position. As shown in Fig. 3, the shoe 13 is resiliently mounted in the lug 18 for radial self-adjustment. The cross head 16 is connected through a rod 19 with an arm 21 secured to a shaft 22 suitably journaled in the drum, the opposite end of this shaft carrying an arm 23 which is operatively engaged through the medium of a roller 24 with a cam 25, this cam being supported on the fixed framework of the machine. As the drum rotates, therefore, the cam functions to periodically close and open the fingers 12, 12 first to pick up the rolls from the conveyer 1 and subsequently to permit discharge to the chute 7 as previously set forth. It will be understood that each of the gripping devices 6 constitutes a unit incorporating the aforedescribed actuating mechanism and each operatively engaged with the cam 25.

The folding-heads 7 each comprise a relatively fixed axial member 26 which is rigidly supported in a bracket 27 on the drum structure. To the inner end of the member 26 is attached an annular series of radial arms 28, each arm being pivotally supported at 29 for movement between the substantially radial position, as shown for example in Figs. 3 and 9, and a position such as shown in Fig. 11, in which they extend substantially parallel to the longitudinal axis of the member 26. Movement of the arms 28 between these two positions is effected through the medium of a collar 31 which is slidably mounted upon the member 26 and which is moved axially of the member 26 through a bell crank lever 32 journaled in the drum and having one arm 33 operatively connected with said sleeve 31. The other arm 34 of this bell crank lever is connected with a slide member 35 mounted for radial reciprocation in the drum and operatively connected through a roller 36 with the duplex cam 25. The arrangement is such that as the drum is rotated, the bell crank 32 is oscillated to thereby effect a periodic forward and backward movement of the sleeve 31. The sleeve carries a plurality of axially projecting arms 37 corresponding in number with the arms 28 and each having bifurcations between which the said arms 28 extend. A pin 38 extends between the bifurcations of the respective arms 37 and through an arcuate slot 39 in the associated arm 28, the arrangement being such that when the sleeve 31 is retracted as shown in Fig. 3, the pins 38 occupy the inner ends of the respective slots 39 and the arms 28 are in the retracted or substantially radial position. When the sleeve 31 is advanced through the medium of the bell crank lever 33 and as previously described, the pins 38 acting in the slots 39, swing the arms 28 downwardly around their respective pivots 29 into the aforesaid axially extended positions.

Each of the arms 28 carries a segmental shoe 41, see Figs. 17 and 18, said shoe having on the rear face thereof a lug 42 which is pivotally secured as indicated at 43 between the bifurcations of the arm 28, this lug having a flat rear surface 44 which is normally engaged by a leaf spring 45 on the arm, said spring tending to hold the shoe 41 in the relative position upon the arm 28, in which it is shown in Figs. 17 and 18 and Figs. 3 and 9. When in the normal operation of the machine the arms 28 are swung inwardly toward each other by the aforedescribed action of the sleeve 31 and associated elements, the relative positions of the pivots 29 of the arms and the end edge of the roll supported in the associated gripping device 6 bring the outer and wider end of the segmental shoe 41 into engagement with the edge of the roll, as illustrated in Fig. 10. When the shoe is thus engaged on the roll, the continued movement of the arms 28 toward each other causes a pivoting of the shoes 41 around their respective pivots 43 until they eventually assume the positions in which they are shown in Fig. 11, wherein they lie flat against the end faces of the roll. The arms 28 and the shoes 41 are so relatively proportioned and arranged that when the shoes occupy the positions shown in Fig. 11 and also at the left of Fig. 2, the side edges of the shoes 41 are separated by narrow gaps. As a result of the aforedescribed movement of the shoes 41, the projecting end of the roll wrapper is turned inwardly against the face of the roll, leaving, however, narrow tucks of the wrapper projecting between the spaces which separate the side edges of the shoes, these projecting tucks being indicated in the drawings by the reference numeral 46.

Each of the folding-heads 7 also comprises a hollow plunger rod 47 which extends axially through the member 26, and has at its inner end an enlarged head 48. This head is also hollow and presents to the end of the adjacent roll a circular flat perforated face. The plunger rod 47 has at its rearward end a block 49 which is guided in the bracket 27 for movement axially of the head 7. This block carries a roller 51 which engages a cam 52 on the fixed frame of the machine. As the drum rotates, the plunger rod 47 is periodically advanced from the retracted position in which it is shown in Fig. 3 to an advance position in which, as shown in Fig. 12, the perforated flat face of the head 48 is brought into position to engage the infolded wrapper end and against the end face of the roll. To permit this advance movement of the plunger into roll-engaging position, the arms 28 and shoes 41 are retracted, as shown in Fig. 12, by action of the cam 25, as previously set forth. As the head 48 of the plunger 47 advances toward the end of the roll, it first engages the radial projecting tucks 46, and flattens these tucks down against the end of the roll or against those portions of the wrapper which previously have been pressed against the surface of the roll by the shoes 41. The final form of these tucks when fully pressed into position by the plunger is illustrated in Figs. 19 and 19*a*, wherein it will be noted that they are symmetrical with respect to a radial line extending longitudinally and centrally of the tuck, and increase in width from the periphery of the roll towards the cylindrical axis of the latter.

As previously stated, the plunger 47 and the head 48 are hollow, and the outer face of the head 48 is perforated. The interior of the stem 47, and hence of the head 48, is connected through a flexible duct 53, see Fig. 3, with a suitable source of suction, the suction thereby being imposed upon the interior of the head 48 of the stem. Means hereinafter described is provided for bringing a sticker or seal into engagement with the perforated face of the head 48 of the plunger 47, where it is retained by said suction, the gummed surface of the sticker being exposed so that when the plunger is advanced against the wrapper, the gummed and moistened surface will adhere to the latter and will thereby not only retain the folded wrapper in position at the ends of the roll but will also effectively seal the wrapper to render it substantially air-tight. Means is

provided, as hereinafter set forth, for moistening the gummed surface of the sticker prior to the application thereof to the wrapper.

Continued retraction of the arms 28 toward their normal radial positions, as shown in Figs. 13 and 14, brings the relatively wide or outer ends of the segmental shoes 41 into engagement with an annular flange 54 on the head 7, see also Figs. 3, 4 and 4a, so that the shoes 41, when the arms 28 move into their normal radial positions, are readjusted from the positions to which they were turned by the aforedescribed engagement with the edge of the roll to the normal position, as shown in Fig. 14, in which position they are ready for a further cycle of operations in the folding of the wrapper of a succeeding roll. It will be noted that the spring 45, by reason of the angular flat-sided form of the lug 42, tends to retain the shoe not only in its normal position, as shown in Figs. 17 and 18, but also in the other position of adjustment, as shown in Fig. 13.

Following completion of the forward or working stroke of the plunger 47, this element is retracted by action of the cam 52 to the position shown in Fig. 13, but is subsequently readvanced to a sticker-receiving position, as shown in Fig. 14. The cycle of the plunger action is completed by a movement of this element, following receipt of the sticker and as hereinafter described, to the fully retracted position in which it is shown in Fig. 15.

The mechanism by means of which the stickers are fed to the plungers 47 is illustrated in Figs. 2, 5, 6 and 7. By reference to Fig. 2, it will be noted that a shaft 55 is journaled in the fixed framework of the machine in a position adjoining the periphery of the drum 4 and above the chute 10, the shaft 55 paralleling the drum shaft 56. The shaft 55 has secured thereto a radial disk 57 which carries in the present instance three sets of arms 58, 59 and 61. The outer ends of the arms of each set are spaced apart in the axial direction, as shown in Fig. 5, and each of the arms has at its outer end and on the outer faces a suction box 62, the perforated face of which lies in a radial plane with respect to the shaft 55. The interiors of the suction boxes of the respective sets are connected through pipes 63, 64 and 65 respectively with ports 66, 67 and 68 in an annular member 69 secured to the disk 57, these ports 66, 67 and 68 terminating in the end face of the member 69 at points around the shaft 55 and at the same radial distance from said shaft as an arcuate recess 71 in the face of a sleeve 72 which abuts the aforesaid face of the member 69. The sleeve 72 is mounted freely upon the hub portion of the member 69, see Fig. 5, and is pressed against the ported face of the said member by means of a spring 73. The sleeve 72 carries an axially extended pin 74 which by engagement with a set screw 75 in a lug projecting from the fixed structure of the machine prevents the sleeve 72 from rotating with the member 69 as the latter rotates with the shaft 55. The arrangement is such that as the shaft 55 rotates carrying with it the disk 57 and the member 69, the ports 66, 67 and 68 are brought successively into communication with the recess 71. The recess 71 is connected through a pipe 77 with a suitable source of suction, as hereinafter described. By this means, the suction boxes 62 of the sets 58, 59 and 61 are periodically connected and disconnected from the source of suction as they are rotated on the shaft 55.

The suction boxes 62, 62 of each set of arms are in axial alignment wtih each other, and the common axes of the respective sets of boxes are so located with respect to the shaft 55 and the said shaft 55 is so located with respect to the shaft 56 of the drum that the cylinder transcribed by the said axes as the shaft 55 is rotated intersects the cylinder transcribed by the axes of the paper rolls rotating as previously described with the drum 4. The shafts 55 and 56 are rotated synchronously, the arrangement being such that the suction boxes 62 of the respective sets are brought into axial alignment and at opposite sides of the said rolls, the perforated faces of the suction boxes thereby being necessarily in alignment with the plungers 47 of the folding heads. When in such alignment and as shown in Fig. 14, an advance movement of the plungers will bring the two suction boxes together so that by a predetermined regulation of the suction in the two members a sticker can be transferred from the boxes 62 to the plungers 47.

The stickers are supplied to the boxes 62 from a pair of suction rolls 78 and 79, see Fig. 7, each of these rolls being provided with an elevated perforated face 81 which as the roll rotates is brought into registration with the bottom sticker of a stack carried in hoppers 82 and 83 respectively. Each of the hoppers 82 and 83 is mounted for oscillation about a pivot 84, and each of the hoppers is oscillated through the medium of a lever arm 85, a connecting rod 86 and a cam 87 which is operatively connected with the associated connecting rod through the medium of a roller 88 carried by the latter. The cams 87 are mounted respectively upon shafts 89 and 91 journaled in the fixed framework of the machine, as best shown in Fig. 6, and are operatively connected through a bevel pinion 92 with a bevel gear 93 on the shaft 55. The lower end of each of the connecting rods 86, as shown in Figs. 6 and 7, is slidably anchored on the associated shaft 89 or 91, so that in effect it oscillates about the axis of this shaft. The arrangement is such that during the period in which the suction faces 81 are engaging the lowermost sticker of the stack contained in the hoppers 82 and 83, the hopper and the suction face are moving in the same direction and substantially at the same rate of speed, this by reason of the oscillation of the hopper and the rotation of the suction wheel. The contact between these moving parts, therefore, is a rolling one substantially devoid of any rubbing or friction, the sticker being transferred from the hopper to the suction face 81 of the roll in obvious manner. The arrangement of the suction roll 78 with respect to the suction boxes 62 is such that the suction faces 81 are made to register with the boxes 62, and the suction is so controlled that when so registered the sticker is transferred from the suction faces 81 of the rolls 78 and 79 to the boxes 62, 62 of the respective sets.

Suction is applied to the interior of the rolls 78 and to the suction faces 81 through the respective shafts 89 and 91. This is illustrated in Fig. 6, wherein it will be noted that a channel 94 extends inwardly from one end of the shaft 91 and communicates at its inner end with a transverse channel 95 extending radially to the exterior of the shaft and communicating with an annular recess in the hollow interior of the roll 78. The outer end of the channel 94 communicates with a chamber 96 in a flange member 97 on the shaft 91, the outer wall of the chamber 96 being formed by a disk 98 secured to the face of the

flange 97. This disk 98 has an aperture 99 which registers with a channel 101 in the face of a relatively fixed flange 102 mounted in the fixed framework of the machine and lying in face-to-face contact with the disk 98. A spring 103 exerts a pressure forcing the flange member 102 against the face of the disk. The channel 101 communicates through a channel 104 with a port 105 which extends axially through the member 102 and communicates with a pipe 106 extending to the source of suction. It is apparent that as the shaft 89 rotates, the suction is intermittently applied and removed from the chamber 96, this chamber being conected with the source of suction during that portion of the rotation wherein the port 99 is in registration with the arcuate channel 101 and the suction being cut off from the chamber 96 during that portion of the rotation when the port 99 is covered by the area of the face of the flange 102 between the terminal ends of the said channel 101. The momentary interruption of the suction in the chamber 96, and hence in the channel 94 and in the suction roll 78, corresponds in time to the period wherein the suction box 62 registers with the suction face 81 of the roll whereby the suction in the box 62 is effective to withdraw the sticker from the suction face 81 and to thereby transfer it from the roll 78 to the box 62. Similar means is provided for momentarily discontinuing the suction in the boxes 62 at the moment when these boxes register with the suction heads of the plungers 47, thereby to permit transfer of the stickers from the faces of the boxes 62 to the suction heads of the said plungers.

Following transfer of the stickers to the plungers 47 as described above, the exposed adhesive-coated faces of the stickers are moistened in preparation for their application to the ends of the roll packages. The mechanism for accomplishing this wetting of the stickers will be understood by reference to Figs. 2, 8, 16 and 22. Immediately below the trough 10 into which the finished packages are deposited from the drum, as previously described, two atomizing nozzles 107, 107 are located in alignment with the path of travel of the suction heads 48 of the plungers 47, these nozzles being so mounted and directed that they are adapted to project a fine spray of water or other moistening medium onto the adhesive-coated faces of the stickers carried by the said plungers. The nozzles 107 are connected through suitable pipes 108 with a pipe 109 extending from a source of liquid supply. Liquid under pressure is passed continuously through the pipes 109 and 108 to the nozzles, which emit the liquid in the form of a finely atomized spray. This spray is normally intercepted by a disk 111 which is mounted for rotation in a cylindrical casing 112 through the outer wall of which the said nozzle projects. The disk 111 is rotated from the shaft 55 through the medium of sprockets 113, 114 and 115 and chains 116 and 117, see Figs. 1 and 2, rotation of the disk being synchronized with the rotation of the drum, so that an aperture 118 in the disk comes into alignment wth the nozzles 107 at the moment that each of the plungers 47 comes into alignment with the nozzles. Under these circumstances, the spray from the nozzles at that moment is permitted to pass through the aperture 118 to the adhesive-coated face of the sticker supported on the plunger 47. At all other times, the spray is intercepted by the disk 111 and drops from said disk into the casing 112 which embraces the disk, from whence it passes through a drain pipe 119. It will be noted that the moistening liquid is applied to the sticker immediately after its transfer to the plungers 47 and after the roll supported in the associated gripping elements has been discharged into the chute 7. The sticker is applied to the roll at a point in the rotation of the drum approximately 180° removed from the position in which the sticker is moistened as described. This affords sufficient time for the moisture to dissolve the adhesive and to put it in condition in which it is entirely effective to bind the sticker to the end of the roll.

The method of suction control on the various elements through the medium of which the stickers are transferred from the hoppers 82 and 83 to the suction heads 48 of the plungers 47 has been described above. Means is also provided for controlling the suction in the heads 48 of the said plungers to permit transfer of the stickers to the ends of the said wrapped package. This control is effected through the medium of valves 121 supported as shown in Figs. 1 and 3 upon the drum and in position to be actuated by cam elements 122 on the fixed structure of the machine. The valves 121 are actuated intermittently by said cams as the drum rotates from the open to the closed position, and vice versa. The duct 53 of each of the plungers 47 extends to one of these valves 121, and through the valve is connected with a duct 123 which in turn is connected through a channel 124 and port 125 with the hollow interior of the shaft 56, see Figs. 2 and 3. The interior channel of the shaft 56 is connected through a pipe 126 with the source of suction. The valves 121 operate to cut the suction from the plungers 47 when the plunger has been advanced to apply the sticker as previously described, so that the sticker is transferred to the package, the suction being eventually reapplied in order to effect transfer to the plungers of the stickers from the suction boxes 62 as previously described.

The operation of the mechanism insofar as described above will be more readily understood by reference to Fig. 25 of the drawings, which shows in graphic form the relative movements of the elements described through a cycle of 360°. It is believed that no further description of the operation of the machine will be required.

In Figs. 6 and 20 I have illustrated means whereby in the event that the gripping device 6 associated with any one of the folding heads fails to receive a roll from the conveyer 1, the plungers 47 of those folding heads will not have transferred thereto a sticker during the one complete cycle of operations. This result is effected through the medium of an electric switch 127, which as shown in Fig. 20 is located in the path of the rolls as they move to the drum on the conveyer 1. This switch as shown in Fig. 21 is normally closed to complete the electric circuit of which it forms an element. This circuit also includes a switch 128 which is intermittently closed and opened through the medium of a cam 129 on the shaft 131 which carries the sprockets 114 and 115. The cam 129 is of such character that in one complete revolution of the shaft 131 the switch is closed and opened three times, the closing of the switch in each instance corresponding to the actuation of the switch 127 by a roll advancing on the conveyer 1. In other words, under normal conditions when the switch 128 is closed, the switch 127 will be opened by the roll, so that the circuit is not energized. The circuit

also includes two electromagnets or solenoids 132 and 133 which are respectively operatively connected with valves 134 and 135 associated with the suction pipes 106 through which suction is applied as previously described to the suction rolls 78 and 79. The valves 134 and 135 are normally closed but are opened by energization of the solenoids 132 and 133, deenergization of the solenoids permitting the valves to close by gravity. When these valves are opened, the negative pressure from the vacuum pump is short-circuited from the rolls 78 and 79. The closing of the switch 128 by the cam 129 is so timed with respect to the movements of the rolls 78 and 79 that the switch is closed at each moment when the suction faces 81 of the rolls are in operative position with respect to the hoppers 82 and 83, or in position to withdraw labels from the hopper. If, therefore, the switch 127 fails to open by reason of the absence of a roll from one of the cradles of the conveyer 1, the closing of the switch 128 by the cam 129 will cause the valves 134 and 135 to open at the moment that the suction rolls 78 and 79 are about to withdraw a sticker from the hoppers 82 and 83, this opening of the valves 134 and 135 short-circuiting as previously described the suction from the rolls 78 and 79, so that the rolls are incapable of withdrawing the sticker in that particular cycle of its operation. Since the rolls 78 and 79 fail to withdraw the stickers from the hoppers, it is apparent that the normal transfer operation to the plungers 47 is interrupted, so that one of the plungers, namely, that one associated with the roll-gripping mechanism which fails to receive the roll from the conveyer 1, will not receive a sticker for that particular cycle of operations. It is apparent that the device provides for the withdrawal of stickers from the hoppers only when required.

With reference to Fig. 20 and in further explanation of the aforedescribed device, it will be noted that the cradle located below the position of the switch 127 is shown as lacking a roll, so that the switch 127 at this moment remains closed, thereby setting the safety device in operation. The empty cradle of the conveyer 1 would normally give up its roll to the gripping device of the folding head designated in Fig. 20 by the character A. The plungers 47 associated with this folding head A would normally receive a sticker from that one of the suction boxes 62 designated in Fig. 20 by the reference character B. This suction box B is about to move into registration with the suction face 81 of the roll 78 and the said suction face 81 is in a position to pick up a sticker from the hopper 82. At this moment, however, by reason of the failure of the switch 127 to open, the valve 134 is actuated by the energized solenoid 132 to short-circuit the suction from the face 81 of the roll 78 so that the roll fails to pick up a sticker from the hopper. The roll 78 is thereby prevented from transferring a sticker from the hopper to the suction box B; and the suction box B is thereby similarly prevented from transferring the sticker to the plunger 47 of the folding head A.

It will be apparent that in the normal cycle of operations, the suction head 48 of the plunger 47 associated with the folding head A will be subjected to a spray of liquid from the nozzles 107, which would be undesirable, and I, therefore, provide means for preventing such application of moisture directly to the faces of the suction heads 48. This device is shown in Fig. 22 and corresponds in operation with the sticker control device described above. It comprises a switch 136 which is intermittently closed by a cam 137 carried by the shaft 131 and corresponding to the cam 129 previously described. This switch controls an electric circuit including a second roll-actuated switch 138 located in the mechanism, as shown in Fig. 20. The circuit also includes a pair of solenoids 139 and 141 associated respectively with the nozzle mechanism 107. These solenoids actuate pivoted levers 142 and 143 respectively, which carry at their ends disks 144. These disks normally occupy the positions shown in Fig. 22, but when elevated by energization of the solenoids 139 and 141 are brought into the paths of the apertures 118 of the respective disks 111 and in alignment with the nozzles 107. When thus positioned, the disks 144 act to intercept the spray from the nozzles projected through the apertures 118 as previously described and prevent the spray from coming into contact with the faces of the suction heads 48 of the plungers 47. The switches 138 are normally closed and are opened periodically by the rolls 2 advancing on the conveyer 1. When so opened, the switches 138 prevent energization of the solenoids 139 and 141 by the closing of the switch 136. In the event that a roll is missing from one of the cradles of the conveyer 1, the switch 138 remains closed, so that the closing of the switch 136 will effect energization of the associated solenoids 139 and 141, thereby moving the disks 144 into the operative or spray-intercepting position. The timing is such that the spray is prevented from contacting any of the plunger heads 48 which by reason of the operation of the mechanism illustrated in Fig. 21 has failed to receive a sticker from the sticker-applying device.

I claim:

1. In a machine of the character set forth, the combination with a conveyer, of roll-holding means carried by said conveyer, mechanism movable with the conveyer and adapted to operate on the projecting end of a wrapper embracing a roll supported in said holder to fold said projecting wrapper end against the face of the roll, said mechanism comprising a folding-head positioned in alignment with said roll-holding means, and mechanism for advancing and retracting said head with respect to said holding means, elements on said head operative in the advanced position of the latter to force portions of said projecting wrapper end against the face of the roll to thereby produce intermediate said portions a series of outstanding substantially radial tucks, means adapted for reciprocation axially of said folding head for pressing said tucks inwardly toward the face of the roll to thereby complete the folding operation, and power means for actuating said conveyer and said folding mechanism.

2. In a machine of the character set forth, the combination with a conveyer, of roll-holding means carried by said conveyer, mechanism movable with the conveyer and adapted to operate on the projecting end of a wrapper embracing a roll supported in said holder to fold said projecting wrapper end against the face of the roll, said mechanism comprising a folding-head positioned in alignment with said roll-holding means, and mechanism for advancing and retracting said head with respect to said holding means, elements on said head operative in the advanced position of the latter to force portions of said projecting wrapper end against the face of the roll to thereby produce intermediate said portions a

series of outstanding substantially radial tucks, means adapted for reciprocation axially of said folding head for pressing said tucks inwardly toward the face of the roll to thereby complete the folding operation, means for supporting a gummed label on the operating face of said pressing means whereby in the normal operation of the latter the gummed surface of said label is pressed against the folded wrapper, and power means for actuating said conveyer and said folding mechanism.

3. In a machine of the character set forth, the combination with a conveyer, of roll-holding means carried by said conveyer, mechanism movable with the conveyer and adapted to operate on the projecting end of a wrapper embracing a roll supported in said holder to fold said projecting wrapper end against the face of the roll, said mechanism comprising a folding-head positioned in alignment with said roll-holding means, and mechanism for advancing and retracting said head with respect to said holding means, elements on said head operative in the advanced position of the latter to force portions of said projecting wrapper end against the face of the roll to thereby produce intermediate said portions a series of outstanding substantially radial tucks, means adapted for reciprocation axially of said folding-head for pressing said tucks inwardly toward the face of the roll to thereby complete the folding operation, means for supporting a gummed label on the operating face of said pressing means whereby in the normal operation of the latter the gummed surface of said label is pressed against the folded wrapper, means operating in advance of the working stroke of said pressing means to apply moisture to the gummed surface of said label whereby said label is caused to adhere to the folded wrapper, and power means for actuating said conveyer and said folding mechanism.

4. In a machine of the character set forth, the combination with roll-holding means, of mechanism operatively associated therewith and adapted to operate on the projecting end of a wrapper embracing a roll supported in said holder to fold said projecting end against the face of the roll, said mechanism comprising a support structure, a plurality of segmental shoes mounted in annular relatively spaced series in said structure, means for moving the shoes from a retracted position inwardly toward the roll end to thereby press relatively spaced segmental portions of the projecting wrapper end against the end face of the roll and to produce intermediate said portions a series of outstanding substantially radial tucks, said shoes being formed so that in the advanced position the proximate side edges of the adjoining shoes are substantially parallel and define narrow radial spaces through which said tucks project, and means operative axially of said roll for pressing said tucks flat against the impressed segmental portions of said wrapper end to thereby complete the folding operation.

5. In a machine of the character set forth, the combination with roll-holding means, of mechanism operatively associated therewith and adapted to operate on the projecting end of a wrapper embracing a roll supported in said holder to fold said projecting end against the face of the roll, said mechanism comprising a support structure, a plurality of segmental shoes mounted in annular relatively spaced series in said structure, means for moving the shoes from a retracted position inwardly toward the roll end to thereby press relatively spaced segmental portions of the projecting wrapper end against the end face of the roll and to produce intermediate said portions a series of outstanding substantially radial tucks, said shoes being formed so that in the advanced position the proximate side edges of the adjoining shoes are substantially parallel and define narrow radial spaces through which said tucks project, and means operative axially of said roll for pressing said tucks flat against the inpressed segmental portions of said wrapper end to thereby complete the folding operation, said latter means comprising also means for applying a gummed label to said folded wrapper end.

6. In a machine of the character set forth, the combination with roll-holding means, of mechanism operatively associated therewith and adapted to operate on the projecting end of a wrapper embracing a roll supported in said holder to fold said projecting end against the face of the roll, said mechanism comprising a support structure, a plurality of segmental shoes mounted in annular relatively spaced series in said structure, means for moving the shoes from a retracted position inwardly toward the roll end to thereby press relatively spaced segmental portions of the projecting wrapper end against the end face of the roll and to produce intermediate said portions a series of outstanding substantially radial tucks, said shoes being formed so that in the advanced position the proximate side edges of the adjoining shoes are substantially parallel and define narrow radial spaces through which said tucks project, means for pressing said tucks in the axial direction to flatten said tucks against the inpressed segmental portions of said wrapper end, said last-named means comprising an axially movable presser plunger having a hollow head portion and having perforations in the working face of said head, and means for applying suction to said hollow head to thereby support a gummed label on the perforated working face of said head for application to the folded wrapper end.

7. In a machine of the character set forth, the combination with roll-holding means, of mechanism operatively associated therewith and adapted to operate on the projecting end of a wrapper embracing a roll supported in said holder to fold said projecting end against the face of the roll, said mechanism comprising a support structure, a plurality of arms pivotally mounted in annular series in said structure and movable in radial planes between retracted substantially radial positions and advanced positions substantially parallel to the axis of said roll, a segmental shoe pivotally mounted on each of said arms and adapted in the retracted positions of the latter to extend in the substantially radial direction, mechanism for advancing said arms to thereby bring the outer ends of said shoes into engagement with the end edge of said roll whereby a continued movement of the arms towards the advanced position effects a pivotal adjustment about their respective axes of the shoes into positions against the end face of said roll whereby said shoes are effective to press relatively spaced segmental portions of the wrapper end against said end face and to produce intermediate said portions a series of outstanding substantially radial tucks, said shoes being formed so that in the advanced position the proximate side edges of the adjoining shoes are

substantially parallel and define narrow radial spaces through which said tucks project, and means for folding said tucks flat against the inpressed segmental portions of said wrapper to thereby complete the folding operation.

8. In a machine of the character set forth, the combination with roll-holding means, of mechanism operatively associated therewith and adapted to operate on the projecting end of a wrapper embracing a roll supported in said holder to fold said projecting end against the face of the roll, said mechanism comprising a hollow plunger adapted for movement axially of said roll and having a working face presented to the end of the roll provided with perforations, suction means for retaining a gummed label against the perforated face of said plunger whereby the gummed face of said label is pressed against the folded wrapper end when said plunger is advanced, and mechanism operating in synchronism with said folding mechanism for feeding labels to said plunger, said feeding mechanism comprising a hopper for the labels remote to the plunger and a suction transfer member movable in a path between said hopper and the plunger.

9. In a machine of the character set forth, the combination with roll-holding means, of mechanism operatively associated therewith and adapted to operate on the projecting end of a wrapper embracing a roll supported in said holder to fold said projecting end against the face of the roll, said mechanism comprising a hollow plunger adapted for movement axially of said roll and having a working face presented to the end of the roll provided with perforations, suction means for retaining a gummed label against the perforated face of said plunger whereby the gummed face of said label is pressed against the folded wrapper end when said plunger is advanced, and mechanism operating in synchronism with said folding mechanism for feeding labels to said plunger, said feeding mechanism comprising a hopper and a suction member movable between the hopper and the plunger and operative to transfer the labels from the former to the latter.

10. In a machine of the character set forth, the combination with roll-holding means, of mechanism operatively associated therewith and adapted to operate on the projecting end of a wrapper embracing a roll supported in said holder to fold said projecting end against the face of the roll, said mechanism comprising as one of the active folding elements a plunger adapted for reciprocation axially of the roll, and mechanism operatively associated with said plunger and operating in timed relation with said folding mechanism for adhesively applying a sticker to the folded end of said wrapper, said sticker-applying mechanism including suction means for supporting a sticker upon the working face of said plunger, a label-holding hopper and a suction-controlled transfer member movable between the hopper and the plunger for transferring the stickers from the former to the latter.

11. In a machine of the character set forth, the combination with a rotary roll carrier, of mechanism movable with said carrier and adapted to operate on the projecting end of a wrapper embracing a roll supported in said carrier to fold said projecting wrapper end against the face of the roll, said mechanism comprising a member movable axially with respect to said roll, suction means associated with said member for supporting a gummed label for application to the folded wrapper end, and means for feeding labels to said member, said feeding means comprising a rotary transfer member adjacent said carrier and having a suction head adapted for movement into registration with said member, means for controlling the suction to thereby permit transfer of a label from said suction head to the member, and means for synchronously operating said carrier and said transfer member.

12. In a machine of the character set forth, the combination with a movable roll carrier, of mechanism operatively associated with the carrier and adapted to operate on the projecting end of a wrapper embracing a roll suported in said carrier to fold said projecting wrapper end against the face of the roll, means for applying a gummed label to the folded end of said wrapper, said means comprising a label-supporting applicator member mounted in the carrier for movement axially of the roll, and means for applying moisture to the gummed surface of said label, said means comprising an atomizing nozzle located adjacent the path of said applicator for projecting a spray against a label supported on the applicator, means for continuously feeding liquid under pressure to said nozzle, and means operated in synchronism with said carrier for intercepting the spray except when the said applicator has moved into alignment with said nozzle.

13. In a machine of the character set forth, the combination with a movable roll carrier, of mechanism operatively associated with the carrier and adapted to operate on the projecting end of a wrapper embracing a roll supported in said carrier to fold said projecting wrapper end against the face of the roll, means for applying a gummed label to the folded end of said wrapper, said means comprising a label-supporting applicator member mounted in the carrier for movement axially of the roll, and means for applying moisture to the gummed surface of said label, said means comprising an atomizing nozzle located adjacent the path of said applicator for projecting a spray against a label supported on the applicator, means for continuously feeding liquid under pressure to said nozzle, and means operated in synchronism with said carrier for intercepting the spray except when the said applicator has moved into alignment with said nozzle, said intercepting means including a rotary disk interposed between the applicator and the nozzle and having an aperture arranged for axial alignment with said nozzle and with said applicator.

14. In a machine of the character set forth, the combination with a rotary member, of a plurality of roll-holding devices on said carrier arranged in circumferential series, mechanism on said carrier operatively associated with each of said supporting means adapted to operate on the projecting end of a wrapper embracing a roll supported in said holding means to fold said projecting wrapper end against the face of the roll, each of said mechanisms comprising a label-applying member movable axially of the associated roll, and means for actuating said member to adhesively apply the label to the folded end of the wrapper, mechanism for automatically feeding the labels to said members, and means for moistening the gummed surface of said labels prior to application thereof to the wrappers, said moistening means comprising a relatively fixed liquid spray nozzle positioned

adjacent the path of said applicator members and adapted to direct a moistening spray against the faces of said labels as the said applicator members move with the carrier past the nozzle position, means for continuously feeding a liquid under pressure to said nozzle, means positioned intermediate the nozzle and said applicator members for intercepting said spray except at the moments that the respective applicator members are moved into position aligned with said nozzle, and means automatically operative in the said aligned positions of the respective applicator members to intercept the spray in the event of failure of said feeding means to transfer a label to said applicator.

15. In a machine of the character set forth, the combination with roll-holding means, of mechanism operatively associated therewith and adapted to operate on the projecting end of a wrapper embracing a roll supported in said holding means to fold said projecting wrapper end against the face of the roll, means for applying a gummed label to the folded end of said wrapper, said means comprising a label-supporting applicator member and means for automatically feeding labels to said applicator, means operative on the label supported by the applicator to moisten the gummed surface of the label, and means for automatically interrupting the operation of said moistening means in the event of failure of said feeding means to feed a label to the applicator.

16. In a machine of the character set forth, the combination with a roll carrier having a plurality of spaced roll-holding means, of a conveyer for conducting rolls to said carrier in position to be received by said holding means, means operatively associated with said carrier and adapted to operate on the projecting end of a wrapper embracing the rolls supported in said holding means to fold said projecting wrapper ends against the faces of the rolls, means for applying a gummed label to the folded ends of said wrappers, said means comprising an applicator member operatively associated with each of said folding mechanisms, means for feeding the labels to said applicators, said means comprising a hopper and mechanism operating in timed relation with said carrier for transferring the labels from the hopper to the respective applicators, and means automatically operative in the event of failure of said conveyer to carry a roll to any one of said holding means for interrupting the operation of said transfer mechanism to prevent the transfer of a label from the hopper to that one of the applicators associated with the last-named holding means.

17. In a machine of the character set forth, the combination with a roll carrier having a plurality of spaced roll-holding means, of a conveyer for conducting rolls to said carrier in position to be received by said holding means, means operatively associated with said carrier and adapted to operate on the projecting end of a wrapper embracing the rolls supported in said holding means to fold said projecting wrapper ends against the faces of the rolls, means for applying a gummed label to the folded ends of said wrappers, said means comprising an applicator member operatively associated with each of said folding mechanisms, means for feeding the labels to said applicators, said means comprising a hopper and suction mechanism operating in timed relation with said carrier for transferring the labels from the hopper to the respective applicators, and means automatically operative in the event of failure of said conveyer to carry a roll to any one of said holding means for interrupting the operation of said transfer mechanism to prevent the transfer of a label from the hopper to that one of the applicators associated with the last-named holding means, said automatic means comprising a suction-controlling valve operatively connected with the transfer mechanism, and valve-actuating mechanism including a control element positioned in the path of the rolls as they move on the conveyer toward the carrier.

18. In a machine of the character set forth, the combination with folding mechanism comprising a roll-holding means and means operatively associated therewith and adapted to operate on the projecting end of a wrapper embracing a roll supported in said holding means to fold said projecting wrapper end against the face of the roll, of a conveyer for feeding said rolls to the holding means, means for applying a gummed label to the folded end of said wrapper, said means comprising a label-supporting applicator member, and means for automatically feeding labels to said applicator, means operative to moisten the gummed surface of the labels on the applicator, and means comprising a control element located in the path of the rolls as they move on the conveyer toward the holding means for interrupting the operation of said label-feeding and moistening means in the event of failure of said roll-holding means to receive a roll from said conveyer.

19. In a machine of the character set forth, the combination with folding mechanism comprising a roll-holding means and means operatively associated therewith and adapted to operate on the projecting end of a wrapper embracing a roll supported in said holding means to fold said projecting wrapper end against the face of the roll, of a conveyer for feeding said rolls to the holding means, means for applying a gummed label to the folded end of said wrapper, said means comprising a label-supporting applicator member, and means for automatically feeding labels to said applicator, means operative to moisten the gummed surface of the labels on the applicator, and electrically-actuated means means for interrupting the operation of said label-feeding and moistening means in the event of failure of said roll-holding means to receive a roll from said conveyer, said interrupting means comprising a normally closed switch positioned in the path of the rolls as they move on the conveyer toward the holding means and adapted to be periodically opened by engagement of the rolls therewith, a second switch connected in series with the said normally closed switch, and means for actuating said second switch in synchronism with said conveyer to close said switch intermittently at the moments when the first-named switch is opened by said rolls, the arrangement being such that both of said switches are closed only when a roll is absent from said conveyer, and an electric motor in circuit with said switches and adapted when energized to interrupt the operation of said label-feeding and moistening means, said energization occurring only when by reason of the absence of a roll from the conveyer the normally closed switch fails to open.

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