J. R. HARBECK.

LABELING MACHINE.

APPLICATION FILED OCT. 12, 1907.

902,578. Patented Nov. 3, 1908.

6 SHEETS—SHEET 1.

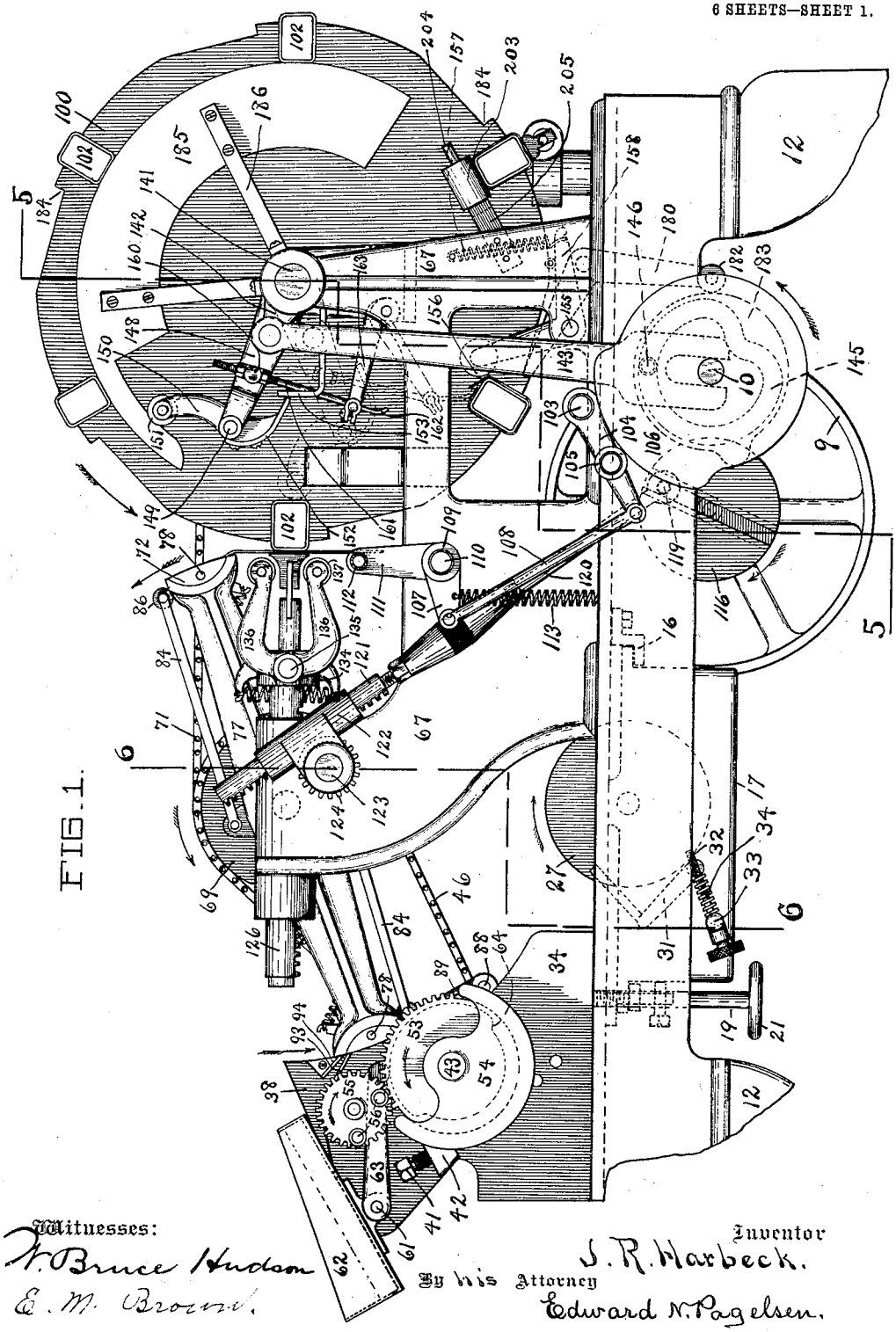


FIG. 1.

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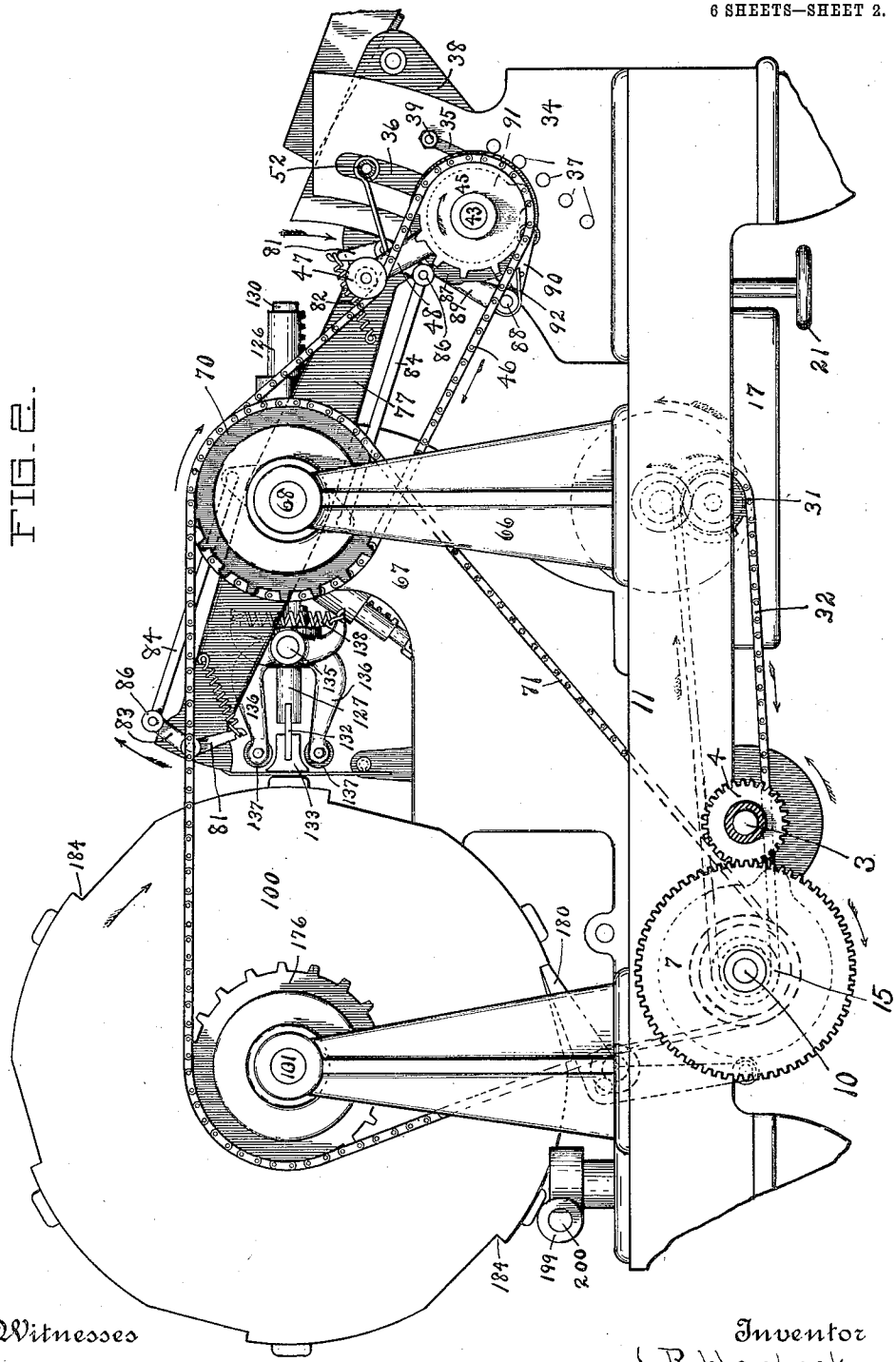
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6 SHEETS—SHEET 2.

FIG. 2.



Witnesses

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6 SHEETS—SHEET 3.

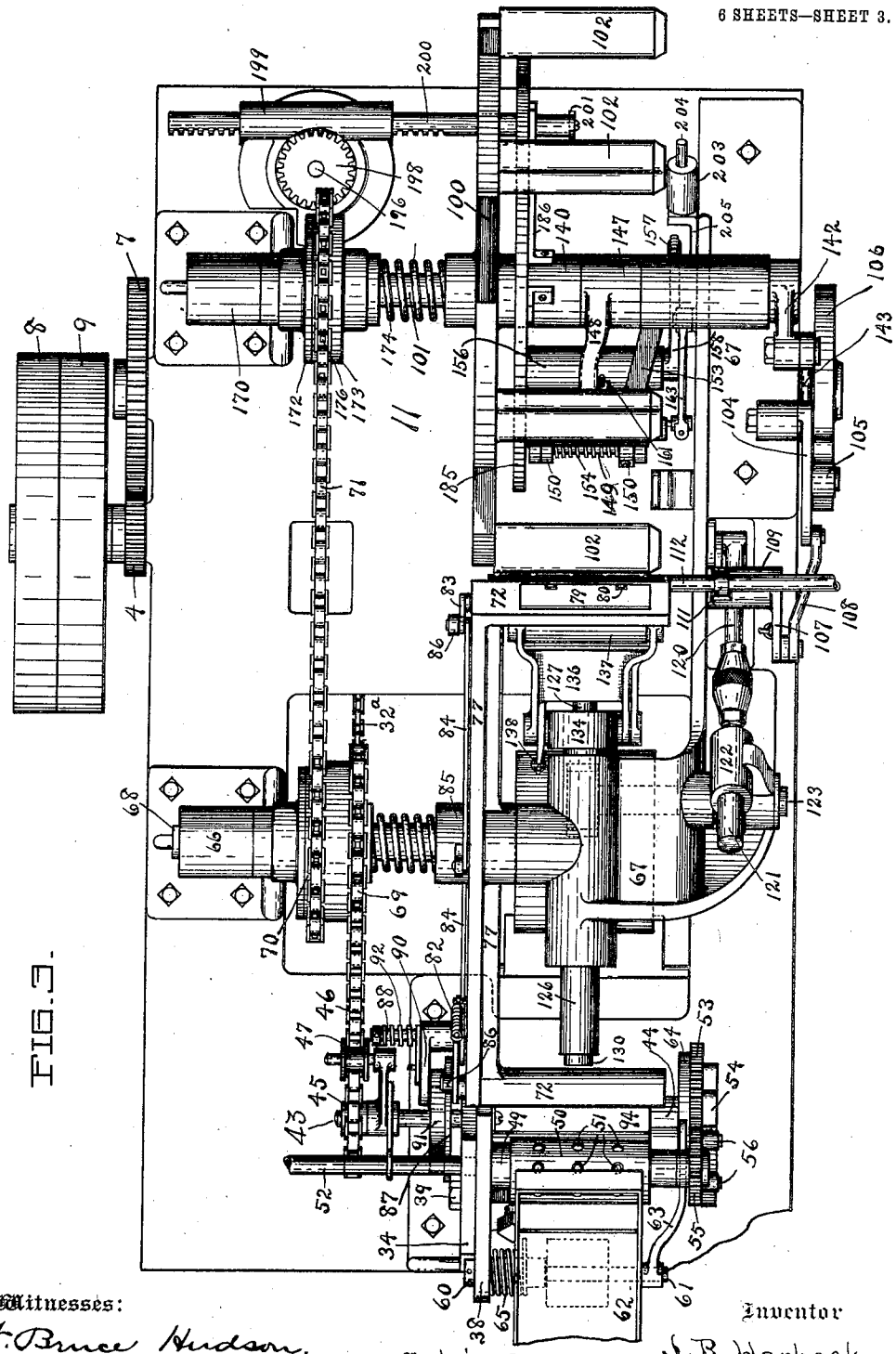


FIG. 3.

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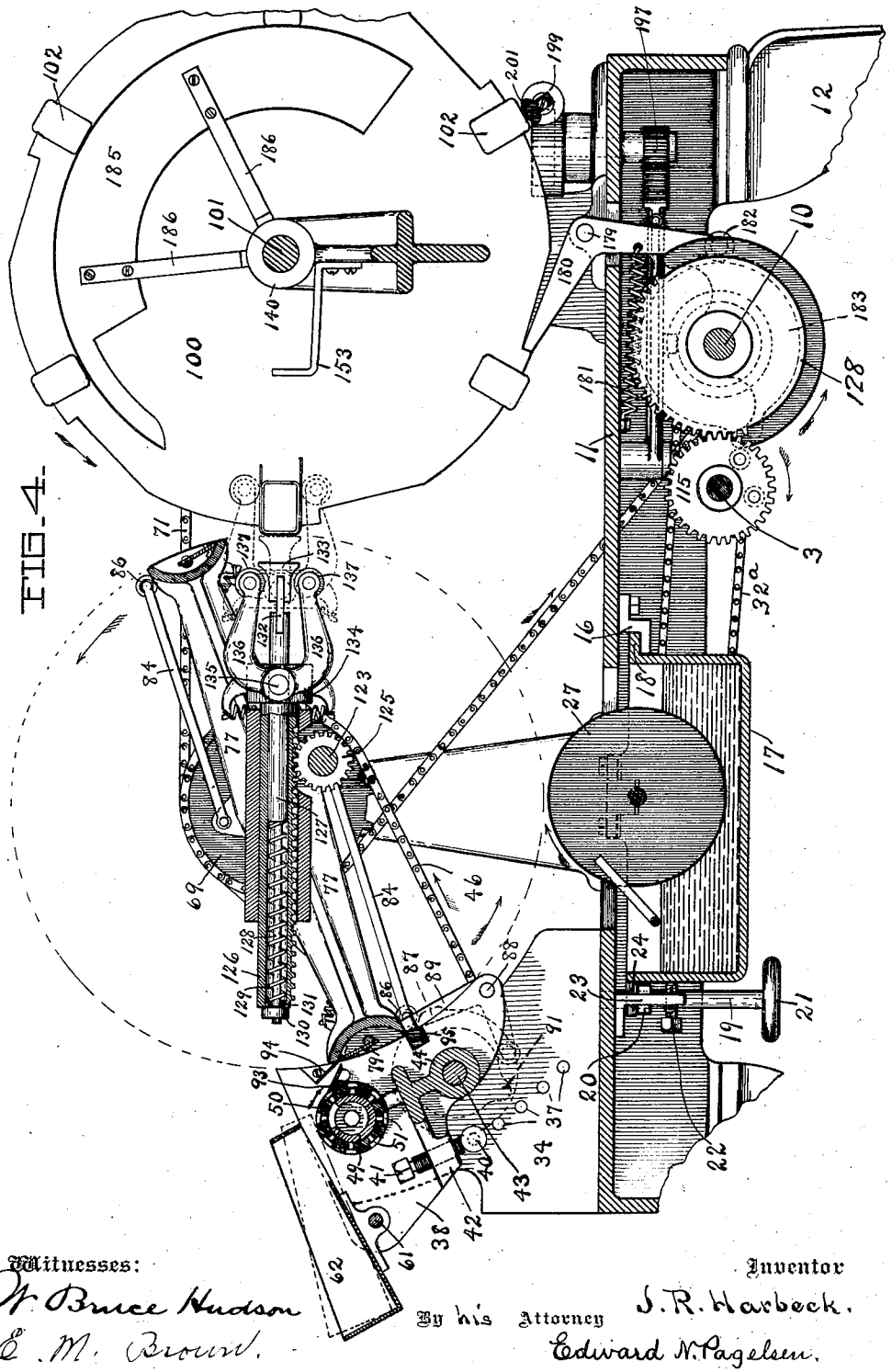
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6 SHEETS—SHEET 4.

FIG. 4.



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6 SHEETS—SHEET 5.

FIG. 5.

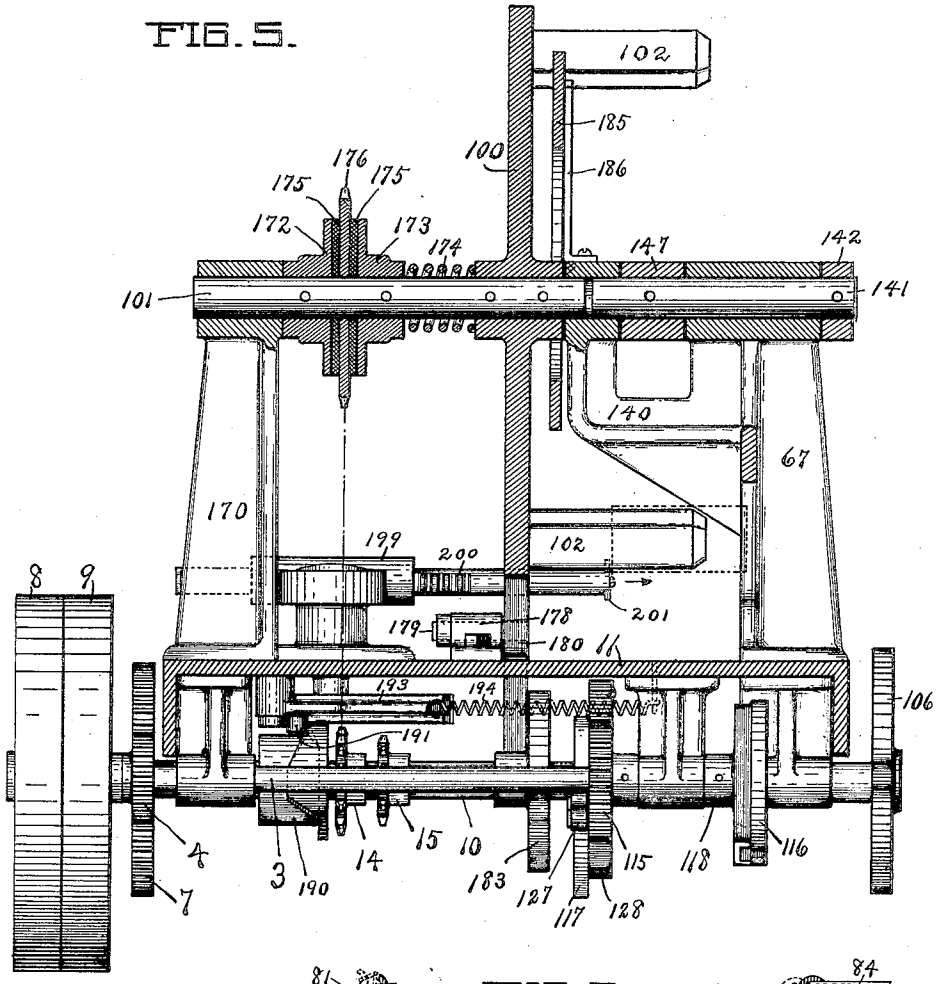
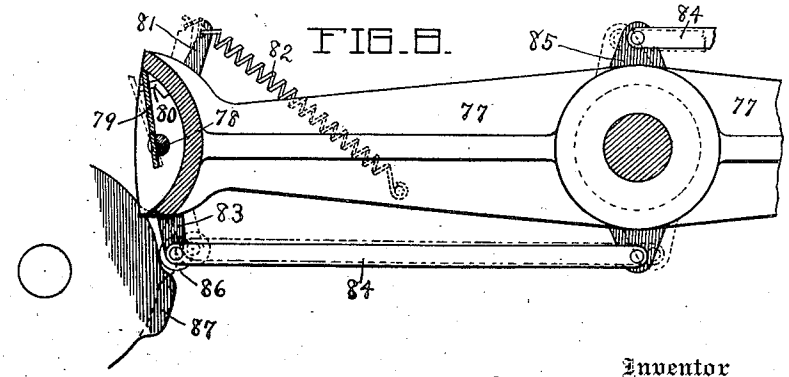


FIG. 8.



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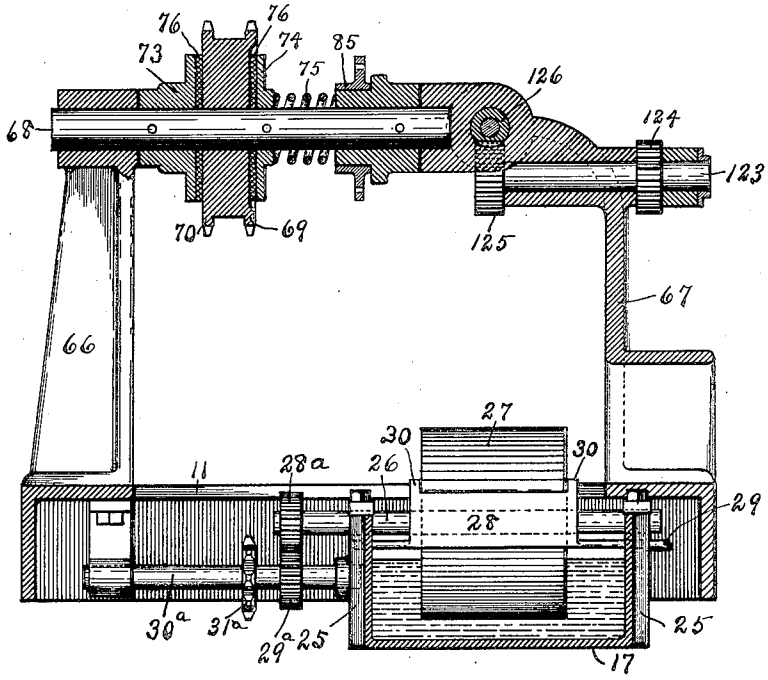
LABELING MACHINE.

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6 SHEETS—SHEET 6.

FIG. 6.



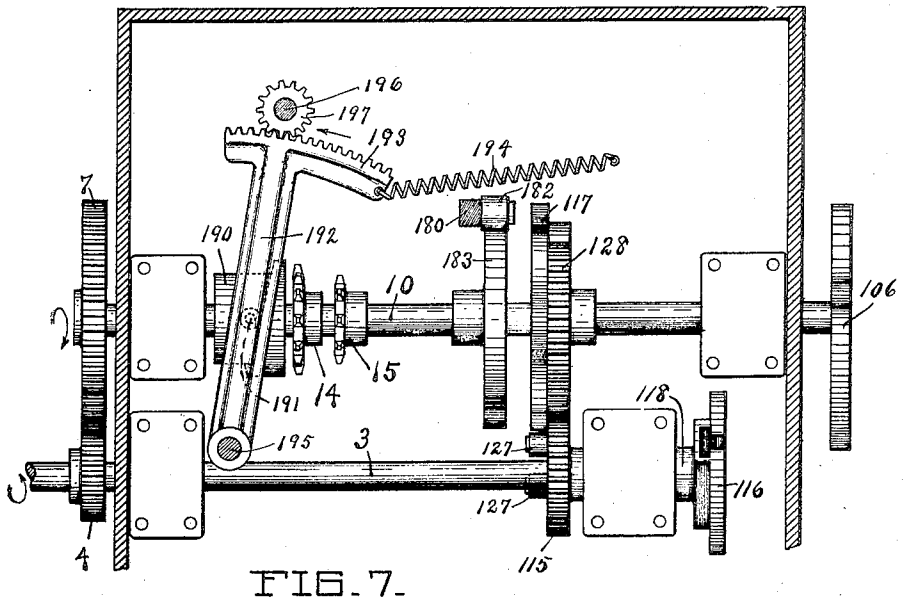


FIG. 7.

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UNITED STATES PATENT OFFICE.

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LABELING-MACHINE.

No. 902,578. Specification of Letters Patent. Patented Nov. 3, 1908.

Application filed October 12, 1907. Serial No. 397,042.

To all whom it may concern:

Be it known that I, JERVIS R. HARBECK, a citizen of the United States, and a resident of Detroit, in the county of Wayne and State of Michigan, have invented a new and useful Labeling-Machine, of which the following is a specification.

This invention relates to means for pasting labels onto the outside of short tubes, particularly tubes adapted to form the bodies of cans, boxes or other containers; and this invention consists in means for removing one of a number of labels from a receptacle, coating it with cement, carrying it to the tube and winding it around the same.

This invention further consists in the novel pneumatic mechanism for removing a label from the bottom of a stack of labels in a box, and feeding one end into the jaws of a carrying mechanism.

It further consists of a novel mechanism for carrying the label from the pneumatic feeder to the applying mechanism, and for carrying a tube to the proper position to receive the label.

It further consists in novel mechanism for applying the label to the tube and for insuring the fastening down of the outer end.

The invention is illustrated in the accompanying drawings, in which

Figure 1 is a general front view of the machine. Fig. 2 is a rear view, Fig. 3 is a plan. Fig. 4 is a front view with portions of the parts broken away for the sake of clearness. Fig. 5 is a vertical cross section on the line 5—5 of Fig. 1. Fig. 6 is a cross section on the line 6—6 of Fig. 1. Fig. 7 is a plan of the two lower driving shafts. Fig. 8 is a detail of the label carrier.

Similar reference characters refer to like parts throughout the several views.

The labeling machine here illustrated comprises a label holder; a rotary device to extract one label from the holder and feed one end of it to the gripping jaws of the label carrier, a coating device; a tube carrier; means to wrap the label around the tube; means to eject the tube; and driving mechanism for the different parts.

The main driving shaft 10 is mounted in bearings secured to the lower side of the bed 11 of the machine, which bed is supported by legs 12, at any desired height. Each revolution of this shaft represents a cycle in the operation of the machine, and the pasting on of one label. Mounted on this shaft are the gear wheel 7, the sprocket wheel 14 for driving all the rotating parts above the bed, and the sprocket wheel 15 for driving the coating mechanism. The gear 7 meshes with the pinion 4 which is united to the pulley 9 and with it runs loose on the shaft 3. A second pulley 8 is independently loosely mounted on the shaft 3.

The coating mechanism.—Secured to the lower side of the bed is a bracket 16. (See Fig. 4). A paste or glue receptacle 17 has a flange 18 adapted to engage this bracket, and a second flange 24, through a slot in which the rod 19 extends. A collar 20 on this rod engages the flange 24 and supports the same, while the upper end of the rod is screw threaded into a hole in the bed. The rod may be turned by means of the wheel 21 and the height of the paste tank may be thereby adjusted. A screw 22 in the bracket 23 holds the tank in position.

Extending down from the bed, beside the tank, (Fig. 6) are brackets 25 which support the shaft 26 of the paste roller 27. On the end of this shaft is a gear 28^a which meshes with the gear 29^a on the shaft 30^a. A sprocket wheel 31^a on this shaft is driven by the sprocket wheel 15 by means of the chain 32^a.

To insure an even coating of paste or glue on the roller 27, a blade 28 is secured to the rod 29 which is mounted in the walls of the tank 17. This blade has fingers 30 projecting over the ends of the roller to prevent ridges of dried glue forming thereon. An arm 31 on one end of the rod 29 is provided with a screw threaded stud at its outer end which is engaged by the screw 32 mounted on the pin 33. The spring 34 holds the head of the screw against the pin 33, and regulates the distance between the blade 28 and the roller, and thus the thickness of the paste or glue on the roller will be controlled by the screw 32.

The label holder and carrying mechanism.—Mounted on the rear end of the bed is a supporting frame 34, provided with slots 35 and 36, and holes 37. A plate 38 is secured to this frame by means of bolt 39, and is held in position by the pin 40 in one of the holes 37, which pin is engaged by a screw 41 mounted in the bracket 42 on the plate 38. A shaft 43 is mounted in this plate and in a bracket 44 projecting therefrom, and has secured on one end the sprocket wheel 45 which is engaged by the driving chain 46. This

chain is kept sufficiently tight by means of the roller 47 on the arm 48 as shown in Figs. 2 and 3. Projecting from this plate 38 is a slotted cylinder 49 upon which is revoluble a drum 50 provided with holes 51. A pipe 52 connects this cylinder with an air pump, so that a partial vacuum is maintained within this cylinder and drum, and a suction will occur at those holes just above the slot in the cylinder.

At the right end of the shaft 43 is a mutilated gear 53 Fig. 1 and a stop plate 54. On the end of the drum 50 is a pinion 55 from which the pins 56 extend. This well known device is so adapted that the constantly revolving shaft 43 will turn the drum 50 one revolution for one half of the revolution of the shaft 43, permitting it to rest during the other half.

Mounted on the plate 38 is a sleeve 60 in which is journaled a shaft 61 carrying the label holder 62. An arm 63 secured to this shaft engages the cam 64 on the shaft 43. A spring 65 holds the adjacent end of the label holder toward the drum 50.

The operation of these parts is as follows:—The shaft 43 running all of the time, the drum 50 will have equal periods of movements and rest. During the periods of rest, the low part of the cam 64 is in engagement with the arm 63, and the label holder will be tipped down toward the drum 50. The adjacent portion of the bottom of the label holder is cut away (Fig. 4), permitting that end of the bottom label to lie on the drum, where the label will be held through suction. Continued movement of the shaft 43 will cause the cam 64 to tip back the label holder and its contents, but the bottom label will be held down by the suction through the holes 51. The drum 50 now begins to turn and feeds this bottom label out of the holder. As each suction hole passes the slot in the cylinder 49, its suction ceases, but that of another hole at once begins so that the labels will not be carried around the drum, but be fed forward in a practically straight line.

Mounted on the bed 11 are standard 66 and frame 67 which support the shaft 68 on which is mounted the drum to which are formed the sprocket wheel 69, which carries the chain 46 to drive the mechanism just described, and the sprocket wheel 70, which engages the chain 71 from the sprocket wheel 14 on the main shaft 10.

On the shaft 68 (Fig. 6) is secured a disk 73, and is slidable a second disk 74, engaged by the spring 75. Washers 76 preferably of leather increase the friction between these disks and the sprocket wheel drum, so that the chain 71 which runs constantly, will turn the shaft 68 whenever it is released. The double sprocket wheel 69—70 acts as a power transmission between the shaft 10 and the shaft 43.

Secured to the shaft 68 is the label carrier having the two arms 77 (Fig. 8) each having lateral projections 72. A shaft 78 mounted in the end of each arm carries a plate 79, adapted to swing out, as shown in dotted lines, to admit the end of the label. Fingers 80 projecting through holes in the plate 79, prevent the labels going too far into the semi-cylindrical cup in the end of the arm. The projecting portions 72 on the arms 77 and the plates 79 form the grippers of the label carriers. A double arm is secured to the end of the shaft 78 (Fig. 8), the upper arm 81 being engaged by the spring 82, to normally hold the plate 79 in gripping position, and the second arm 83, being connected by the link 84 to a projecting lug on the collar 85, which is mounted on the hub of the label carrier. (Fig. 6). A roller 86 on the end of arm 83 reduces friction with the cam 87 on the shaft 43.

Mounted on the pin 88 on the plate 38 is a lever having one arm 89 provided with a lateral extension adapted to project into the path of the ends of the arms of the label carrier (Fig. 4), while the other arm 90 (Fig. 2) engages the cam 91 on the shaft 43. A spring 92 (Fig. 3) holds this arm against the cam. The operation of these parts is as follows. The parts being in the position shown in Figs. 1 and 4, the label carrier has just swung back and the gear 53 is beginning to turn the drum 50, and with it, to pull a label from the holder. As the label moves, it passes in between the guide plates 93 and 94 (Fig. 1) carried by the plate 38. Further turning of the shaft 43 causes the high part of cam 87 to engage the roller 86 on arm 83, forcing open the plate 79 so that the end of the label may enter the gripper. Further turning of the shaft will cause the gripper to close and the high point on the cam 91 to engage the end of arm 90, carrying the end of the arm 89 from under the end of the carrier arm 77. At this point the high part of the cam 87 has passed the roller 86 and the gripper has closed, locking the end of the label. The plate 38 has a notch 95 (Fig. 4) into which the lateral projection on arm 89 may enter out of the path of the arm 77.

The friction between wheels 69—70 and disks 73—74 now swings the arms 77 around one half a revolution, the arm 89 immediately springs back into the path of the next arm 77 after the first is released. In passing the coating mechanism, the label is dragged over the cement coated surface of the roller, the circumferential speed of the roller being slightly less than that of the gripper.

While the arms 77 are moving, the label holder has dipped down against the drum 50 which has just begun to turn as the next arm 77 is stopped by the arm 89.

The label applying mechanism.—The tube carrier disk 100 is mounted on the shaft 101

and is provided with pins 102 upon which the tubes are placed to receive the labels. The disk turns the distance between pins 102 at each cycle, and presents a pin and tube opposite the label applying mechanism at each stopping of the arms 77. The tube carrier will be described further on.

Referring to Figs. 1, 3 and 5, the frame 67 is shown to extend to furnish a bearing for the shaft 101. On this frame is supported a pin 103, on which is pivoted a lever 104 carrying the roller 105 which contacts with the edge of the cam 106. The end of the lever is connected to the arm 107 through the link 108. This arm is secured to the sleeve 109, mounted on the pin 110, secured to the frame 67. The arm 111 is also secured to this sleeve and carries the pipe 112 which has a connection to the air pump and has a row of holes as shown in Fig. 3.

The pipe 112 is shown in the path of the part 72 of the end of the arm 77, but before the part 72 crosses the path of the pipe, the high part of the cam passes the roller 105, and the spring 113 pulls back the pipe out of the way. Immediately after the arm 77 has passed, the pipe swings back in time to contact with the "lower" end of the label hanging down from the gripper, and as the suction is on, will hold the label with some persistence, causing it to be stretched flat and straight when in wrapping position.

The pulleys 8 and 9, and the pinion 4 are loose on the shaft 3. The gear 115 and disk 116 are joined by the sleeve 118 loose on the shaft 3. The gear 115 is intermittently driven by the mutilated gear 128, the periods of rest being fixed by the disk 117 and pins 127. The disk 116 is provided with a slot in which is adjustably secured a pin 119, (See Figs. 1 and 3) on which is pivoted one end of the rod 120. A rack 121 is slidable in a sleeve 122, mounted on the shaft 123, which rack is in engagement with the gear 124. A turn-buckle adjusts the position of the rack.

The shaft 123 also carries the gear 125 (Fig. 6) which engages the rack teeth cut in the longitudinally movable cylinder 126. Slidably mounted in this cylinder (Fig. 4) is a rod 127, having a reduced end 128 upon which is mounted a spring 129. A collar 130 on the rod 128 limits the movement of the rod with respect to the cylinder. The spring engages the flange 131 of the cylinder and the enlarged portion 127 of the rod.

On the outer end of the rod 127 is a plate 132 which carries a buffer 133 of rubber or other desirable material. A collar 134 is secured to the end of the cylinder 126, and on the pins 135 on this collar are pivoted the arms 136 which carry rollers 137 at their outer ends. The arms 136 are crossed at one side of the collar as shown in Fig. 2, and their free ends connected by the spring 138 which holds the rollers toward each other.

The operation of the label applying mechanism is as follows. The parts being in the position shown in solid lines in Fig. 4, and the shaft 3 with disk 116 turning to the right, the rack 121 will move down, turning the shaft 123 and gear 125 to the right. This will move the rollers 137 and the buffer 133 outward, the buffer pressing the label against the tube as shown in Fig. 1. Here the buffer will remain, but the rollers will continue, passing over the top and bottom of the tube as shown in dotted lines in Fig 4. At the time that the buffer contacts with the label, the cam 87 has passed the roller 86 on the arm 83 toward the shaft 68 to open the gripper. This causes the link 84 to turn the ring 85, to actuate the second link 84 and so to open the second gripper which is supporting the label adjacent the tube, releasing the label which is then rolled against the tube by the rollers, 137. Continued movement of the shaft 3 causes the parts to return to normal position.

As the rollers 137 are moving back, a mechanism is brought into play to turn down the projecting "upper" end of the label against the side of the tube facing the shaft 151.

Referring to Figs. 1, 3 and 5, it will be seen that the frame 67 has an inwardly projecting arm 140 provided with a bearing for the inner ends of the shafts 101 and 141. The crank arm 142 secured to the outer end of the shaft 141 has a link 143 pivoted to it, whose lower end is forked and fits over the shaft 10. The disk cam 106 has a slot 145 in which the pin 146 on the link 143 travels, and this cam will cause the shaft 141 to rock. The sleeve 147 on the shaft 141 has an arm 148, mounted in the forked end of which is a shaft 149. A pair of arms 150 support a roller 151. One arm 150 carries a plate 152 adapted to engage the brace or guide 153 projecting from the frame 67. A spring 154 on the shaft 149 tends to force the roller 151 outward. The action of these parts is as follows. While the rollers 137 are moving back out of the way, the link 143 descends, carrying down the arm 148. The plate 152 sliding down the guide 153 comes to the corner, permitting the spring 154 to throw out the roller 150 which will be drawn down the right side (Fig. 1) of the tube, as shown in dotted lines. Further turning of the shaft 10 will swing the parts back to position.

Through mechanism to be explained, the tube which has been previously labeled has moved along one sixth of a revolution of the tube carrier 100, and there is a possibility that the "upper" end of the label which was held by the gripper may not be stuck down.

It should be held down while the "lower" end is being brought up.

Pivoted on the pin 155 projecting inward from the frame 67 is a bell crank lever 158 carrying the roller 156. (Fig. 1). This roller is held in the path of the tubes by means of the spring 157. As the tube passes this roller, the "lower" end of the label will be swept up over the tube and pasted down. To tuck the "upper" end of the label under the "lower" end, a pin 160 (Fig. 1) is pivoted in the arm 148, and adjustably mounted on this pin is a rod 161. A crank arm 163 is mounted on the frame 67 and in its end is journaled a pin on the rod 161. A plate 162 is carried by the rod 161.

When the link 143 pulls down the arm 148, the rod 161 will also descend, and the adjustment is such that the plate 162 will tuck the "upper" end of the label under the "lower" end, just before it is pressed down by the roller 156. See dotted lines in Fig. 1.

The tube carrier.—Mounted on the bed 11 are the frames 170 and 67, which latter has a bracket 140. A shaft 101 is mounted in the bearings of the frames and has secured to it the disk 172, has slidably mounted on it the disk 173 and has secured to it the tube carrying plate 100. A spring 174 between the disk 173 and the hub of the tube carrier presses washers 175, preferably of leather, against the sides of the sprocket wheel 176. This sprocket wheel carries a chain 71 which is constantly driven by the sprocket wheel 14 on the shaft 10. The friction between the sprocket wheel 176 and the washers and disks is such that the tube carrier will turn whenever released.

Mounted on the bed 11 is a bearing 178 for the pin 179 which carries the bell crank lever 180. A spring 181 (Fig. 4) normally holds the upper arm of the bell crank against the edge of the plate 100. The lower arm carries a roller 182 which engages the cam 183 on the shaft 10. The high point of this cam will swing the upper arm of the bell crank out of the notch 184 in the plate 100 immediately after a label has been applied to a tube, and the arm will spring up in time to engage in the next notch.

The plate 185 is a segment supported by arms 186 secured to the bracket 140. The outer edge of the plate extends to the tube carrying pins 102 and limits the distance the tubes may be slipped onto the pins. The tubes are placed on these pins by hand.

The tube ejector.—Secured to the shaft 10 (Figs. 5 and 7) is a drum cam 190 adapted to engage a pin 191 on the arm 192 of the sector 193 to swing the same to the left. The spring 194 returns the sector. The arm 192 is mounted on the pin 195 secured to the bed 11. A shaft 196 is journaled in the bed and has a gear 197 at its lower end and a second gear 198 at its upper end. (Fig. 3).

Mounted in the guide sleeve 199 on the bed, is a rack 200 engaged by the gear 198. On the outer end of the rack is a plate 201 which will scrape along the tube carrier pins 102 and remove the tubes. This ejector is timed to move out and back during the period the carrier plate 100 is at rest.

To prevent the tubes from "canting" when being removed, a roller 203 is mounted on a pin 204 carried by a bracket 205 secured to the frame 67. This roller will hold the tube in line with the pin 102 while the tube is being moved along the pin and thus prevent injury to the tube.

Operation.—The operation of this machine is as follows. The operator places tubes on those pins 102 which are adjacent to the segment 185, the distance they are slipped on being limited by this plate. The operator also keeps the label holder 62 and the glue tank 17 supplied.

In operation, the drum 50 feeds a label into the gripper, the plate 201 begins to push off a finished tube and the buffer 133 moves up to hold a label against a tube. Next the grippers open simultaneously, one to admit the end of a label and the other to release a label so it may be attached to a tube. The rollers 137 also move out over the upper and lower sides of the tube, and the suction pipe 112 begins to swing away from the path of the grippers. Next the grippers close, one empty, the other onto a label, the rollers 137 move back, and the cam 106 causes the roller 151 to move down to turn down the "upper" end of the label that has just been applied. At the same time the plate 162 tucks in the possible loose end of the label under the "lower" end just being turned up by the roller 156. The ejector is also returned to normal position by its spring and the cam 91 completes the withdrawal of the arm 89 from under the end of the arm 77, and the lever 180 releases the tube carrier 100.

The arms 77 swing around through one half a revolution, a label being dragged over the roller 27. The carrier plate moves to bring another tube opposite the buffer. At the same time, a tube is moved under the roller 156 so as to have the "lower" end of the label rolled down. The pipe 112 swings into the path of the grippers in time to engage the label sufficiently long to straighten it, while the roller 151 and plate 162 return to normal position. The machine has completed one cycle, and the time consumed is about one second. It will be observed that this machine is not limited to the application of labels to rectangular tubes, any form of tubes across or around which the rollers 137, 151 and 156 can move being suitable material for this machine. For certain tubes, the buffer 133 may be omitted.

Having now explained my improvements,

what I claim as my invention and desire to secure by Letters Patent is:—

1. In a machine for applying labels to tubes, the combination of a label holder, means for removing a label therefrom, a revoluble gripping device adapted to receive one end of the label and carry it to position where it may be applied, means to coat one side of the label while in transit, a tube carrier, and means for applying the label to the tube.

2. In a tube labeling machine, the combination of a label holder, means for removing a label therefrom, an arm adapted to swing about a pivot, gripping means in the end thereof adapted to receive one end of the label and carry it to position where it may be applied, and means for applying the label.

3. In a tube labeling machine, the combination of a revoluble disk, a series of pins projecting therefrom each adapted to receive a tube and to carry it to a label receiving position, a label supporter, means adapted to simultaneously press a label against opposite sides of the tube, and means to remove the tube after it has been carried from the label receiving position.

4. In a labeling machine, the combination of a revoluble carrier adapted to support the article to be labeled and carry it through a plurality of positions, means to coat labels with cement, means to support a cement coated label adjacent the article when in one position, means to attach the label to the article at that position, means to revolve the article carrier to second and third positions, means to complete the application of the label at such second position, and means to remove the article at such third position.

5. In a tube labeling machine, the combination of a tube carrying plate, means to intermittently revolve the same, means to stop said plate at predetermined positions, pins carried by said plate to receive the tubes, a plate to regulate the distance the tubes may be moved over the pins, means to apply a label to the tubes when stationary at one position, and means to remove the tubes from the pins when in another position.

6. In a tube machine, the combination of a bed, frames mounted thereon, a shaft intermittently revoluble in said frames, a pair of arms mounted on said shaft, grippers mounted in the ends of said arms, means to feed labels to the grippers when in one position, a tube carrier and means to receive the labels from the grippers when in their succeeding position and apply the same to the tubes.

7. In a labeling machine, the combination of a shaft, a pair of arms mounted thereon and adapted to intermittently revolve through one hundred and eighty degrees, a gripper mounted on each arm, means to feed the end of a label into the grippers when in one position, means to receive the label from the grippers when in the other position and apply the same to the article to be labeled, and means to simultaneously operate the grippers on said arms.

8. In a labeling machine, the combination of a label holder, a drum having perforations adapted to permit the bottom label in the holder to adhere to said drum by pneumatic pressure, a label carrier adapted to receive one end of a label and convey it to the article to be labeled, and means for applying the label.

9. In a labeling machine the combination of a receptacle for sheets of paper, the bottom of the receptacle having an opening, a revoluble drum provided with perforations adapted to permit the bottom label in the holder to adhere to said drum by pneumatic pressure, and means to move said holder towards and from said drum so that the bottom sheet only will be pulled out of the holder by said drum, means to receive the labels, and means to apply the same.

10. In a labeling machine, the combination of a horizontal snaft, an article carrier mounted thereon, means for vertically suspending a cement coated label adjacent to the article to be labeled, means to press the middle portion of the label against the article, means adapted to pass above and below the article and press the label against the same, and rollers to press the ends of the label against the article.

11. In a labeling machine for flat sided tubes, the combination of means to support the tube, means for vertically suspending a cement coated label adjacent to the tube, rollers adapted to press the label against two sides of the tube simultaneously, and means to lap the ends of the label to secure the same in place.

12. In a labeling machine, the combination of a pivotally mounted label holder having an aperture at one end of its bottom, a revoluble drum provided with perforations adapted to permit the bottom of the label to adhere to the drum by pneumatic pressure, a sleeve on which said drum is mounted, said sleeve being provided with a slot through which said pneumatic action is effected, the labels being released after the holes in the drum pass the slot in the sleeve, means to receive the labels and means to apply the same.

13. In a labeling machine, the combination of a horizontal revoluble shaft, an article carrier mounted thereon, means for vertically suspending a cement coated label adjacent to the article to be labeled, a longitudinally slidable head, a spring tensioned presser carried thereby and adapted to be moved against the label to press the middle

part of the same against the article, a pair of auxiliary pressers hinged to said head and adapted to be moved so as to pass across the upper and lower sides of the articles to secure the label thereto, an arm mounted concentric with the article carrier, and a roller in the outer end of the arm adapted to be carried down across the inner face of the article to press the label against the same.

14. In a labeling machine, the combination of a frame, an article carrier mounted on one end of the same, a label holder mounted at the other end of the frame, a label carrier revolubly mounted between the two, bearings for the same, applying means mounted between the label carrier bearings and the article carrier, and means for coating the labels with cement mounted below the bearings of the label carrier.

15. In a tube labeling machine, the combination of means for supporting the label, pneumatic means for tensioning the label to hold it flat, a tube support adapted to be positioned between the label holding and tensioning means, means adapted to press the middle part of the label against the tube, and means to carry the opposite ends of the label against the tube simultaneously.

16. In a labeling machine, the combination of a label holder having its bottom partly cut away, a drum having perforations and so connected with an air pump that the bottom label in the holder will adhere to said drum because of air pressure, the revolution of the drum moving the label endwise out of the holder, a carrier adapted to engage one end of the label and convey it to the article to be labeled, and means for applying the label.

17. In a labeling machine, the combination of an article holder, means for supporting a label adjacent thereto, a pipe extending below said label supporter and provided with holes through which the label is caused to adhere to the pipe through air pressure and thus be held flat, and means to apply the label.

18. In a labeling machine, the combination of an article holder, a label holder, a label carrier so mounted and actuated that it may convey a label from the holder to the article holder, a pipe normally in the path of the label and provided with holes through which the label may be caused to adhere to the pipe through air pressure and thus be stretched flat, and means to apply the label.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses.

JERVIS R. HARBECK.

Witnesses:
H. K. WHITE, Jr.,
A. J. MAAS.