Dec. 6, 1927. 1,651,691

H. GATES

MACHINE FOR LABELING CYLINDRICAL ARTICLES

Filed March 1. 1924 4 Sheets-Sheet 1

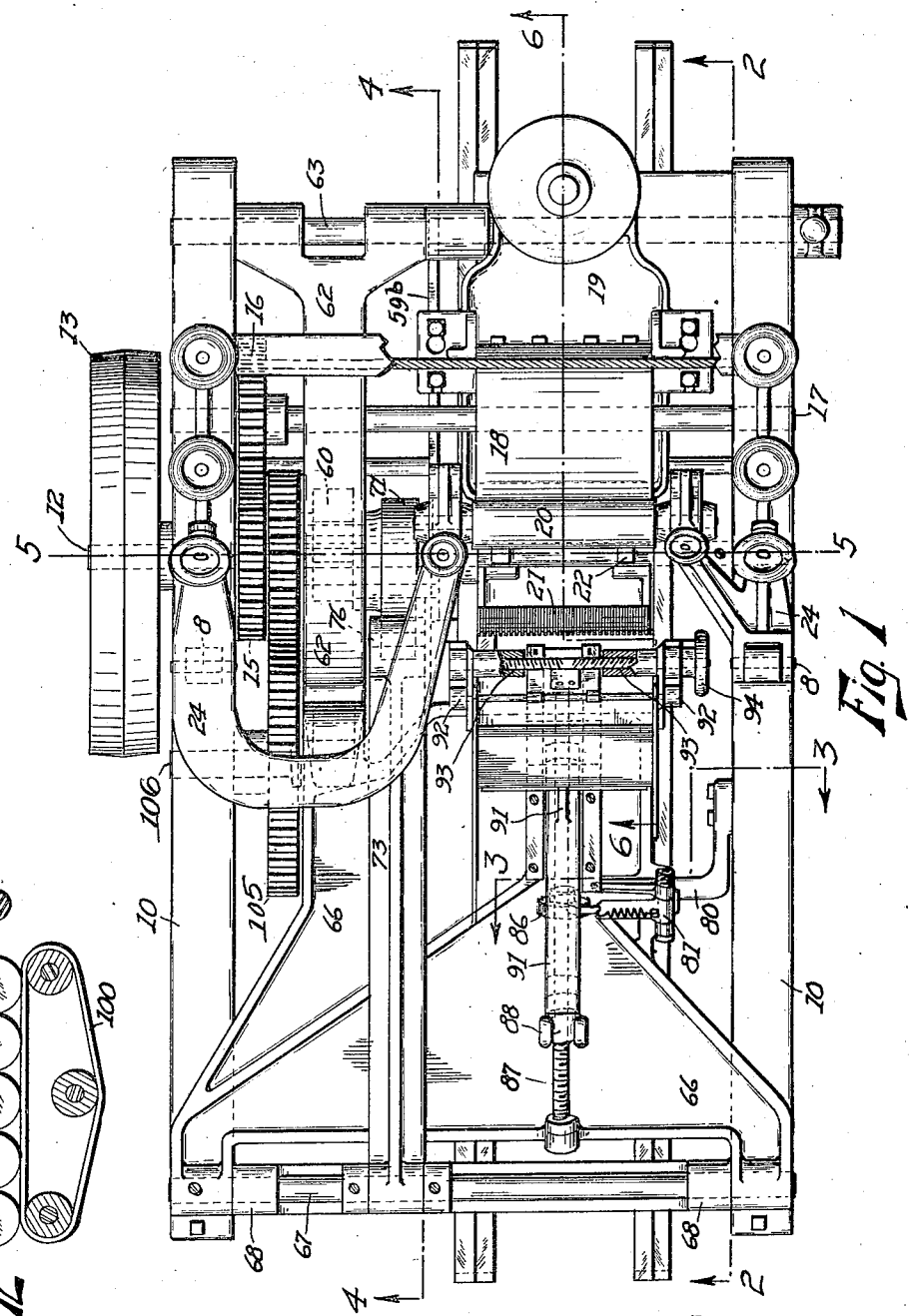

Fig. 1

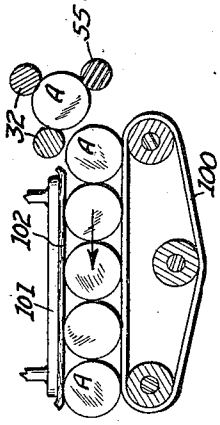

Fig. 12

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MACHINE FOR LABELING CYLINDRICAL ARTICLES

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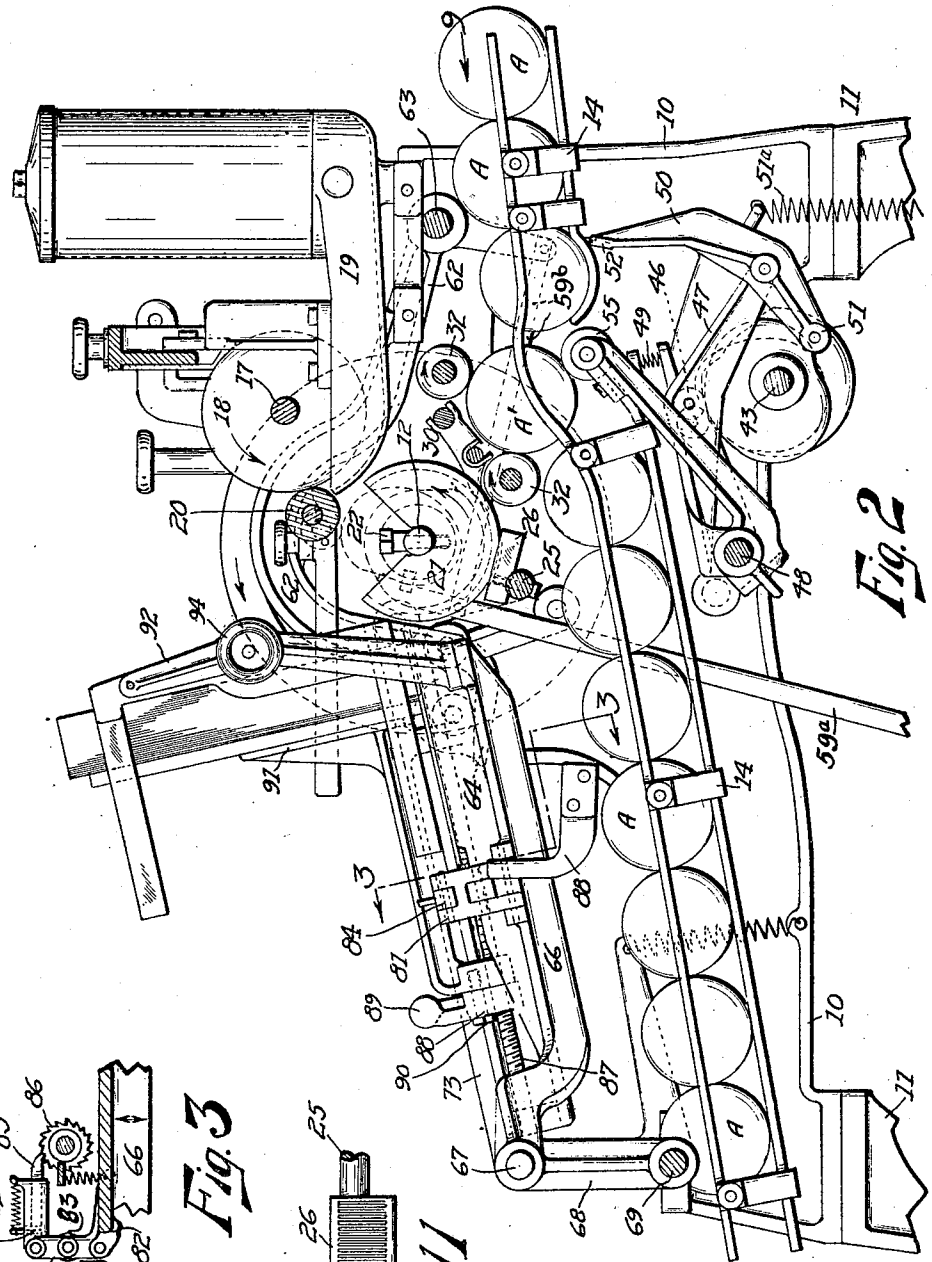

Fig. 2

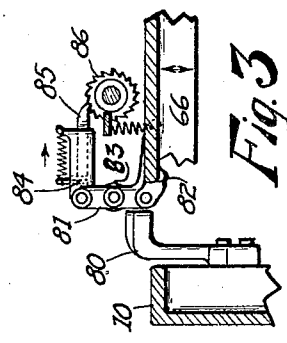

Fig. 3

Fig. 11

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MACHINE FOR LABELING CYLINDRICAL ARTICLES

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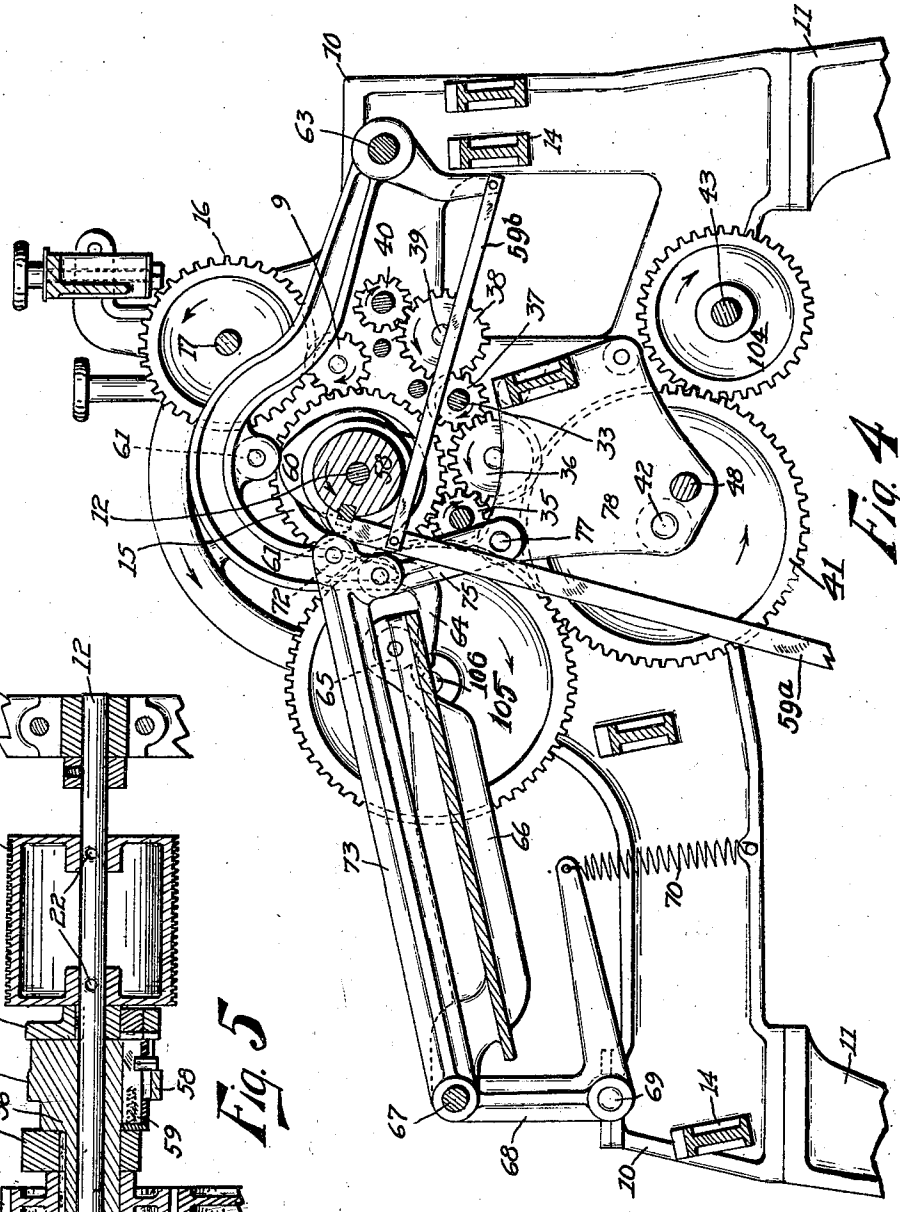

Fig. 4

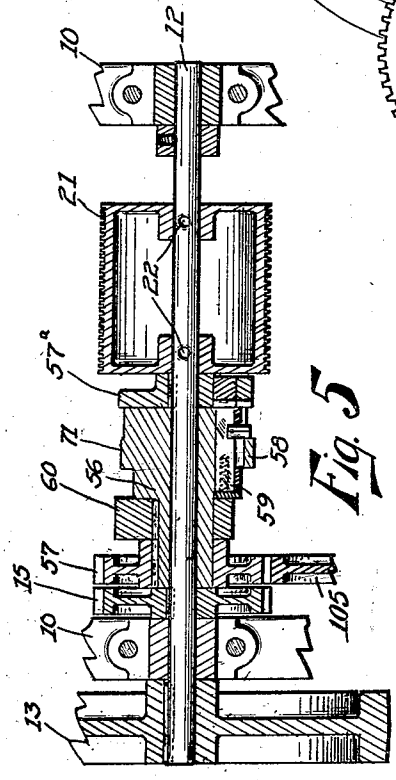

Fig. 5

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MACHINE FOR LABELING CYLINDRICAL ARTICLES

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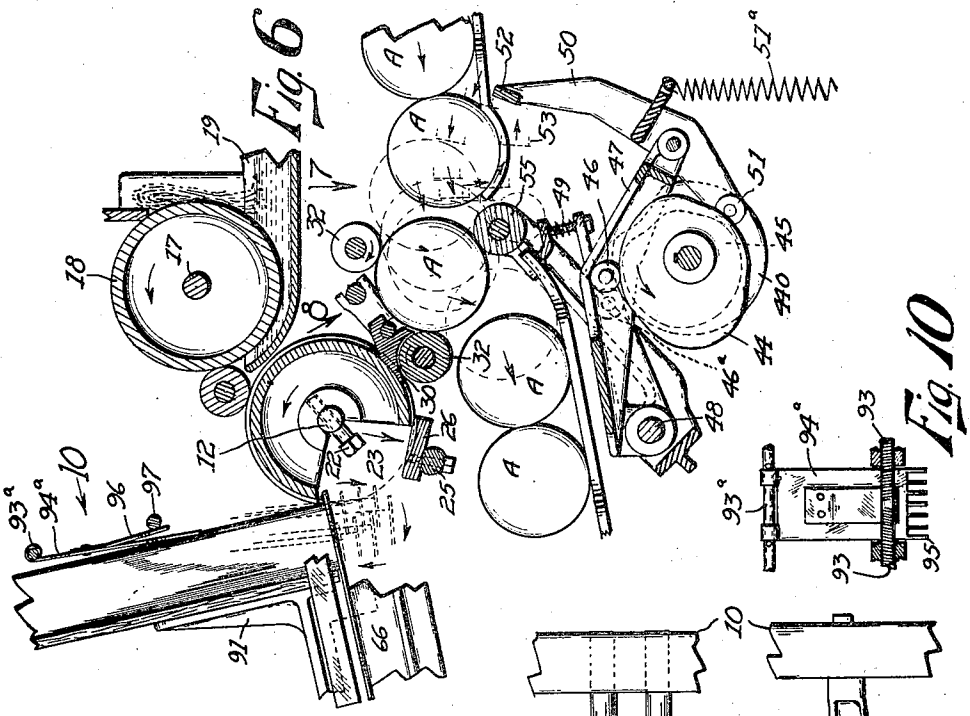

Fig. 6

Fig. 10

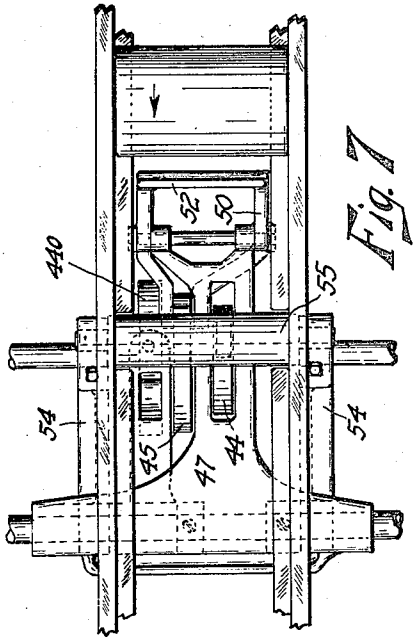

Fig. 7

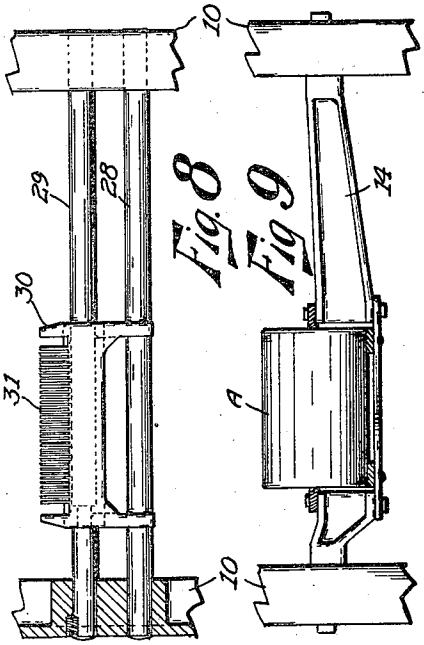

Fig. 8

Fig. 9

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UNITED STATES PATENT OFFICE.

HORATIO GATES, OF WORCESTER, MASSACHUSETTS.

MACHINE FOR LABELING CYLINDRICAL ARTICLES.

Application filed March 1, 1924. Serial No. 696,328.

This invention relates to a labeling machine of the type in which cylindrical articles to be labeled, or at least articles that can be rolled along a path, are labeled as they are advanced.

The principal objects of the invention are to provide an improved way of advancing each rolling article into a position to receive a label on its surface; to provide positively operating means for rotating the article on a stationary axis while the label is being applied and also to provide the label holder with means for giving it an irregular circular or orbital motion as the label is being taken therefrom and gummed by the gumming roll and advanced to a position to come into contact with the article to be labeled. The invention also involves improvements in the details of the mechanism for accomplishing these objects and advantages of the invention will appear below.

Reference is to be had to the accompanying drawings, in which

Fig. 1 is a plan of a machine constructed in accordance with this invention;

Fig. 2 is a side view of the operative parts of the machine but partly in section on the line 2—2 of Fig. 1 just inside the side frame;

Fig. 3 is a detail sectional view on the line 3—3 of Fig. 1;

Fig. 4 is a longitudinal sectional view of the far side of the device showing the gearing, taken on the line 4—4 of Fig. 1;

Fig. 5 is a transverse sectional view on the line 5—5 of Fig. 1 through the main shaft;

Fig. 6 is a longitudinal sectional view on the line 6—6 of Fig. 1 through the center of the labeling mechanism;

Fig. 7 is a plan of a part of the device looking in the direction of the arrow 7 in Fig. 6;

Fig. 8 is a view looking down at an angle as indicated by the arrow 8 of Fig. 6 of the mechanism for rotating the article to be labeled while the label is applied;

Fig. 9 is an elevation of the supporting means for the articles showing the track itself in transverse section;

Fig. 10 is a front elevation of a device on the label holder for keeping the labels in position, taken in the direction indicated by the arrow 10 in Fig. 6;

Fig. 11 is a plan of a contact plate used in conjuction with the cylinder or roll which receives the labels from the label holder; and

Fig. 12 is a side view of a modified form comprising means for receiving the freshly labeled cans and rolling the labels on more firmly while the can rolls along and the gum is drying.

I have shown the invention as applied to a machine comprising a frame 10 mounted on legs 11. This frame consists mainly of two side pieces constituting the extreme sides of the machine. The two side pieces are held together by bars 14 extending across each at the ends and serving as supports for some of the other parts. There is also a main shaft 12 extending across the frame and having on it a driving pulley 13 for operating the machine from a belt, or, of course, it can be driven in any other way.

On the shaft 12 there is a gear 15 which, through a gear 9, operates a gear 16 on a shaft 17 parallel with the power shaft. This shaft 17 carries a gum roll 18 operating in a gum box 19 the details of which need not be set forth herein as any convenient form of gum box can be used. The gum or adhesive is taken up by the roll 18 and delivered to a roller 20 which rotates by friction with the gum roll 18 and also with a gum carrying member in the form of a drum 21 positively fixed on the main shaft 12. The roll 20 is mounted on frames 24 pivoted to swing on aligned studs 8. It can be adjusted by screws to vary the thickness of the gum. The drum or roll 21 is provided with circumferential grooves so as to provide intermediate areas constituting a gum carrying surface to apply only a series of parallel strips of gum to the labels. It is fixed to the shaft 12 by a pair of screws 22 passing first through the shaft and then into sector shaped internal hubs at the rear, and is not continuous all the way around having a gap 23 extending the whole length of it and in which the screws are located. It is intended to rotate once for each operation and the surface shown from one end of the gap around to the other is designed so as to be sufficient to receive the entire label. That is, this convex surface is at least equal to the circumference of one of the cans or other articles A to be labeled.

Mounted in fixed position on a cross rod 25

is a contact plate 26. This plate is provided with a series of slots 27 in its surface and it is arranged in such relation to the drum 21 that the labels coming down from above will enter a wedge shaped space between the upper side of the plate 26 and the surface of the drum. The parts of the plate between the grooves are arranged alternately with the grooves in the drum and tangent thereto so that the labels will be guided into close contact with the gummed drum. Although the surfaces of these two members do not touch, they force the label into a position to receive gum throughout their length.

Also mounted on two cross rods 28 and 29 is a comb 30. This comb is provided with slots which separate the teeth 31 from each other. These teeth are spaced apart the same distance as the grooves on the drum 21 and the comb is so located as to peel the label off the drum and guide it over roll 32 directly in contact with the rotating can or other article to be labeled as it is being fed along by the drum as shown in Fig. 6. Meshing with the gear 15 is a gear 35 which drives a gear 36 which in turn drives a gear 37 on one shaft 33. This gear 37 meshes with a gear 38 on a short shaft 39 and drives a gear 40 on the other shaft 33. The gears 37 and 40 are the same size so that the two rolls 32 are driven at the same surface speed. They operate to rotate the can in the position A'. Gear 57 keyed on clutch sleeve 56 meshes with large gear 105 on stud 106. This gear 105 meshes with gear 41 of the same size on short shaft 42 which drives shaft 43 through gear 104.

On the shaft 43 are three cams 44, 440 and 45. The cam 44 operates a roll 46 on a lever 47 pivoted on a cross shaft 48 against a spring 49. On the end of this lever 47 there is pivoted another lever 50 which has a cam roll 51 engaging the surface of the cam 45 which operates it against the action of a spring 51^a. On the lever 50 there is a plate 52 which by the action of the two cams 44 and 45 is given an orbital or elliptical motion, as indicated by the series of arrows 53. Pivoted on the shaft 48 are two arms 54 which constitute a frame provided at the end with a freely rotatable roll 55. This frame has a roll 46^a resting on the cam 440 to give it a motion between the full line and the dotted line positions shown in Fig. 6. The rolls 32 and 55 are all alike of rubber and of the same size. The rolls 32 are geared to run at a slightly greater surface speed than the gumming drum 21 which is feeding the label along, and consequently have a tendency to stretch the label slightly so as to draw and press it very firmly on to the can, leaving no wrinkles, air pockets or blisters.

On shaft 12 just inside of drive gear 15 is a clutch sleeve 56 extending over to a clutch hub 57^a which is keyed to shaft 12 next to the drum 21. Rigidly attached to this clutch sleeve are a gear 57, lifter cam 60, and push cam 71, clutch body or housing 58 containing a clutch bolt 59 and spring back of it, adapted to be operated through various levers 59^a and 59^b shown in Fig. 4 but which, not being of novel construction need not be fully described. The object of this is to allow the clutch bolt 59 to enter the clutch hub 57^a so that said sleeve with gear and cams on same will be put in motion. That starts the label feeding and the can feeding mechanisms into full operation. The same can be instantly stopped by withdrawing the clutch bolt from the clutch hub by the opposite movement of the hand lever at the will of the operator.

Mounted on the main shaft 12 there is a clutch sleeve 56 on which are keyed lifter cam 60 and pusher cam 71. Cam 60 operates a roll 61 freely rotatable on a frame 62 hung on a cross pivot shaft 63. This frame 62 is bowed upwardly around the elements on the shaft 12 and extends down at the rear thereof and terminates in a toe 64 having a flat upper surface which supports a roll 65 on the cradle 66. This cradle is pivoted on a shaft 67 carried by a pair of arms 68 pivoted on cross shafts 69. One of them is held yieldingly forward by a spring 70 connected with it.

The cradle 66 constitutes a supporting frame for the label holding device and it is capable of a motion in an irregularly curved path or orbit at its front end. That end is raised and lowered by the cam 60 as explained above.

Pusher cam 71 keyed on clutch sleeve 56 engages and operates back and forth horizontally a roll 72. This roll is freely rotatable on a stud on the front end of a supporting frame 73 for the cradle 66. This frame is pivoted on the shaft 67 and at its front end on studs 76. These studs 76 are mounted on pivoted arms 75 about as long as the arms 68 and pivoted at 77 on housing 78. Thus the arms 75 and 68 swing together to give substantially a parallel motion swing forward and back to the skeleton frame 73. The cradle 66 has to partake of the to-and-fro motion of the frame 73 but its front end is raised and lowered by means of the cam 60. As the two cams that cause these two motions are on the same sleeve the motion of the end of the cradle will be uniform during each revolution and will be in an irregularly curved path.

The frame of the machine is provided with a stationary cam 80. Every time the cradle 66 oscillates a lever 81 pivoted on the side of the cradle will be oscillated on its pivot. This lever has a projecting end 82 for engaging the side of the cradle to limit its motion in one direction. It has a roll 83 which engages the cam 80 to cause the lever

to move. This lever is connected with a casing 84 in which is a spring-pressed sliding pawl 85 adapted to engage a ratchet wheel 86 and turn it through the space of one tooth if desired every time the lever oscillates This ratchet wheel is located on a screw-shaft 87 extending longitudinally with respect to the cradle. This screw, therefore, is turned through part of a rotation every time the cradle moves back and forth. It passes through a nut 88 which is formed of two parts having finger pieces 89 projecting from them adapted to be held together by a spring. The two parts of the nut are pivoted on a bolt 90 which is supported by the label follower base 91 of the label holder. Therefore, the rotation of the shaft feeds this follower and the labels along step by step toward the drum or cylinder 21.

On cradle 66 are located the side walls of the label holder 92. This label holder need not be described in full, but two side walls are adapted to be adjusted toward each other by a right and left hand screw 93 operated by hand wheel 94 on it. The screw passes through nuts connected to the sides of the frame so that the sides can be adjusted toward and from each other for labels of different widths.

Located on the front of the label holder is a cross bar 93^a from which depends a sheet metal guard plate 94^a having spaced teeth 95 at the bottom. Extending from this plate is a spring 96 adapted to engage a rod 97 and press the plate yieldingly against the labels, the object of which is to exert a gentle pressure against the front or exposed label so as to overcome any tendency for it to sag, also to prevent a second label being slightly drawn down while the front label is being drawn away from the rest of the pack by the drum, at the instant when the label holder ceases to travel downward at the same speed as the front label is being moved by the drum. The object of the slots and teeth on the lower end of this plate is to allow it to press into the grooves in the drum beyond the surface of same so as not to interfere with the proper gumming of the label.

The labels stand in an inclined position, the bottom ends resting on a plate or floor of the holder at right angles with each other with portions of said plate extending out in front of the labels. This plate is provided with one or more sharp, thin, knife points, projecting slightly upwardly, from same at a slight distance in front of the labels for the purpose of preventing a second label following the one being taken from the holder by the drum.

In the modification shown in Fig. 12 a different means is illustrated for guiding the cans or bottles away from the rolls 32. In this case an endless belt 100 is arranged to support the cans and there is a guide 101 above it with a soft or yielding surface 102 to engage the tops of the cans or the like. This is a substitute for the form shown in Fig. 2, for example, and I prefer to use it in practice as it gives the labels an additional pressure after being rolled on by the pressure rolls.

Operation.

The gum box having been supplied with gum and a pack of labels properly adjusted in the label holder and the feed chute supplied with cans to be labeled, the motor is switched on. The gumming rolls and drum are thus set in motion, and allowed to run until the operator has properly adjusted the gumming mechanism so that just the desired amount of gum is being applied to the drum. Then the clutch bolt is thrown in by a simple movement of the hand lever, and the machine is then in full operation. The label holder advances in a forward and downward movement, bringing the bottom of the foremost label in contact with the advanced ends of the circumferential ribs of the drum. Then the drum and label holder move along together for a space of two inches more or less, while the end of the first label, which is attached to the gummed surface of the drum, has been moved away from the pack past the sharp edged obstructions in the end of the label holder near the front of the pack for the purpose of preventing more than one label to move out of the holder at a time. Then the label holder starts to recede slightly from contact with the drum, leaving the front label free to be drawn out of the holder. Then the detached label is being moved along between the upper surface of the contact plate and the drum to the comb where it is removed from the drum, and guided into contact with the article to be labelled, as shown in Fig. 6. The label holder continues to move in its irregularly curved path until it brings another label in contact with the drum, and so on, until the operator throws the clutch bolt out which will immediately bring the label, and the can feeding mechanisms to a stop.

In order that the pack of labels in the holder may be always in position, so that the front label will get the same contact pressure regardless of how fast the labels are being fed out, the spring controlled pawl which operates the ratchet on the feed screw shaft can be regulated by applying a weaker or stronger spring as may be found desirable. Thus the pawl will push against the ratchet at just the desired pressure to feed the labels against the drum as hard as desired. The spring on the pawl will yield so that the labels are sure of always getting just the desired pressure against the drum. This operation of the mechanism takes place just at the time when the labels have fully con-

tacted with the drum, and finishes the operation before the label holder begins to recede from the drum on its backward movement.

As will be readily understood by the above description, the machine is fully automatic, and can be run continuously at a high rate of speed without vibration, and practically without noise.

The motion of the cradle 66 has been described in full. As it moves forward each time to bring the label holder up into the position in which it started, the roll 83 will engage the cam 80 and turn the ratchet wheel 86 thereby turning the shaft 87 and feeding the label holder forward a very slight distance. The number of teeth on this ratchet wheel 86 and the other parts are so proportioned that this feed will be substantially the same as the thickness of the label. When it is desired to draw back the frame 91 and reset the parts to take a new stack of labels the two finger pieces on the half nuts 89 will be forced apart, then the whole thing can be slipped down the screw 87 to a new position.

Although I have illustrated and described only a single form of the invention, I am aware of the fact that modifications can be made therein by any person skilled in the art without departing from the scope of the invention as expressed in the claims. Therefore, I do not wish to be limited in these respects, but what I do claim is:—

1. In a label gumming and feeding device, the combination of a gumming member, a label holder adapted to hold the labels with the exposed label in position to be engaged by the gumming member, and means for moving the label holder along with and away from the gumming member in a non-circular orbital path to detach the label from the holder and leave it adhering to the gumming member.

2. In a label feeding device, the combination with a gumming member having a movable gum carrying surface, of a label holder bodily movable in a direction toward and from the gumming member, and adapted to deposit a label thereon flatwise, and means for moving the label holder in a curved path transverse to the plane of the exposed label in the holder.

3. In a label feeding device, the combination with a gumming member having a movable gum carrying surface, of a label holder movable toward and from the gumming member, and supporting a bundle of labels on edge, said holder being movable in a direction transverse to the plane of the exposed end label against the gumming member and then in a continuous path along with the gum carrying surface.

4. In a label feeding device, the combination with a rotatable gumming drum having a gum carrying surface, of a label holder movable toward and from the gumming member and adapted to deposit a label thereon flatwise, and means for moving the label holder along with the direction of motion of the gum carrying surface of the drum in a convex path intersecting the path of the convex surface of the drum.

5. In a label feeding device, the combination of a gumming member, with a label holder adapted to hold the exposed label in position to be engaged by the gumming member, a guard plate pivoted from above, means for limiting the forward motion of the guard plate to hold the upper edges of the labels at the delivery side thereof, and yielding means for holding the guard plate against the labels when the limiting means is in operation.

6. In a label feeding device, the combination of a rotary gumming member, with a label holder adapted to hold the exposed label in position to be engaged by the gumming member, means for moving the label holder away from the gumming member to detach the label from the holder, the label holder having a guard plate pivoted from above, means for limiting the forward motion of the guard plate to hold the upper edges of the labels at the delivery side thereof, and yielding means for holding the guard plate against the labels when the limiting means is in operation.

7. In a labeling machine, the combination with a label holder movable in an orbital path, of a gumming roll located in a position to receive the front label against its surface and rotatable at a speed to move the label along with it in time with the motion of the label holder in the same direction, and means for drawing the label holder bodily back from the gumming roll.

8. In a labeling machine, the combination with a rotary gumming roll, of a frame movable back and forth toward and from the gumming roll, a cradle carried by the frame and pivoted thereto at one end, a movable member having means for supporting the other end of the cradle and moving it up and down, and a label holder mounted on the front end of the cradle with an open side adjacent to the gum roll.

9. In a labeling machine, the combination with a rotary gum roll, of a frame, means for moving the frame periodically, a cradle carried by the frame and pivoted thereto at one end, means whereby the cradle is given an orbital motion at its front end, and a label holder mounted on the front end of the cradle with its feeding side adjacent to the gum roll.

10. In a labeling machine, the combination with a rotary gumming roll, of a frame, means for moving the frame periodically forward and back with a parallel motion, a cradle carried by the frame and pivoted thereto at one end, an upwardly and down-

wardly movable member having means for supporting the other end of the cradle, whereby it is given an orbital motion at its front end, and a label holder mounted on the front end of the cradle with its feeding side adjacent to the gum roll.

11. In a labeling machine, the combination with a label holder movable in an orbital path, of a gumming roll located in a position to receive the front label against its surface, means for positively rotating it at a speed to move the label along with it in time with the motion of the label holder in the same direction, said drum having a convex surface as long circumferentially as the length of the labels but less than a complete circle.

12. In a label feeding device, the combination of a rotary gumming member, a label holder adapted to hold the exposed label in position to be engaged by the gumming member to detach the end label from the holder, said gumming member having grooves, and a fixed contact plate having grooves alternating with the grooves of the gumming member, the contact plate being in position to engage a label carried by the gumming member.

13. In a label feeding device, the combination of a gumming cylinder having grooves, a stationary contact plate having grooves alternating with the grooves of the gumming cylinder, the contact plate being in position to engage a label carried by the gumming cylinder, the upper side of the contact plate engaging the label where it is unsupported by the gumming cylinder, and stationary means for taking the labels from the gumming cylinder.

14. In a label feeding device, the combination of a gumming cylinder having grooves, a contact plate having grooves alternating with the grooves of the gumming cylinder, the contact plate being in position to engage a label carried by the gumming cylinder, and a comb fixed in position and projecting into the grooves of the gumming cylinder to positively remove the labels therefrom.

15. In a labeling machine, the combination with a pair of tracks along which articles to be labeled can roll, said tracks having means forming a part thereof for receiving one of said articles and preventing its rolling further along the track, a plate for engaging an article, and means for moving said plate in an orbital path to force the article upwardly and forwardly.

16. In a labeling machine, the combination with a pair of tracks along which articles to be labeled can roll, means for engaging one of said articles and preventing its rolling further along the track, a lever having a plate thereon for engaging an article in said depression, means for operating the end of said lever to move the plate in an orbital path to force the article upwardly from said depression and forwardly along the track, a set of three rolls located in position to receive the article between them when moved by the plate, means for positively rotating some of said rolls to rotate the article on its own axis, means for feeding a label with its gummed side against the article while it is rotating, and means for moving one of said rollers away from the article to permit it to descend back on the track and roll out of labeling position.

17. In a labeling machine, the combination with a track down which the articles to be labeled are adapted to roll, of a shaft, two cams on said shaft, a lever pivoted at one side of said shaft and having means by which one of said cams swings it on its pivot, a second lever pivoted on the end of the first lever and having means by which the other of said cams swings it on its own pivot while it is swinging on the first named lever, and a plate on the second lever movable in an orbital path for engaging an article on the track and moving it upwardly therefrom and forwardly into a position to be labeled.

18. In a labeling machine, the combination with a track down which the articles to be labeled are adapted to roll, of a shaft, three cams on said shaft, a lever pivoted at one side of said shaft and having means by which one of said cams swings it on its pivot, a second lever pivoted on the end of the first lever and having means by which another of said cams swings it on its own pivot while it is swinging on the first named lever, a plate on the second lever movable in an orbital path for engaging an article on the track and moving it upwardly therefrom and forwardly into a position to be labeled, a second lever pivoted on the same axis as the first lever and operated by the third cam on the shaft, and a roll on said lever adapted to be moved through the track and engage an article moved over by the plate and elevate it into labeling position.

19. In a labeling machine, the combination with a pair of inclined tracks down which articles to be labeled can roll, said tracks having a depression for receiving one of said articles and preventing its rolling further down the rack, a lever having a plate thereon for engaging an article in said depression, means for operating said lever in such a way as to move the plate in an orbital path to force the article upwardly from said depression and forwardly above the track, a set of rolls located in position to receive the article between them when moved by the plate, and means for rotating some of said rolls to propel the article around and cause it to rotate on its own axis.

20. In a labeling machine, the combination with tracks down which articles to be

labeled are rolled, said tracks having an interruption, a roller located at the interrupted part of the tracks, means for moving the roller to elevate an article on the tracks located over the roller, a pair of propelling rolls in position to be engaged by the article when moved upwardly by the first named roll, means for rotating said rolls to rotate the article when held between the three rolls, and means for feeding a label with its pasted side against the article under one of said propelling rolls while the article is being propelled.

21. In a labeling machine, the combination with a chute down which articles to be labeled are rolled, said chute having an interruption, a roller located in the interrupted part of the chute, means for moving the roller through the chute to elevate an article therein located over the roller, a pair of propelling rolls in position to be engaged by the article when moved upwardly by the first named roll, and means for positively rotating said propelling rolls to rotate the article when held between the three rolls.

22. In a labeling machine, the combination with a pair of tracks along which articles to be labeled can roll, means for engaging one of said articles and moving it upwardly and forwardly along the track, a set of three rolls located in position to receive the article between them, means for positively rotating some of said rolls to rotate the article on its own axis, means for feeding a label with its gummed side against the article while it is rotating, and means for moving one of said rollers away from the article to permit it to descend back on the track and roll out of labeling position.

In testimony whereof I have hereunto affixed my signature.

HORATIO GATES.