

Aug. 30, 1932.

L. MYERS

1,875,110

MACHINE FOR APPLYING COLLARS TO BOTTLES

Filed Jan. 28, 1931

4 Sheets-Sheet 1

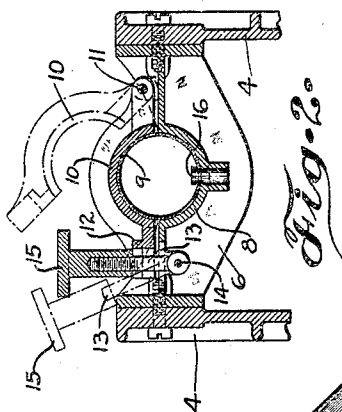


Fig. 2.

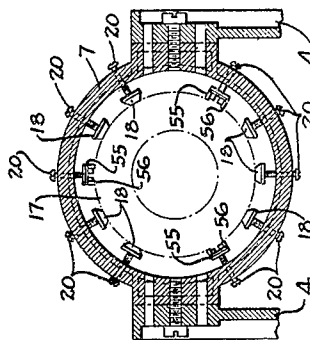


Fig. 3.

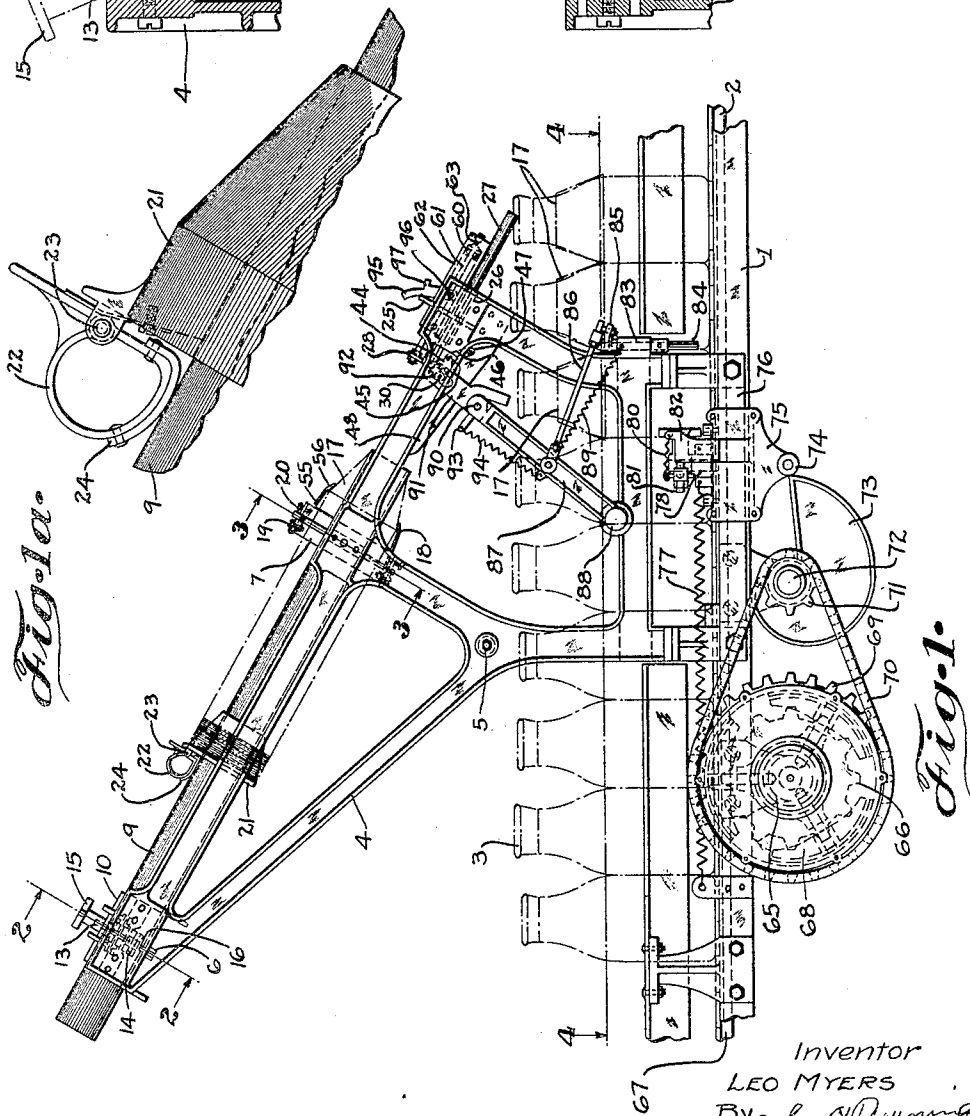


Fig. 1.

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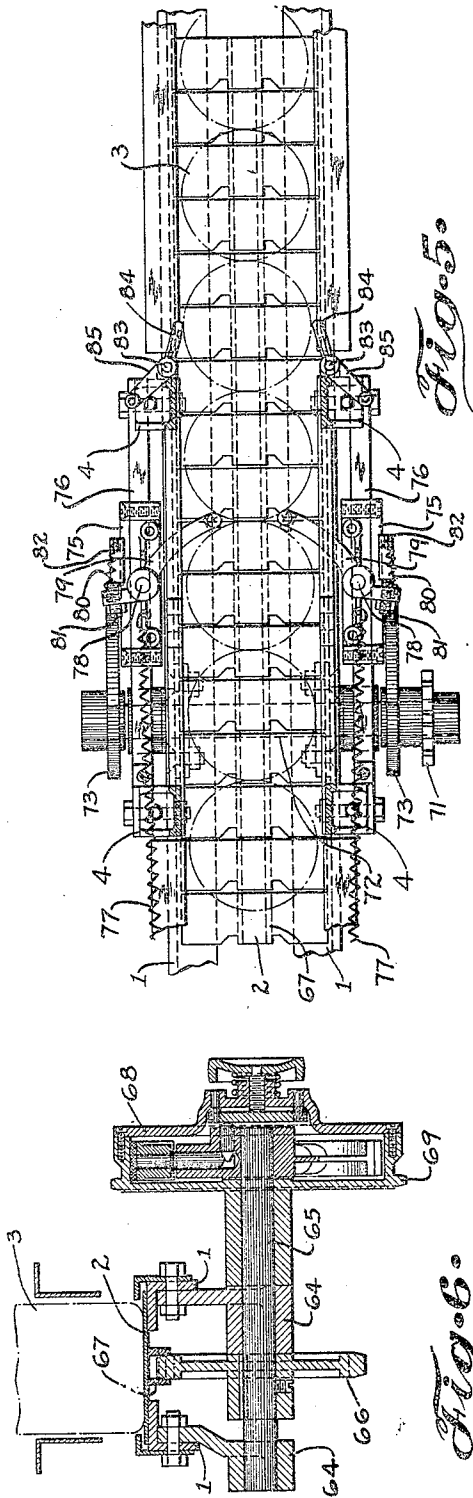
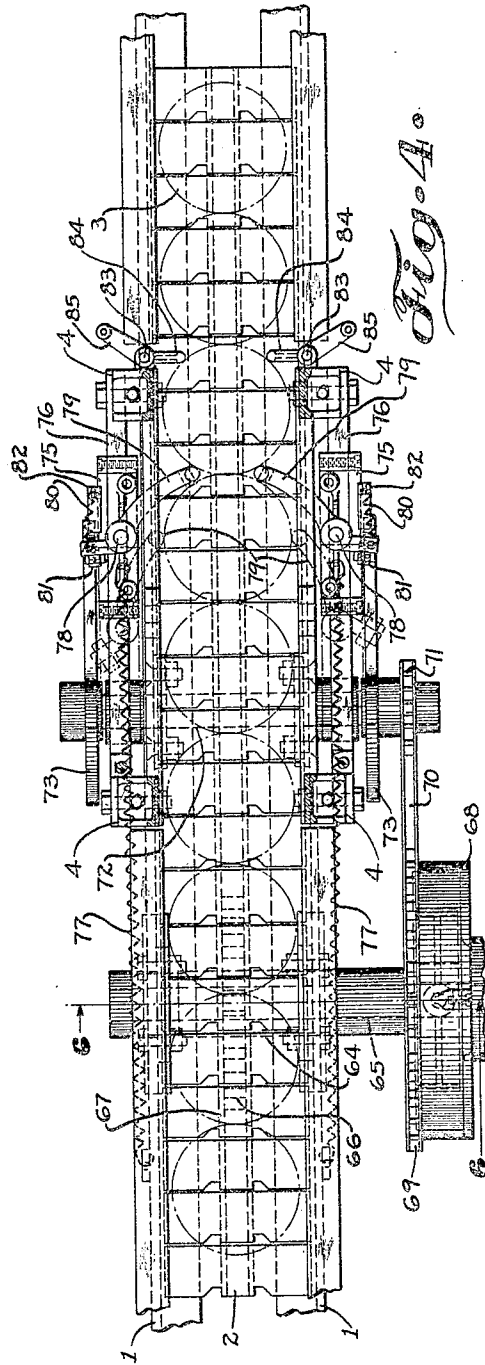
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4 Sheets-Sheet 2



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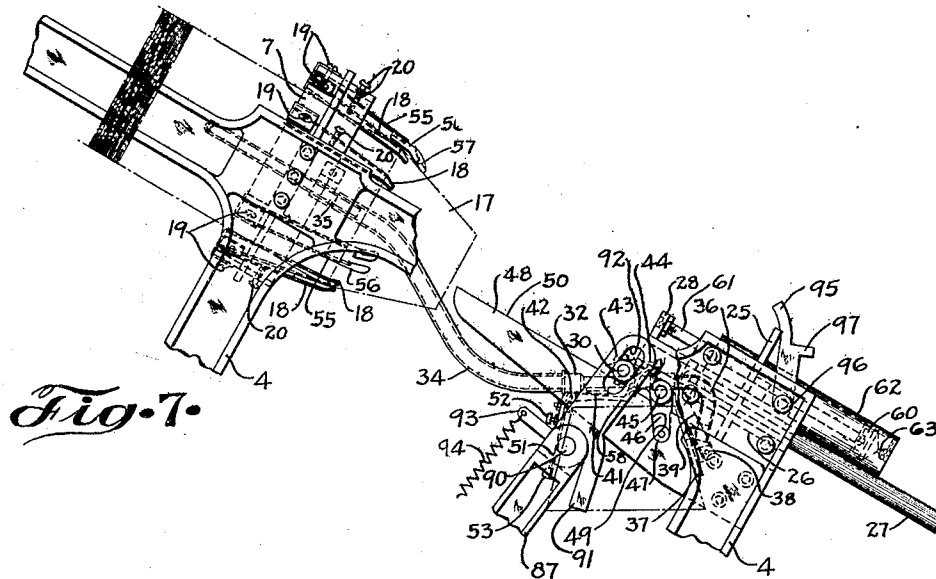
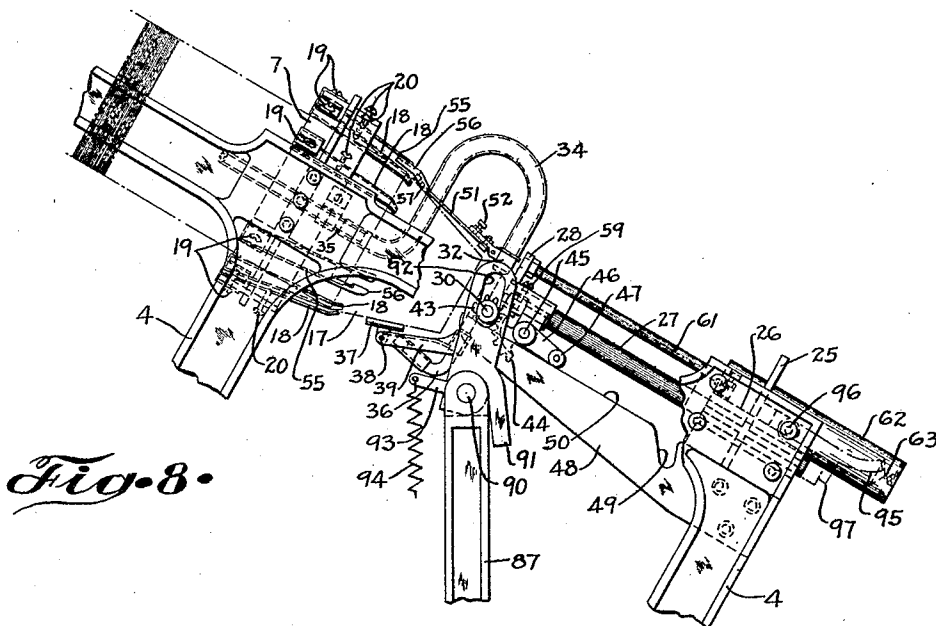
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MACHINE FOR APPLYING COLLARS TO BOTTLES

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4 Sheets-Sheet 3



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4 Sheets-Sheet 4

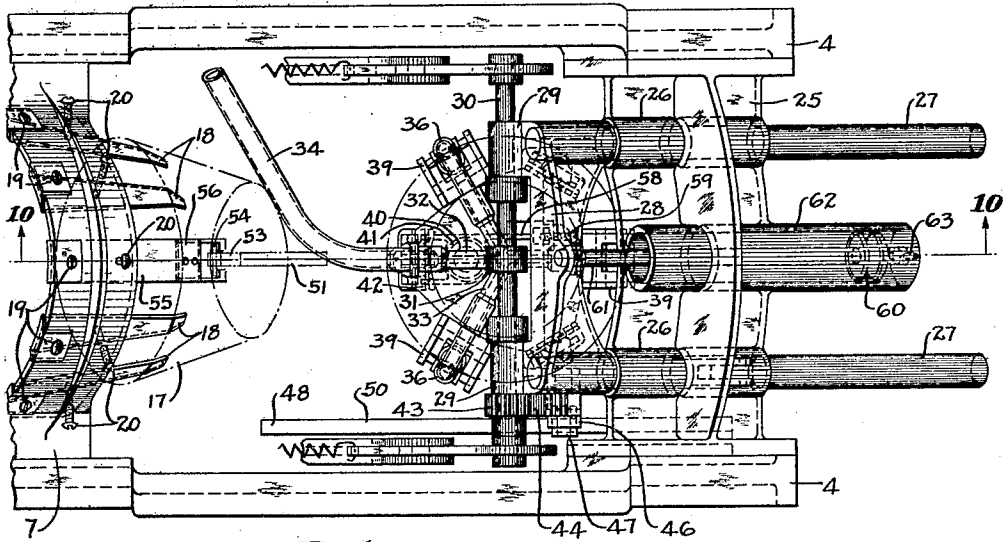


Fig. 9.

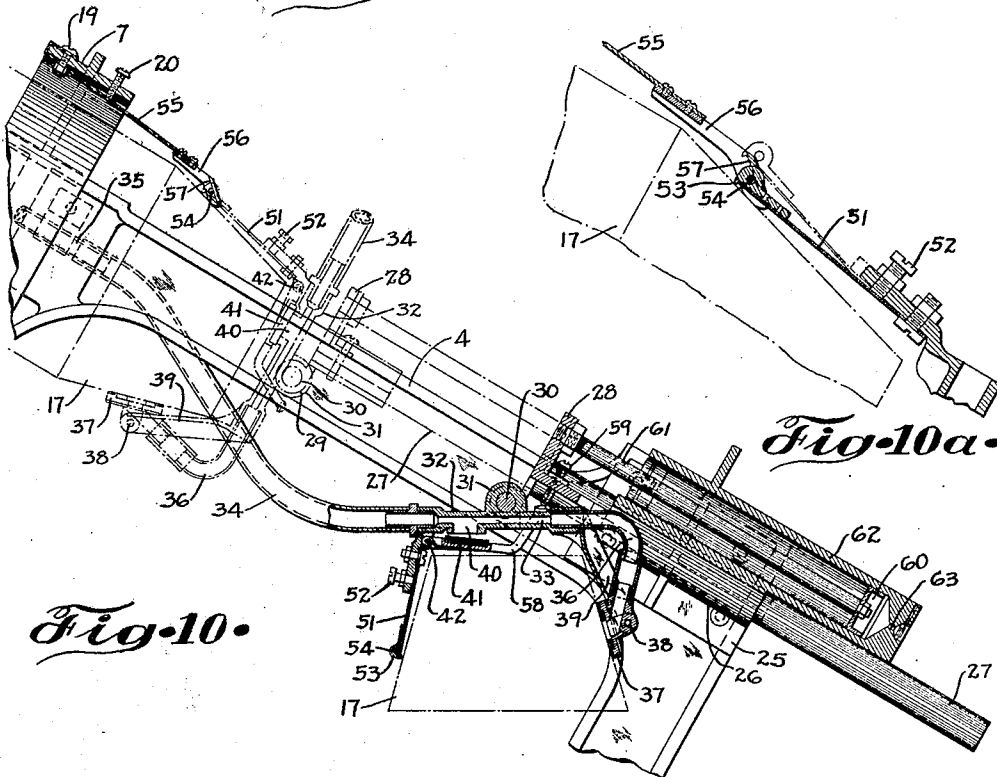


Fig. 10.

Fig. 10a.

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MACHINE FOR APPLYING COLLARS TO BOTTLES

Application filed January 28, 1931. Serial No. 511,801.

This invention pertains to machines for handling articles and more particularly to a machine for applying to bottles such as milk bottles, an article such as a paper collar, which collars are often used to carry advertising matter to the milk customers along with the bottle of milk.

It has been found that this type of paper collar which is usually conical in form and is placed over the bottle neck so as to rest on the shoulder of a bottle, is a convenient and an effective advertising medium. It lends itself well to the display of advertising matter, attracts the attention of the customer when he receives his bottle of milk each day and is distributed with the milk bottles at substantially no additional cost. It is desirable, therefore, particularly in installations which turn out a large number of such bottles each day to provide automatic means for placing these collars on the bottles. Such means are required not only to save the cost of manual handling, but to avoid delay of the product since these bottles pass thru the plant at a rapid rate in order to maintain a large output.

One of the objects of this invention, therefore, is to provide a device which will automatically apply such articles to a product element such as a milk bottle.

Another object is to provide such a device which may be mounted in the path of the bottles as they pass thru the plant and which will carry out its function during such passage and without delaying the product.

Another object is to provide a device of this character in which a stack of the articles may be placed and which will successfully transfer an article to each bottle as it passes on its way.

Another object is to provide such a device together with means for positively feeding the bottles and which is actuated by the bottle as it is fed along.

Another object is to provide such a device capable of handling such frail and flexible articles as paper cones in a positive and reliable manner so that the articles are transferred, one at a time.

Another object is to provide such a device

which while capable of positively feeding the bottles in succession is so arranged as to slip in case the progress of the bottles is arrested for any reason.

Another object is to provide a device of this character which is positive in its action, cheap to manufacture and durable in service.

Other objects will appear from the following description taken in connection with the accompanying drawings; in which:

Figure 1 is a side view of a machine embodying this invention;

Figure 1a is an enlarged detail of Fig. 1;

Figure 2 is an enlarged section on line 2—2 of Fig. 1;

Figure 3 is an enlarged section on line 3—3 of Fig. 1;

Figure 4 is a section on line 4—4 of Fig. 1; showing the feeding mechanism in position to feed a bottle.

Figure 5 is a similar view showing the action of a bottle being fed in actuating the transferring mechanism.

Figure 6 is a detail section on line 6—6 of Fig. 4;

Figure 7 is an enlarged detail of Fig. 1 with parts broken away illustrating the transferring mechanism and showing the parts in position for depositing a collar on a bottle.

Figure 8 is a similar view showing the parts in position to take an article from the stack;

Figure 9 is a plan view somewhat enlarged of the mechanism of Figures 7 and 8 showing more clearly the construction and method of the article holder;

Figure 10 is a section on line 10—10 of Fig. 9;

Figure 10a is an enlarged detail of Fig. 10 showing more clearly the action of the holder claws.

The accompanying drawings illustrate a machine representing an embodiment of this invention adapted to be applied to a milk bottle conveyor on a bottle filling machine, such as is ordinarily used in dairy plants. In the drawings 1 designates the side rail of such a conveyor, the conveyor belt being shown at 2. A row of bottles is indicated in broken lines at 3, these bottles being carried by the con-

veyor 2 in a direction toward the right of Fig. 1.

Secured in any suitable manner to each of the rails 1 is an upstanding frame 4, such frame having complementary side members on each side of the conveyor, said side members are held in spaced relation over the conveyor by one or more cross rods 5, a cross frame 6 at the upper end and a transverse ring frame 7 near its middle portion.

The upper cross frame 6 is provided with a semi-circular socket 8 adapted to receive a tubular support 9. A clamping member 10 is hinged at 11 on the cross member 6 and has a forked end 12 adapted to receive a clamping screw 13. The screw 13 is pivoted at 14 on the member 6 so that it may be swung into or out of the forked end 12 of the clamping member. A thumb nut 15 is arranged on the screw 13 so that it may be screwed down upon the forked end of the clamp 10 so as to clamp the tubular support 9 rigidly in the cross member 6. In order to accurately locate the support 9 longitudinally, the same may be perforated to receive a dowel 16 mounted in the bottom of the socket 8. The tube 9 may be provided with a series of such perforations so that it may be fixed in different adjusted positions longitudinally.

The tubular support 9 is adapted to receive and support a stack of articles 17. The stack is formed by nesting the conical collars one within the other and the assembled stack is then slipped on the tube 9 as indicated in Figure 1. The tube 9 is set at such an inclination to the vertical that the stack of articles will tend to slide down the tube by gravity.

Mounted in the ring 7 is a series of restraining fingers 18. These fingers are spaced at intervals around the circumference of the ring 7. They are preferably formed of spring material so as to be resilient. Each may be secured to the ring 7 by a screw 19 and an adjusting screw 20 may be provided for adjusting the tension of each finger. These fingers extend downwardly along the axis of the ring 7 thru which the tube 9 also passes. The stack of articles 17 sliding down said tube is arrested by engagement with the fingers 18. The fingers are so placed as to substantially encircle the stack of articles. The tip of each finger is bent inwardly to a slight extent so that only its tip engages the terminal article 17 of the stack. When such engagement is effected the movement of the stack is arrested and further movement of the articles is restrained by these fingers.

In order to insure positive feeding of the stack of articles a weighted feeding element 21 is mounted on the tube 9. This element may have a conical exterior surface fitting the collars in the stack and is provided with a cylindrical bore having a sliding fit upon the tube 9. This feeding element slides down

the tube against the rear end of the stack and continually bears by gravity on the stack so as to urge it downwardly along the tube. In order to resist back pressure of the mechanism on the stack when taking off an article the element 21 is provided with a dog 22 pivoted at 23 on the element 21 and provided with a friction shoe 24 engaging the tube 9. The arrangement is such that the dog 22 may turn freely about the pivot 23 so as not to retard the downward movement of the element 21. Upon reverse movement, however, the dog 22 is wedged against the tube 9 so as to press the shoe 24 against the tube thereby providing a friction stop adapted to resist rearward movement of the stack.

Mounted between the side frames 4 at the right hand end thereof, Fig. 1, is a cross frame 25 shown more clearly in Figs. 9 and 10. Mounted in the frame 25 is a pair of guides 26 adapted to support and guide a pair of rods 27. The rods 27 are joined at their upper ends by a carrier 28 equipped with bearings 29 in which is journaled a cross shaft 30. The shaft 30 has fixed thereto by a lug 31 a suction head 32. The head 32 has formed therein four radially divergent air passages 33 which are all connected together at the center of the head. One of these passages has connected thereto a flexible suction tube 34 whose other end is connected to a suction pipe 35 mounted on one of the side frames 4. The pipe 35 is connected in any suitable manner, not shown, to a suitable source of vacuum, such as a vacuum tank, suction pump, or the like. Each of the other passages 33 is connected by a flexible connection 36, such as a rubber tube, to a suction gripper 37 pivoted at 38 to an arm 39 on the head 32. The gripper 37 is thus flexibly mounted on the head 32. One of the passages 33 has an inlet opening 40 which may be closed by a valve 41 pivoted at 42 on such head.

The shaft 30 has fixed thereto near one end a pinion 43 in engagement with a gear sector 44, (see Figs. 7 and 8), pivoted on a stud 45 mounted in the head 32, said sector being rigidly connected to an arm 46 equipped at its other end with a cam roller 47. Mounted on one of the side frames 4 is a cam bracket 48 having a cam slot 49 adapted to receive the roller 47 when the head 32 is in its normal position as shown in Figs. 7 and 10. The cam 48 also has a straight face 50 along which the roller 47 moves after it has passed out of the slot 49 upon movement of the holder as will be described later.

The head 32 together with the arms 39 and the suction grippers 37 at the ends thereof, form a holder adapted to receive and hold one of the paper collars 17.

It will be seen by reference to Figs. 7 to 10 inclusive, that when the carrier 28 is

moved upwardly, being carried by the rods 27 sliding in the guides 26, the cam roller 47 will be moved upwardly out of the slot 49 and will roll forward on the straight face 50 of the cam. As the roller moves upwardly in the slot 49 the sector 44 will move downwardly and will thereby cause the pinion 43 to be rotated in a clockwise direction as seen in Fig. 8. This rotates the shaft 30 which carries with it the head 32. Thus the article holder is moved from its normal or delivery position as shown in Figs. 7 to 10 inclusive, to its taking position as shown in Fig. 8. The holder accomplishes its complete movement during the rise of the roller 47 out of the slot 49. Thereafter the roller moves along the straight face 50 and keeps the holder in its taking position as it moves up to the stack of collars. As it engages the terminal collar of the stack the flexible grippers 37 of which there are 3 in the machine illustrated, adjust themselves to the surface of the cone and are yieldingly pressed thereagainst as will be more fully described later. During the forward movement of the holder the valve 41 is closed so that the suction is active at the grippers 37. Consequently when these grippers engage the terminal collar 17 the collar will be firmly drawn into engagement with said grippers by the suction active therein.

In order to assist in detaching the terminal collar from the stack the holder is further provided with a series of spring arms 51 mounted at 52 on the head 32 and yieldingly pressed into engagement with the collar. The tip of each arm is provided with a sharpened claw 53 which may be pressed into engagement with the collar 17. The end of each of these arms 51 is provided with a laterally extending pin 54 which protrudes at both sides of the claw 53. Mounted in suitable positions on the ring 7 are springs 55 each equipped at its end with a pair of fingers 56 spaced apart a sufficient distance to permit the pin 54 to drop between them. Each finger 56 carries a shoe 57 which extends inwardly from the finger 56 a sufficient distance to engage the end of the pin 54 while permitting the arm 51 to pass between these shoes. As the holder moves up to the end of the stack of collars the pins 54 engage the outside surfaces of the shoes 57, ride over these shoes and thereafter drop between the fingers 56 so that the claws 53 come into engagement with the collar. As the holder is now withdrawn (by mechanism which will be described later) the pins 54 engage the underside of the shoes 57 and are firmly pressed into engagement with the collar 17 by the resiliency of the arms 55. This causes the claws to bite into the paper collar so that as the holder is retracted the terminal collar is separated from the stack and retained in the holder by the

suction at the grippers 37. As the terminal collar is withdrawn from the stack the resilient fingers 18 snap over its rear edge into engagement to the succeeding collar in the stack so as to retain or restrain said collar from following the one just removed. As the fingers 18 leave the rear edge of the terminal collar that collar is released from pressure while the succeeding collar is compressed by these fingers. This has the effect of permitting a gap to form between the rear edges of these two collars so as to relieve any tendency to form a vacuum between these collars and thereby cause them to adhere to each other.

As the carrier now moves downwardly or to the right, (Figs. 7 to 10 inclusive), the cam roller 47 reverses its former movement. As it drops back into the slot 49, the arm 46 and thereby the sector 44 are moved in the reversed direction so as to turn the holder down again to its normal or delivery position. As this movement is completed an arm 58 on the valve 41, (see Fig. 10), engages an adjustable stop screw 59. This causes the valve 41 to open thereby admitting air to the inlet 40 relieving the suction at the grippers 37. This releases the hold of the holder on the collar 17 and permits it to drop over the neck of a bottle which has previously been pushed therebeneath. The return movement of the carrier 28 is cushioned by the action of a piston 60 on the end of a rod 61 fixed to the carrier. This piston slides in a dash pot 62 provided with an adjustable opening 63 for the escape of air.

In order that the collars shall be deposited accurately upon the bottles the operation of the above described mechanism must be timed in accordance with the movement of the bottles. The mechanism for accomplishing this purpose will now be described. Journaled in a bracket or brackets 64 suspended from the rails 1 of the bottle conveyor is a shaft 65. Fixed to the shaft 65 is a sprocket 66 engaging teeth 67 on the underside of the conveyor belt 2. The movement of the belt 2, therefore, turns the sprocket 66 to rotate the shaft 65. Mounted on the end of the shaft 65 is a slip clutch 68 of any suitable design. This clutch is so designed as to exert a certain maximum driving effect. When the load on the clutch becomes greater than this maximum the clutch slips. The clutch 68 carries a sprocket 69 connected by a chain 70 to drive a sprocket 71 on a shaft 72 mounted in suitable journals on the rails 1. (See Figs. 1, 4 and 5.) The shaft 72 carries a cam 73 cooperating with a cam roller 74 on a slide 75 arranged to slide forward and backwards on rails 76 mounted on the lower portion of the frame 4. A spring 77 exerts a yielding tension on the slide 75 so as to keep the same in engagement with the cam 73. This mechanism is duplicated on the other side of the

machine as will be seen from Figs. 4 and 5. As the cam 73 rotates in the direction indicated by the arrow in Fig. 1 the slide 75 is gradually moved to the right, Fig. 1, until just after the position shown in Fig. 1 when the roller 74 is released by the cam and the slide 75 executes a quick return movement.

Each slide 75 has pivoted thereto at 78, (see Fig. 4), an arm 79. This arm is tensioned by a spring 80 tending to move it in a counter-clockwise direction, as seen in Figure 4. Its movement is limited by the engagement of a stop screw 81 thereon with a stop 82. The arm 79 is, therefore, normally held in a position to engage a bottle on the conveyor 2.

The conveyor 2 normally moves to the right, (Figs. 4 and 5). As the cam 73 moves the slide 75 to the right, (Figs. 1 and 4), the arms 79 on both sides of the machine engage the rear of a bottle and move it along in its normal direction of movement. The dimensions of the cam 73 are such that each stroke of the slide 75 will move a bottle forward a distance equal to the diameter of the bottle. At the completion of this forward feeding movement the slides 75 snap back under the action of the springs 77. During this return movement the arms 79 yield when they engage the succeeding bottle so as to pass around the same and they then snap back to their normal position behind the succeeding bottle under the action of the springs 80. Fig. 4 shows in dotted lines the positions of a pair of arms 79 passing around a bottle in this manner.

It will be seen therefore, that this mechanism provide means for positively feeding the bottles thru the machine so as not to depend simply upon movement of the conveyor 2 to carry the bottles along.

Pivoted on a vertical stud 83 on each of the frame members 4 is an arm 84 which extends inwardly to a position to be engaged by a bottle as it passes thru the machine. The same stud 83 carries an arm 85 which is connected by a link 86 with an arm 87 pivoted at 88 on the frame 4 and extending upwardly therefrom. A spring 89 connects the link 86 with a point on the forward edge of the frame 4 as shown in Fig. 1 so as to urge the arm 87 to the right thereby swinging the arm 84 into the path of a bottle. Pivoted at 90 to the upper end of the arm 87 is a short section 91 having a slot 92 engaging the shaft 30. The section 91 has an outstanding arm 93 tensioned by a spring 94 so as to hold the section 91 against a stop so positioned as to yieldingly maintain said section in prolongation of the arm 87.

As a bottle is fed forwardly along the conveyor by the arms 79, the bottle just ahead of it is forced past the arms 84. As the bottle passes the arms 84 it swings these arms outwardly until they pass over the largest diam-

eter of the bottle after which they snap back to their original position. During this movement the arms 85 swing the links 86 and thereby the arms 87 to the left, (Fig. 1). This movement of the arm 87 forces the carrier 28 to the left, (Fig. 1), thereby carrying the article holder up to the stack to take a collar therefrom, after which the arms 87 snap back again to return the carrier and deposit the collar on the bottle as previously described. The provision of the spring 94 permits flexing of the section 91 relative to the arm 87 so that the holder is pressed yieldingly against the stack of collars, this pressure being restrained by the stop 22 as previously described.

A latch 95 pivoted at 96 on the frame 4 has a dog 97 arranged so that the carrier may be moved up to its taking position after which the latch is turned on its pivot to engage the dog 97 behind the end of the rod 27 in order to hold the carrier in this position. This throws the machine out of action so that bottles may be passed thru without having the collars deposited thereon.

It will be seen therefore, that this invention accomplishes its objects. A machine is provided which may be applied to any machine for handling product elements, such as bottles or the like. The mechanism is arranged to be actuated by the movement of the conveyor which carries the bottles. A positive feed of the bottles is provided so that in case the bottles arrive irregularly having gaps between the movement of the bottles passing the collar handling mechanism will be positive and the action of the mechanism will be timed in accordance with such movement. Furthermore, the collar handling mechanism is actuated by a bottle which is being fed. Accordingly, when a gap occurs in the line of bottles the mechanism is not actuated so that there is no tendency to feed a collar even when there is no bottle to receive it.

The collar holding devices are operated by suction so that a firm hold is maintained on the collar which may be instantly released at the proper time to drop the collars. The collar feeding mechanism is such that only one collar is fed at a time, the others being positively but yieldingly restrained. A positive feeding of the collars by gravity is maintained by the weight of element 21 so that the feed continues in a normal manner even when only a few collars remain in the stack which would normally be too light to feed positively by their own weight. The feeding mechanism is so arranged that a new stack is easily and quickly inserted in the machine. The mechanical movements are all simple and the arrangement of parts is such that the entire machine is simple to manufacture.

While the machine has been described as a unitary device it will be understood that

certain individual features or sub-combinations thereof, may be useful of themselves without reference to other features or the rest of the combination. It is understood
 5 that the employment of such individual features and sub-combinations is contemplated by this invention and is within the scope of the appended claims.

It is further obvious that various changes
 10 may be made, within the scope of the appended claims, in the details of construction without departing from the spirit of this invention; it is to be understood, therefore, that this invention is not limited to the specific details shown and/or described.

Having thus described the invention, what is claimed is:

1. In a machine of the character described, means for supporting and feeding a stack
 20 of collars, a holder engageable with a peripheral portion of the terminal collar of the stack, and suction means for securing the collar to said holder.

2. In a machine of the character described, means for supporting and feeding a stack
 25 of collars, a holder engageable with a peripheral portion of the terminal collar of the stack, suction means for securing the article to said holder and means actuated by movement of said holder adapted to drop the collar.

3. In a machine of the character described, means for supporting and feeding a stack of
 30 articles in nested relation, a holder engageable with the terminal article of the stack, suction means for securing the article to said holder, and means for releasing the terminal article from the stack.

4. In a machine of the character described, means for supporting and feeding a stack of
 40 articles in nested relation, a holder engageable with the terminal article of the stack, suction means for securing the article to said holder, a claw on said holder, and means for operating said claw to grip the terminal
 45 article to remove it from the stack.

5. In a machine of the character described, means for supporting and feeding a stack
 50 of articles in nested relation, a holder engageable with the terminal article of the stack, suction means for securing the article to said holder, a claw on said holder, means for operating said claw to grip the terminal article to remove it from the stack, and means
 for releasing said securing means.

6. In a machine of the character described, means for supporting and feeding
 55 a stack of articles, a holder having a flexible gripper engageable with the terminal article of the stack, and suction means for securing the article to said gripper.

7. In a machine of the character described, means for supporting and feeding a stack of
 60 articles in nested relation, a holder engageable with the terminal article of the stack, suction means for securing the article to

said holder, means for releasing the terminal article from the stack, and means for moving
 said holder to carry the article away from the stack.

8. In a machine of the character described, means for supporting and feeding a stack of
 70 articles in nested relation, a holder engageable with the terminal article of the stack, suction means for securing the article to said holder, means acting during a predetermined movement of said holder to release
 75 the terminal article from the stack, and means for moving said holder to carry the article away from the stack.

9. In an apparatus of the character described, means for holding a stack of collars,
 80 means for feeding a product element, and means actuated in timed relation with said feeding means adapted to take a collar from the stack and drop the same on the product
 85 element.

10. In an apparatus of the character described, means for holding a stack of articles,
 means for feeding a product element, and means mounted above and actuated in timed
 90 relation with said feeding means adapted to take an article from the stack and drop the same upon the product element.

11. In an apparatus of the character described, means for holding a stack of conical
 95 articles, means for feeding a bottle, and means actuated in timed relation with said feeding means adapted to take an article from the stack and deposit the same upon the neck of the
 100 bottle.

12. In an apparatus of the character described, means for holding a stack of collars,
 means for feeding a bottle, and means actuated by movement of an element being fed
 105 adapted to take a collar from the stack and drop the same on the neck of the bottle.

13. In an apparatus of the character described, means for holding a stack of conical
 110 articles, means for feeding a bottle, and means actuated by the moving bottle adapted to take an article from the stack and deposit the same upon the neck of the bottle.

14. In an apparatus of the character described, means for holding a stack of conical
 115 articles, means for feeding a bottle, means actuated by the moving bottle adapted to take an article from the stack and deposit the same upon the neck of the bottle, and a slip-clutch drive for said feeding means.

15. In a device for applying collars to bottles, a carrier, means for supporting and guid-
 120 ing said carrier for reciprocating movement between taking and depositing stations, a collar holder on said carrier, means for feeding a bottle, and means actuated by the bottle being
 125 fed adapted to position said carrier over a bottle.

16. In a device for applying collars to bottles, a carrier, means for supporting and guid-
 130 ing said carrier for reciprocating movement

between taking and depositing stations, a collar holder on said carrier, means for feeding a bottle, means actuated by the bottle being fed adapted to move said carrier, and means for cushioning the return of said carrier.

17. In a device for applying collars to bottles, a carrier, means for supporting and guiding said carrier for reciprocating movement between taking and depositing stations, a collar holder movable on said carrier, means for feeding a bottle, means actuated by the bottle being fed adapted to move said carrier, and means actuated upon movement of said carrier adapted to move said holder to taking position thereon.

18. In a device for applying collars to bottles, a carrier, means for supporting and guiding said carrier for reciprocating movement between taking and depositing stations, a collar holder movable on said carrier, means for feeding a bottle, means actuated by the bottle being fed adapted to move said carrier, an arm on said carrier connected with said holder, and a cam positioned for engagement with said arm and adapted upon movement of said carrier to cause said arm to move said holder to taking position on said carrier.

19. In a device for applying collars to bottles, a rack for holding a stack of collars adapted for movement of the collars therealong, and gravity means for feeding the tack along said rack adapted to resist back pressure on the stack.

20. In a device for applying collars to bottles, a rack including an interior guide adapted to receive a stack of collars, means for supporting said guide at one end thereof, and means engaging the stack exteriorly near the other end of said guide adapted to restrain movement of the stack.

21. In a machine of the character described, means for supporting and feeding a stack of articles, a holder engageable with the terminal article of the stack, means for feeding a product element, means for moving said holder to position the article over the product element, and means for actuating said holder to drop the article upon the product element.

22. In a machine of the character described, means for supporting and feeding a stack of articles, a holder engageable with the terminal article of the stack, means for feeding a product element, means for moving said holder to position and orient the article over the product element, and means for actuating said holder to drop the article upon the product element.

In testimony whereof I affix my signature this 16 day of January, 1931.

LEO MYERS.