July 22, 1958 S. T. CARTER 2,843,986

BAND HEIGHT POSITIONER FOR BANDING MACHINES

Filed April 27, 1956 6 Sheets-Sheet 1

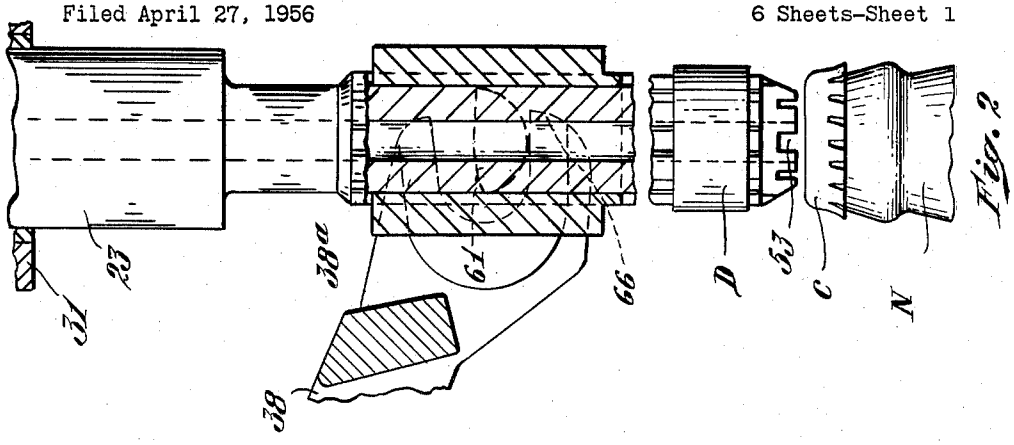


Fig. 2

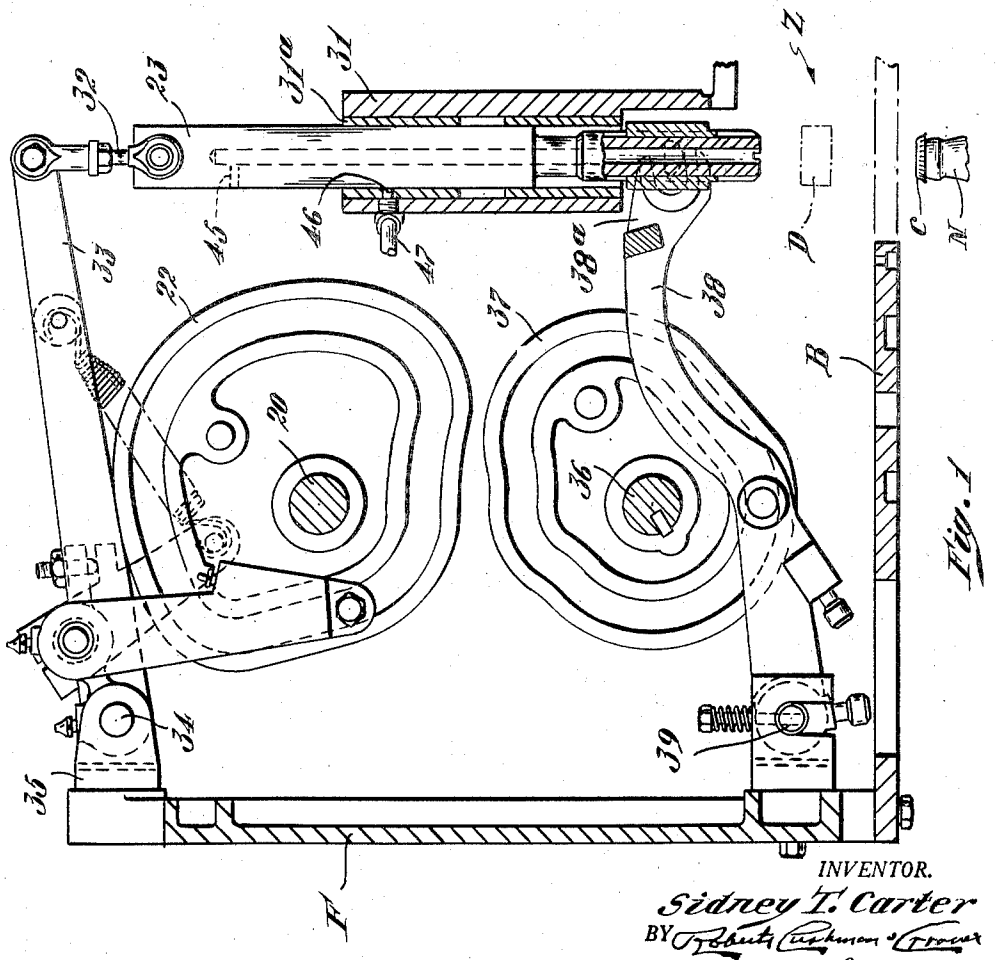


Fig. 1

INVENTOR.
Sidney T. Carter
BY Roberts Cushman & Grover
ATT'YS

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BAND HEIGHT POSITIONER FOR BANDING MACHINES

Filed April 27, 1956 6 Sheets-Sheet 2

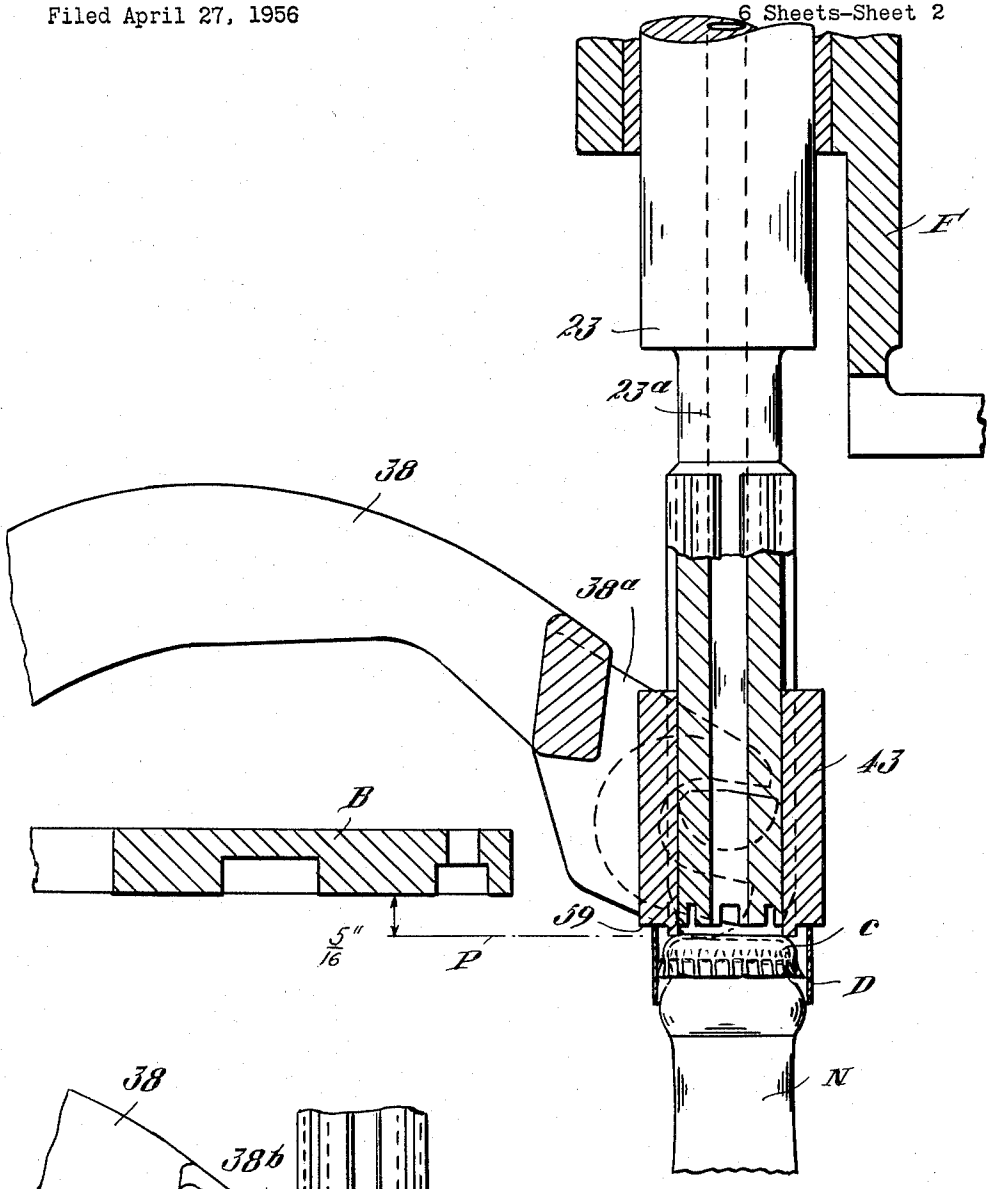


Fig. 3

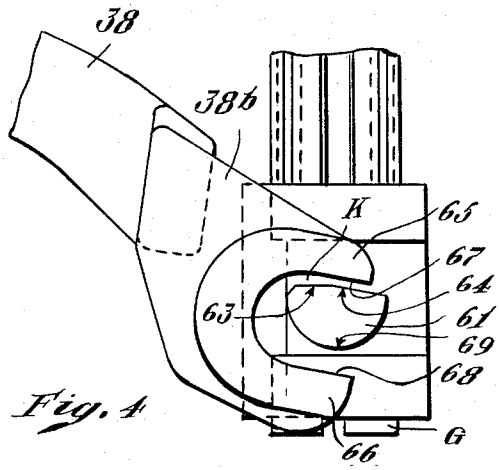


Fig. 4

INVENTOR.
Sidney T. Carter
BY Robert Cushman & Egan
ATT'YS

July 22, 1958 S. T. CARTER 2,843,986

BAND HEIGHT POSITIONER FOR BANDING MACHINES

Filed April 27, 1956 6 Sheets-Sheet 3

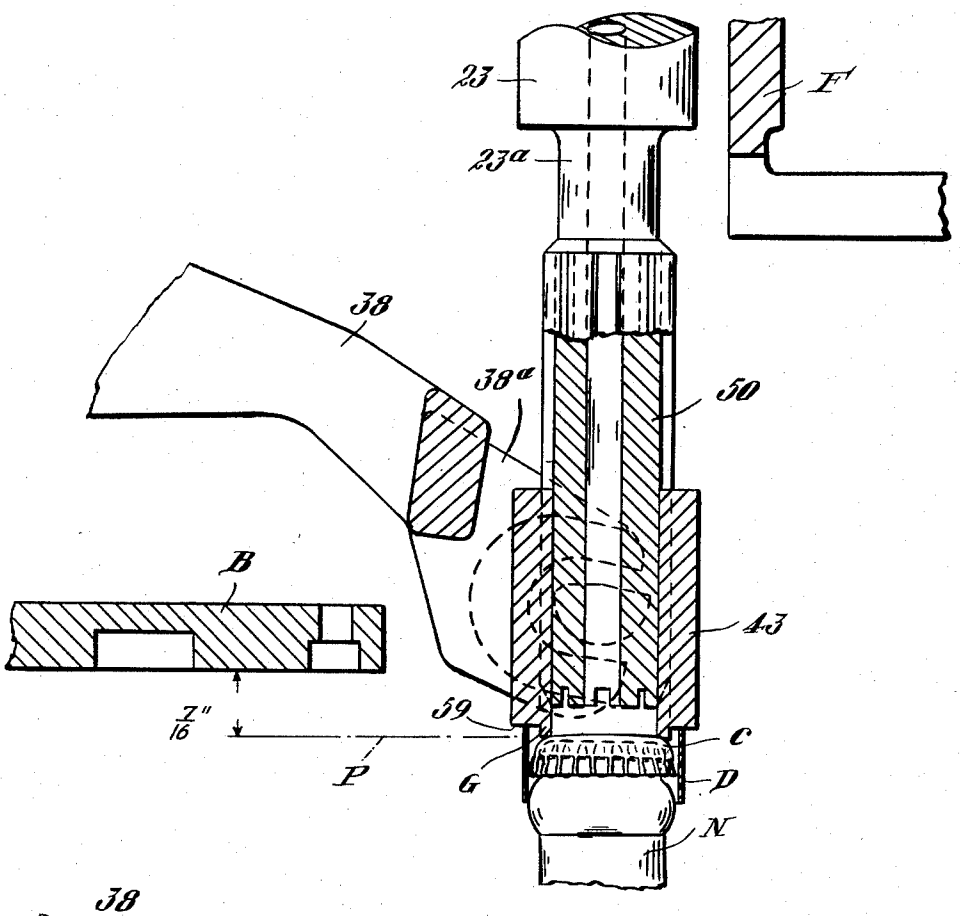


Fig. 5

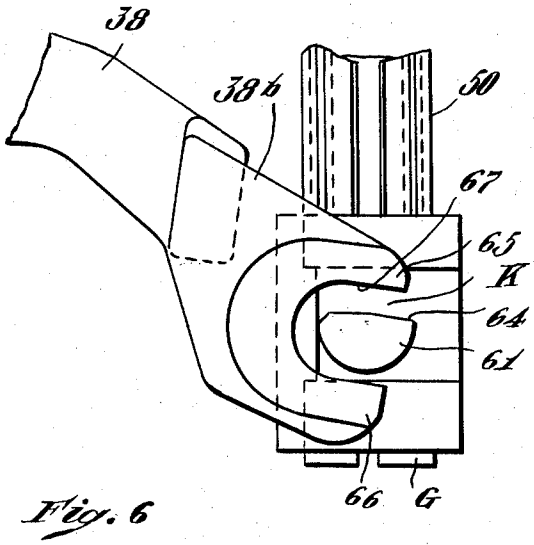


Fig. 6

INVENTOR.
Sidney T. Carter
BY Roberts Cushman Grover
ATT'YS

July 22, 1958 S. T. CARTER 2,843,986

BAND HEIGHT POSITIONER FOR BANDING MACHINES

Filed April 27, 1956 6 Sheets-Sheet 4

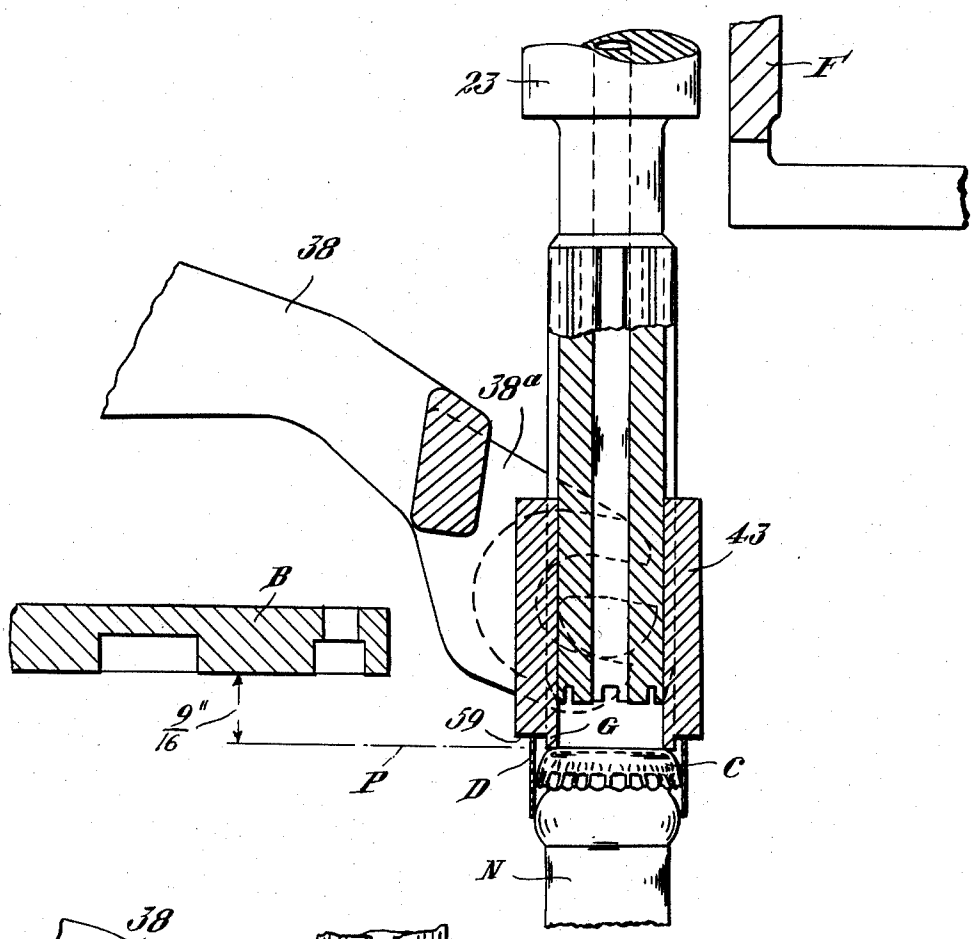


Fig. 7

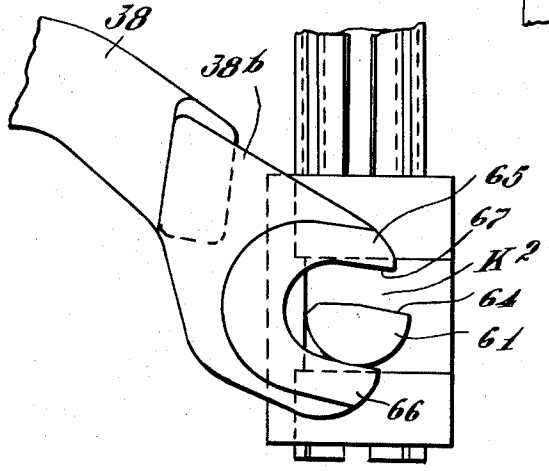


Fig. 8

INVENTOR.
Sidney T. Carter
BY Robert Cushman & Grover
ATTYS

July 22, 1958 S. T. CARTER 2,843,986

BAND HEIGHT POSITIONER FOR BANDING MACHINES

Filed April 27, 1956 6 Sheets-Sheet 5

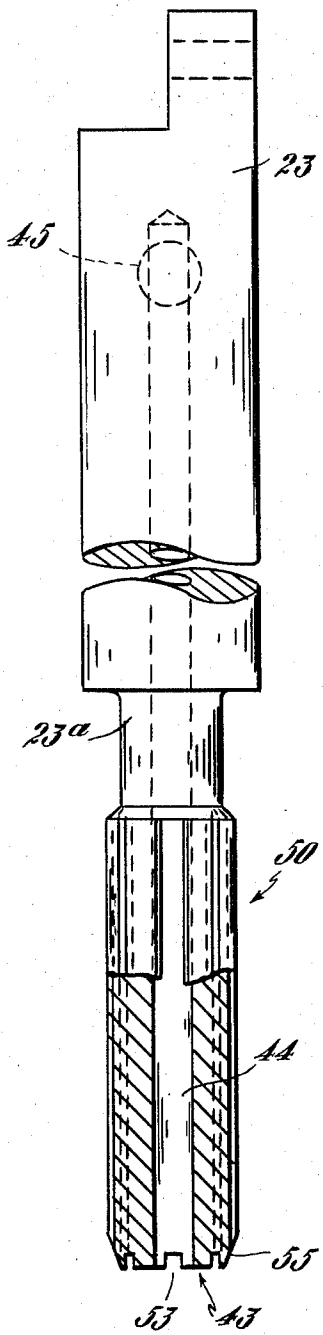


Fig. 9

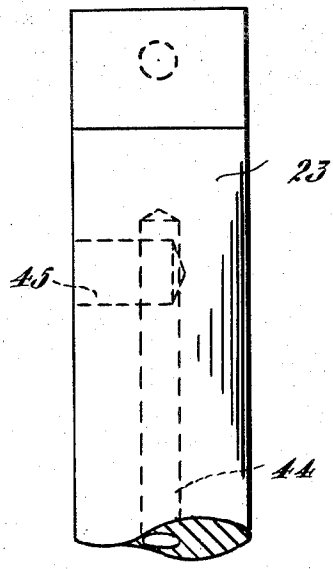


Fig. 11

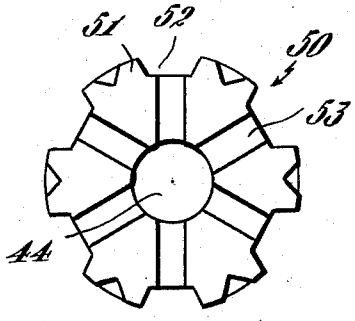


Fig. 10

INVENTOR.
Sidney T. Carter
BY Roberts Cushman & Groves
ATT'YS

July 22, 1958 S. T. CARTER 2,843,986

BAND HEIGHT POSITIONER FOR BANDING MACHINES

Filed April 27, 1956 6 Sheets-Sheet 6

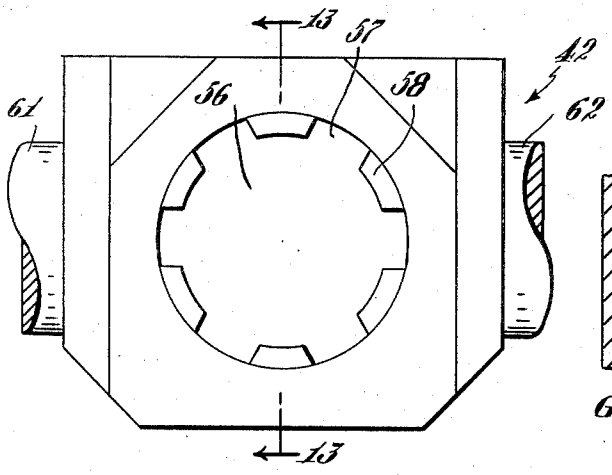


Fig. 12

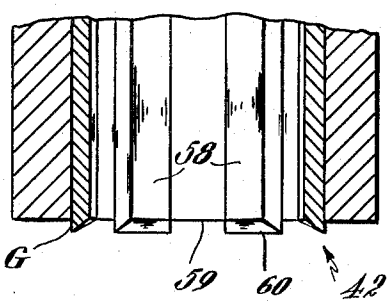


Fig. 13

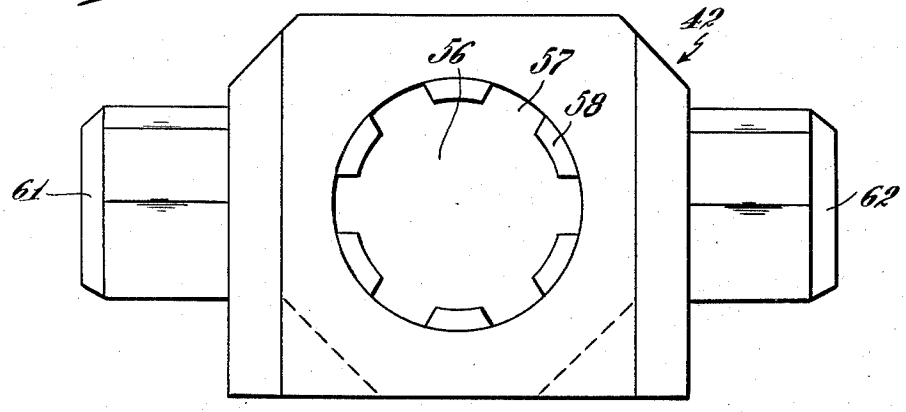


Fig. 14

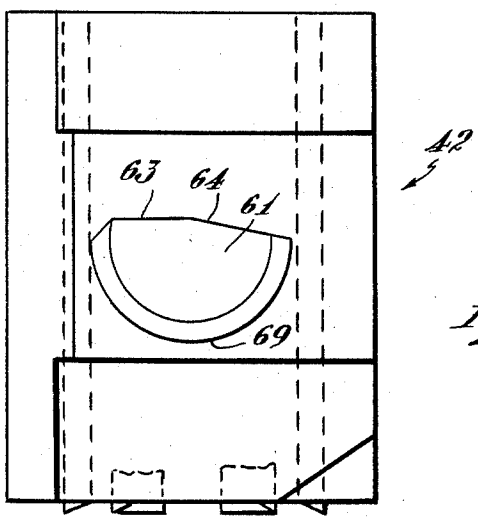


Fig. 15

INVENTOR.
Sidney T. Carter
BY Roberts Cushman & Grover
ATTYS

United States Patent Office

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BAND HEIGHT POSITIONER FOR BANDING MACHINES

Sidney T. Carter, Shrewsbury, Mass., assignor to Geo. J. Meyer Manufacturing Co., Cudahy, Wis., a corporation of Wisconsin

Application April 27, 1956, Serial No. 581,043

17 Claims. (Cl. 53—291)

This invention pertains to apparatus for applying shrinkable bands to articles, for example containers, and, as here shown and particularly described, to the hops of capped bottles such as beer bottles. Apparatus of this general type is described for instance in the copending application of Sidney T. Carter, Serial No. 416,561, filed March 16, 1954, now issued as Patent No. 2,771,725, dated November 27, 1956, and the present invention is herein described by way of example, but without limitation, as embodied in a machine such as that shown in said application. In applying bands to capped bottles, it has been found desirable so to dispose the band that, in shrinking, the upper margin of the band will curl inwardly over the top of the cap, thereby to insure removal of the band when the cap is removed, and also to provide an improved appearance.

As a result of experiment in the attempt to apply shrinkable cellulose bands so as to embrace the crown cap of a beer or carbonated beverage bottle, it was found that such bottles vary as much as 3/16 of an inch in height and in some extreme cases with a maximum variation between the shortest and longest of ¼ inch. However, the bands are of uniform axial length as delivered to the mechanism which applies them to the bottle. It is necessary, for acceptable banding, that the upper edge of the band, when first applied, be always spaced the same distance above the plane of the upper surface of the cap in order that, in shrinking, the band will curl over the upper surface of the cap to the requisite and uniform amount. Thus it is obvious that the band-applying mechanism should be so designed as always to deposit the band on the bottle neck with the upper edge of the band in a plane spaced from the top of the bottle cap the same predetermined distance, regardless of the height of the bottle. Since bottles of different height may succeed each other in haphazard fashion in advancing into the band-applying zone, and since, in so advancing, the bottoms of the bottles rest on a conveyor moving in a horizontal plane, it is evident that the means for applying the bands should be so designed as to deposit bands at different distances from the plane of the conveyor, according to the height of each individual bottle. Since machines of this type operate at very high speed it would be wholly impractical to depend upon the operator of the machine to make manual adjustments with sufficient rapidity to accomplish the desired result and thus it becomes necessary to provide automatic means, capable of operating at the high speed at which such machines ordinarily run, for depositing each band at a proper height corresponding to the heights of successive bottles moving along the conveyor path.

The principal object of the present invention is to provide simple and efficient mechanism whereby the action of the band-applying means is so controlled that each band will be applied properly to the bottle regardless of the height of the bottle (within the customary range of heights). A further object is to provide means in the

nature of an improvement upon the machine of the above copending application, whereby bottles, differing in height, may be properly banded without necessitating any decrease in the normal speed of the machine. A further object is to provide band-applying means of a type which may readily be applied to banding machines of usual types without substantial change in the general mechanism of such a machine and of so simple a nature as readily to be understood by the operator. A further object is to provide apparatus operative to apply bands to the necks of capped bottles in such a way as to insure the lapping of the same amount of the band over the upper surface of the cap, regardless of differences in the heights of the bottles.

A further object is to provide band-applying means of dependable character capable of properly applying the bands regardless of slight irregularities in the shape of the cap. Other and further objects and advantages of the invention will be pointed out in the following more detailed description and by reference to the accompanying drawings, wherein

Fig. 1 is a fragmentary elevation, partly in vertical section, illustrating certain elements of a band-applying machine of a commercial type—the band-transferring plunger and the stripper being shown in their uppermost positions and the top of a capped bottle being shown as positioned for the reception of a band;

Fig. 2 is a view generally similar to Fig. 1 but showing the band-transferring plunger as having moved down to its lowermost position where its lower end is spaced a short distance above the upper surface of the bottle cap—the bottle shown being one of maximum height;

Fig. 3 is a fragmentary view, to somewhat larger scale than Fig. 1, showing the plunger in the same position as that of Fig. 3, but with the stripper sleeve at the lower end of its stroke and with the band embracing the bottle cap;

Fig. 4 is a fragmentary side elevation showing the position of the stripper actuating lever and the stripper trunnions when the parts occupy the positions shown in Fig. 3;

Fig. 5 is a view similar to Fig. 3, but showing the position of the plunger and stripper when applying a band to a bottle which is shorter than that shown in Fig. 3;

Fig. 6 is a fragmentary view similar to Fig. 4, but with the stripper operating lever in a position corresponding to the position of the parts shown in Fig. 5;

Fig. 7 is a view similar to Fig. 3, but showing the plunger and stripper at the completion of the application of a band to a bottle which is still shorter than that shown in Fig. 5;

Fig. 8 is a view similar to Fig. 4 but showing the stripper actuating lever located correspondingly to the position of the parts shown in Fig. 7;

Fig. 9 is a front elevation, to large scale, with portions broken away, of the plunger separated from the other parts of the machine;

Fig. 10 is a large scale bottom view of the plunger;

Fig. 11 is a side view of the upper part of the plunger looking at it at right angles to Fig. 9;

Fig. 12 is a bottom view of the stripper to large scale;

Fig. 13 is a fragmentary section on the line 13—13 of Fig. 12;

Fig. 14 is a top view of the stripper; and

Fig. 15 is a side view of the stripper, looking at the end of one of its trunnions.

Referring to the drawings, the invention forming the subject matter of the present application is shown as embodied in a banding machine of that general type wherein a reciprocating plunger enters the opened band, moves it toward the bottle neck, and holds it stationary in axial alignment with the bottle neck while a stripper

sleeve, moving along the plunger, slides the band from the plunger onto the bottle neck.

In Fig. 1 the character F indicates a portion of the frame of such a machine, while the character B indicates a portion of the base of the machine frame. The character N indicates the neck portion of a capped bottle disposed in position for the application of the band. The machine comprises a constantly turning horizontal shaft **20** which, by suitable motor means, not shown, is caused to turn once for each cycle of operation of the machine as a whole. On this shaft **20** there is a cam **22** which actuates the vertically reciprocable band positioning plunger **23**. This plunger **23** moves up and down in a bearing **31** supported by the machine frame—this bearing preferably having an antifriction lining sleeve **31a** in which the plunger slides. The plunger is actuated by a pitman **32** connected at its upper end to the forward end of a lever **33** which swings up and down about the axis of a shaft **34** mounted in a bracket **35** carried by the machine frame. The lever **33** moves up and down in response to the rotation of the cam **22**.

A second horizontal shaft **36** parallel to the shaft **20**, is journaled in suitable bearings in the machine frame and is constantly driven by suitable connections, not shown, from the drive motor. This shaft **36** carries a cam **37** which actuates a lever **38** pivoted to swing about the axis of a shaft **39** supported by the machine frame. The free or right-hand end of the lever **38** as viewed in Fig. 1 is bifurcated. The fork arms thus provided at the free or right-hand end of the lever **38** are spaced to receive between them the stripper sleeve **42** which is arranged to slide up and down on the lower part of the plunger **23**. It will be understood that the bottles which are to be banded will be moved successively to the position indicated by the character N in Fig. 1 by any suitable means, for example a horizontal conveyor which is intermittently driven so that each bottle is caused to dwell with its neck in axial alignment with the axis of the plunger **23** during the band-applying operation. Since the surface of the conveyor on which the bottoms of the bottles rest is at a fixed distance below the base B of the machine frame, the upper surfaces of the bottle caps may be disposed at varying distances below the plane of the undersurface of the base B of the machine frame according as the bottles vary in height.

Referring particularly to Figs. 9 and 11, the plunger **23** is shown as provided with an axial, longitudinal bore **44** which extends from the lower end **43** of the plunger nearly up to the upper end of the plunger where it intersects a transverse bore **45** leading to the exterior surface of the plunger. The bearing **31** is provided near its upper end with a radial port **46** (Fig. 1), desirably internally screw-threaded, and which receives a pipe fitting to which one end of an air pipe **47** is secured. This air pipe **47** leads to a control valve (not shown) which may be of any suitable type and which is actuated once for each cycle of operation of the machine—the pipe being supplied with compressed air so that at each cycle, air under pressure is delivered to the bore **44** in the plunger. While this arrangement whereby air may be discharged at the lower end of the plunger is desirable, it is not an essential feature of the present invention.

Referring to Figs. 9 and 10, the plunger **23** is shown as provided with a portion **50** of an external diameter somewhat less than that of the upper portion of the plunger, and which is connected to the latter by a neck **23a** of reduced diameter. The external diameter of the portion **50** of the plunger is such that this part of the plunger may enter an opened or nearly open neck band D (positioned as indicated in broken lines in Fig. 1), so as to distend the band to fully open condition in readiness to be slipped down onto the neck of the bottle. As herein illustrated (Fig. 10), this band-holding portion **50** of the plunger is shaped to provide longitudinally extending splines or ribs **51** with intervening grooves **52**. Such an arrangement reduces the area of contact of the band with the plunger and thus facilitates the slipping of the band from the plunger. At its lower end the plunger is provided with radial channels **53** leading from the central bore **54** into the grooves **52**, thereby to permit ready escape of air in a radial direction from the lower part of the bore **44**. The delivery of radial air jets thus provided for helps to expand the lower portion of the band as it moves down toward the bottle cap. As shown in Fig. 9, the lower end of the plunger is desirably tapered downwardly as shown at **55** to facilitate the entry of the part **50** of the plunger into a band located as shown in Fig. 1, and which is usually held in this position by suitable suction heads, not shown.

The stripper sleeve **42**, as shown more particularly in Figs. 12 to 15, is provided with a bore **56** of a diameter to receive with a sliding fit the band positioning portion **50** of the plunger **23**. The wall of this bore is provided with grooves **57** which receive the splines or ribs **51** of the plunger, these grooves **57** being separated by ribs **58** which are shaped to fit within the longitudinal grooves **52** of the plunger. These interengaging ribs and grooves prevent rotation of the plunger, thus insuring that the part **45** will always be in the same radial plane as the part **46**.

The ribs **58** (Fig. 13) extend downwardly, as shown at G, below the plane **59** of the lower end of the plunger proper to form positive stop fingers, and the lower surfaces of these downwardly projecting stop fingers G are beveled as shown at **60**, to accommodate the curved upper edge of the bottle cap C, thereby helping to center the neck of the bottle accurately with reference to the axis of the plunger. It will be understood that the distance to which the stop finger G projects below the plane of the lower radial face **59** of the stripper, and the angle of inclination of the surfaces **60**, may be varied in accordance with the particular shape of the upper surface of the bottle cap with which the apparatus is to be employed.

Two axially aligned pintles **61** and **62** (Figs. 12, 14, 15) project from opposite sides of the stripper **42**, the axes of these pintles being accurately perpendicular to the axis of the plunger **23**. As may be seen by reference to Fig. 15, these pintles **61** and **62** are not circular in transverse section, but are cut away at their upper portions so as to provide substantially flat surfaces **63** and **64** which intersect at an obtuse angle at approximately the vertical radial plane of the pintle. For example, the surface **63** may slope upwardly at an angle of 10° to the horizontal plane of the apex of this angle, and the face **64** may slope downwardly at an angle of 10°.

As above noted, the free or right-hand end portion of the stripper actuating lever **38** is bifurcated, thereby providing spaced parallel arms **38a** and **38b**, Figs. 3 and 4, which are so spaced as to straddle the body portion of the stripper **42**. Each of the arms **38a** and **38b** is provided with a deep notch at its free end, thereby defining the vertically spaced fingers **65** and **66** (Fig. 4), having substantially parallel inner edges **67** and **68** respectively. As shown for example in Fig. 4, these edges **67** and **68** are spaced apart a distance which exceeds the thickness of the pintle **61** as measured between its curved lower portion **69**, and the point of intersection of its upper flat upper surfaces **63** and **64**, thus providing for a substantial degree of relative motion between the pintle **61** and the surfaces **67** and **68**.

It may be stated at this point that the stripper **42** is sufficiently heavy and slides with such ease on the part **50** of the plunger that, if allowed freedom of motion while in contact with the upper edge of a band held by the part **50** of the plunger, it would of itself slide the band down from off the plunger and onto the neck of the bottle.

In Fig. 2 the plunger **23** is shown as having been moved from the position indicated in Fig. 1, which is the uppermost position of the plunger, through a band-receiving

zone Z, where an open band is held in readiness to receive the plunger, to its lowermost position as determined by the contour of the cam 22 carrying the band with it. In this position the extreme lower end of the plunger is shown as spaced slightly above the upper surface of the cap C on the neck N of the bottle which is to be banded. It is desirable that the cam 22 be so contoured that the plunger will stop with its lower end in a definite horizontal plane, slightly above that of the top of the cap of the tallest bottle which is to be banded. In Fig. 2, the stripper 42 is shown in its uppermost position, its pintles resting on the lower fingers 66 of lever 38, and a band D is shown on the part 50 of the plunger in readiness to be slid down onto the bottle neck. It may here be noted that the outside diameter of the downwardly projecting stop finger G of the stripper is the same as the outside diameter of the part 50 of the plunger on which the band is held in readiness to be applied to the bottle neck so that these stop fingers are inside the band as the latter is moved down onto the bottle neck.

Assuming that the parts are in the position shown in Fig. 2, and that the bottle is the tallest which will be encountered in the banding operation, for example, so that the plane P, Fig. 3, of the upper surface of the bottle cap C is at a distance of 5/16 of an inch below the lower surface of the base B of the machine frame, then as the stripper lever 38 is moved downwardly from the position of Fig. 2 to that of Fig. 3, the stripper sleeve will move down under its own weight until the edges 60 of the stop finger G of the stripper encounter the cap C of the bottle. The lever 38 may now continue its downward motion to the lower limit of its path of travel, as determined by the cam 37, because the cutting away of the pintles provides sufficient clearance to allow such motion.

Since the lower edge 59 of the stripper is that which engages the upper edge of the band D, the location of the upper edge of the band with reference to the plane of the upper surface of the cap C, will always be determined by the distance to which the stop fingers G project down below the surface 59.

Figs. 5 and 6 show the arrangement of the parts resultant from the fact that the bottle, whose neck N is there shown, is somewhat shorter than the bottle illustrated in Figs. 3 and 4. For instance, whereas the plane P of the upper surface of the cap C in Fig. 3 is shown as 5/16 of an inch below the lower surface of the base B of the machine frame, the corresponding distance as shown in Fig. 5 is 7/16 of an inch. Nevertheless the stripper 43 has been stopped in its downward movement solely by the engagement of the stop fingers G with the bottle cap although the stroke of lever 38 remains the same. The upper edge of the band D, whose position is determined by the lower edge 59 of the stripper, is at the same distance above the plane P of the bottle cap as in the arrangement shown in Fig. 3. It will be noted that the space K between the surfaces 67 and 64 is larger than the corresponding space as shown in Fig. 4.

Figs. 7 and 8 show the relative positions of the parts when dealing with a bottle of minimum height, for instance, a bottle of a height such that the plane P of the upper surface of its cap C is at a distance of 9/16 of an inch below the lower surface of the base B of the machine frame. As in the previous instances the stripper 43 has moved downwardly until the stop fingers G have contacted the bottle cap, thus stopping the further downward movement of the stripper. Since its lower edge 59, which engages the upper edge of the band D, is always at the same distance above the cap contacting edges of the projections G, the upper edge of the band D is again at the same distance above the plane of the top of the bottle cap as in the previous instances. As noted in Fig. 8, the space K^2 between the under surface 67 of the finger 65 of lever 38, and the upper surface 64 of the pintle 61, is larger than the corresponding spaces as shown in Figs. 4 and 6, the pintles now resting on the fingers 66 shown as at their lowermost position.

It is thus evident that with this arrangment the upper edge of the band which is being applied will always be disposed at the same distance above the plane of the upper surface of the bottle cap, even though the bottles being of different heights and rest on the surface of a conveyor which is always at a fixed distance below the plane of the plunger when the latter is in its lowermost position. Since the length of the stop fingers G below its radial lower surface 59 determines the height of the upper edge of the band above the plane of the top of the bottle cap, it is merely necessary to substitute a stripper having stop fingers G of a different length, if it be desired to change the amount to which the band projects above the upper edge of the bottle cap as it is placed on the neck of the bottle. As the only function of the pintles 61 and 62 of the stripper is to provide means whereby the forked end of the lever 38 may raise the stripper from its lowermost to its uppermost position, these pintles are not subjected to any substantial stress and thus if the range of bottle heights be greater than that above suggested, it is readily possible to cut away more of the height of the pintles than here suggested, thereby to provide for a greater permissive range of motion of the stripper.

While one specific apparatus for applying bands to capped bottles has herein been shown and described, it is to be understood that the invention is broadly inclusive of any and all equivalent means whereby bands of uniform axial width may be automatically applied to capped bottles of varying heights, in such a way that the upper edges of the bands, when first applied, will always be the same distance above the plane of the upper surface of the bottle cap. All such modifications and rearrangements of parts as fall within the terms of the appended claims are to be considered as within the purview of the invention.

I claim:

1. Apparatus for applying shrinkable bands to the necks of bottles, said apparatus being of the kind wherein the open band is supported on a generally cylindrical holder directly above and in axial alignment with the bottle and is moved axially downward, from off the holder, until it embraces the bottle neck by an applying element which engages the upper edge of the band, and wherein the bottle rests upon a support below the holder while being banded, in combination, means for moving the applying element relatively to the holder, and means, carried by the applying element, engageable with the bottle so to limit downward motion of the applying element that the trailing edge of the band, when first applied, is always located a predetermined distance from the horizontal plane of the top of the bottle regardless of the height of the bottle.

2. Apparatus for applying shrinkable bands to the necks of bottles, said apparatus being of the kind wherein the open band is supported on a generally cylindrical holder directly above and in axial alignment with the bottle neck in readiness to be applied to the latter and wherein the bottle to be banded rests upon a support below the holder and wherein a vertically movable applying element, by engagement with the upper edge of the band, slides the latter from the holder onto the bottle neck, in combination, actuating means for the applying element operative to move the latter to a position such that it may contact the upper edge of the band, said actuating means being so constructed and arranged as to permit the applying element to move downwardly without restraint until it reaches a predetermined lowermost position, and means operative to stop the downward motion of the applying element before it reaches said lowermost position whenever the bottle to be banded exceeds a predetermined minimum height.

3. Apparatus according to claim 2, wherein the means for stopping the downward motion of the applying ele-

ment comprises a part carried by the applying element and which is so arranged as to engage the bottle to be stopped by the latter.

4. Apparatus for applying shrinkable bands to a capped bottle in such a way that the upper margin of the band, when first applied, is in a plane above the horizontal plane of the top of the bottle cap, said apparatus being of the kind wherein the open band is supported on a generally cylindrical holder directly above and in axial alignment with the bottle neck and is advanced axially downward from off the holder until it embraces the cap by a vertically movable applying element which, by engagement with the upper edge of the band, moves the latter downwardly relatively to the holder and wherein the bottle to be banded rests upon a horizontal support at a fixed distance from the lower end of the band holder when the latter is in band-delivering position, in combination, means, comprising a part carried by the applying element, engageable with the bottle cap for limiting downward motion of the applying element whereby the upper edge of the applied band is always located a predetermined distance from the horizontal plane of the top of the bottle cap, and actuating means for lifting the applying element to a position so spaced above the bottle support that it may engage the upper edge of the band on the holder.

5. Apparatus according to claim 4, wherein the band-applying element is a sleeve coaxial with and slidable relatively to the band holder and the actuating means for lifting the sleeve comprises a lever and means for swinging the lever through an arc of constant predetermined extent, the lever having spaced fingers at its free end and the sleeve having a part which is disposed between said fingers and which is of such dimensions as to permit lost motion between said part and said fingers.

6. Apparatus according to claim 4, wherein the band-applying element is a sleeve coaxial with and slidable relatively to the band holder, the sleeve being of sufficient weight so that when allowed to rest upon the upper edge of a band on the holder it will move downwardly and thereby push the band down into embracing relation to the bottle cap, and the means for actuating the sleeve is so constructed and arranged as to raise the sleeve to a position such that it may engage the upper edge of the band, said actuating means comprising a lever and means for swinging it in an arc of predetermined extent, and lost motion connections between the sleeve and lever.

7. Apparatus according to claim 4, wherein the holder for the band is a vertically movable plunger and the applying element is a sleeve coaxial with and slidable relatively to the plunger, having, in combination, means for moving the plunger from an elevated position downwardly through a band-receiving zone where it enters an open band positioned to receive it, means for moving the plunger so constructed and arranged that at its lowermost position the lower end of the plunger is always spaced the same predetermined distance from the bottle support, the actuating means for the sleeve being operative to elevate the latter to a position above the band-receiving zone, and being so constructed and arranged as to permit the sleeve to move downwardly to a predetermined lowermost position, and means operative to limit downward motion of the sleeve according to the height of the bottle to be banded.

8. Apparatus according to claim 4, wherein the holder for the band is a vertically movable plunger and the applying element is a sleeve coaxial with and slidable relatively to the plunger, having, in combination, means for moving the plunger from an elevated position downwardly through a band-receiving zone where it enters an open band positioned to receive it, the means for actuating the sleeve being operative to elevate the latter to a position above the band-receiving zone, the sleeve having pintle elements projecting from diametrically opposite points, and the sleeve actuating means comprising a lever having at its free end two pairs of fingers so arranged that one of said pintles is disposed between the fingers of each pair respectively, the pintles being of such dimensions relatively to the spacing of the fingers between which they are disposed as to provide for lost motion between the lever and sleeve.

9. Apparatus according to claim 4, wherein the holder for the band is a vertically movable plunger and the applying element is a sleeve coaxial with and slidable relatively to the plunger, having, in combination, means for moving the plunger from an elevated position downwardly through a band-receiving zone where it enters an open band positioned to receive it, the means for actuating the sleeve being operative to elevate the latter to a position above the band-receiving zone, and the sleeve having downwardly directed elements operative by contact with the bottle cap to limit downward motion of the sleeve according to the height of the bottle.

10. Apparatus according to claim 4, wherein the holder for the band is a vertically movable plunger having an axial bore and a radial port leading to said bore, guide means for the plunger having a passage designed to register at times with the port in the plunger, the band-applying element being a sleeve coaxial with the plunger, the plunger and sleeve having cooperable parts operative to prevent rotation of the plunger about its longitudinal axis, the actuating means for the sleeve being so constructed and arranged as to prevent rotation of the sleeve.

11. Apparatus according to claim 4, wherein the band holder is a vertically movable plunger, and the applying element is a sleeve coaxial with the plunger and movable axially relatively to the latter, the plunger having longitudinally extending grooves and the sleeve having internal longitudinally extending ribs which enter the grooves in the plunger thereby preventing relative rotation of the plunger and sleeve, the actuating means for the sleeve being so constructed and arranged as to prevent rotation of the sleeve, the ribs on the sleeve extending downwardly below that surface of the sleeve which engages the band and constituting stops engageable with the bottle cap to limit downward motion of the sleeve.

12. Apparatus for applying shrinkable bands to capped bottle necks, said apparatus comprising a bottle support, means for holding an open band above and in axial relation to the bottle neck, and means operative to place the band in embracing relationship to the bottle cap, said band-placing means including means for moving the band downward, and detector means, responsive to the height of the bottle, operative automatically to arrest downward motion of the band when the upper edge of the band is at a predetermined distance above the plane of the upper surface of the bottle cap regardless of the height of the bottle.

13. Apparatus, according to claim 12, wherein the detector means includes a stop element which is engageable with the bottle cap and thereby automatically arrests downward motion of the band when the upper edge of the band is at a predetermined distance above the plane of the upper surface of the bottle cap, regardless of the height of the band.

14. Apparatus, according to claim 12, wherein the means for moving the band downwardly comprises a vertically movable sleeve having a radial lower surface for contact with the upper edge of the band, and the detector means comprises parts carried by the sleeve and projecting downwardly below said radial surface and which are positioned to contact the upper surface of the bottle cap as the sleeve moves down.

15. Apparatus, according to claim 12, wherein the means for moving the band downwardly comprises a vertically slidable sleeve having a radial lower surface for contact with the upper edge of the band, and the detector means comprises a plurality of circumferentially spaced, downwardly directed fingers fixed to the sleeve and located in a circle of lesser radius than that of the band, said

fingers having beveled lower edges operative to contact the upper edge of the cap and thereby to center the sleeve with reference to the cap and to limit downward motion of the sleeve.

16. Apparatus, according to claim 12, wherein the means for moving the band downwardly comprises a vertically movable sleeve, and the detector means comprises a stop member fixed to the sleeve and projecting downwardly below that surface of the sleeve which engages the upper end of the band, said downwardly projecting stop member being spaced from the axis of the sleeve a lesser distance than the radius of the band whereby said stop member is located within the band as the latter moves down onto the bottle cap, said stop member being engageable with the upper surface of the cap thereby positively to limit downward motion of the sleeve.

17. Apparatus for applying shrinkable bands to the necks of bottles, said apparatus being of the kind wherein the open band is supported on a generally cylindrical holder directly above and in axial alignment with the bottle neck in readiness to be applied to the latter and

wherein the bottle to be banded rests upon a support below the holder and wherein a vertically movable applying element, by engagement with the upper edge of the band, slides the latter from the holder onto the bottle neck, in combination, actuating means for the applying element, the applying element being a sleeve coaxial with and sildable relatively to the holder, and the actuating means for the sleeve being so constructed and arranged as to raise the sleeve sufficiently high so that it may contact the upper edge of the band on the holder and to permit the sleeve to move downwardly without restraint until the sleeve reaches a predetermined lowermost position—the means for limiting downward motion of the applying element comprising a part, carried by the sleeve, operative to stop downward motion of the sleeve before it reaches said lowermost position whenever the height of the bottle exceeds a predetermined minimum height.

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