

[54] BAND DISPENSING APPARATUS

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Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 245,858, April 20, 1972, abandoned.

[52] U.S. Cl. **225/100, 225/93, 225/106**

[51] Int. Cl. **B65h 35/10, B26f 3/02**

[58] Field of Search. 225/100, 106, 93; 29/235, 236

[56] References Cited

UNITED STATES PATENTS

3,727,814	4/1973	Kuckhermann.....	225/100
3,730,411	5/1973	Brockmuller.....	225/100

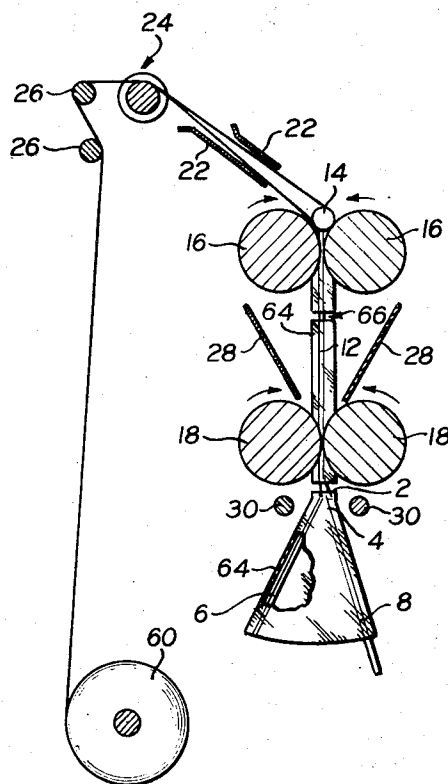
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[57]

ABSTRACT

Tubular band members such as plastic band labels are individually dispensed from a continuous supply of bands severably attached to one another in strip form. The dispensing apparatus includes two series of horizontal contact rolls vertically spaced apart and a band separator suspended in the nip of the first pair of rolls and extending downward between both pairs of rolls and terminating in a spreader which is suspended below the second pair of rolls. The first pair of rolls are driven in a predetermined cycle relative to the height of the tubular band or at a predetermined dispensing speed and the second pair of rolls is driven and is adapted to sever individual bands from the strip and advance the severed label downward over the spreader thereby dispensing same downward in a substantially open condition.

8 Claims, 7 Drawing Figures



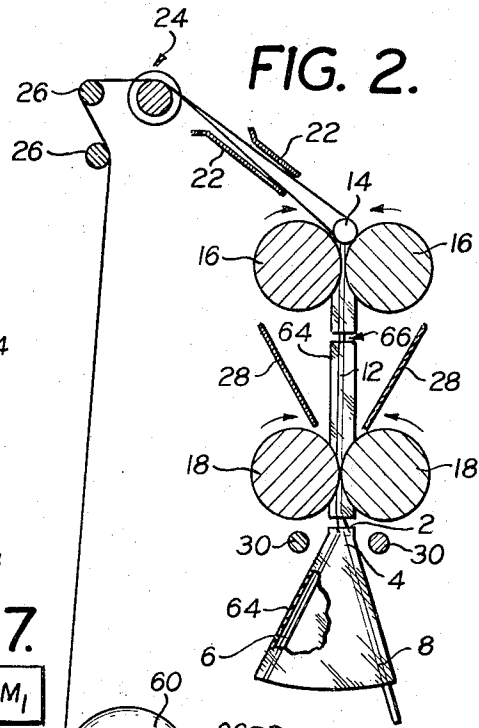
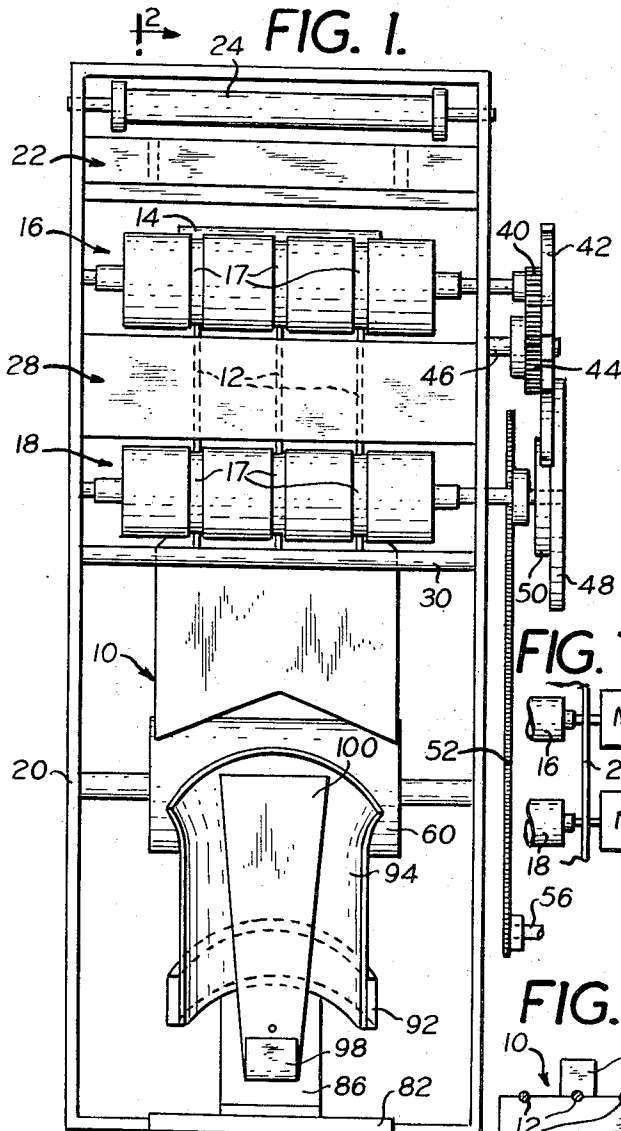
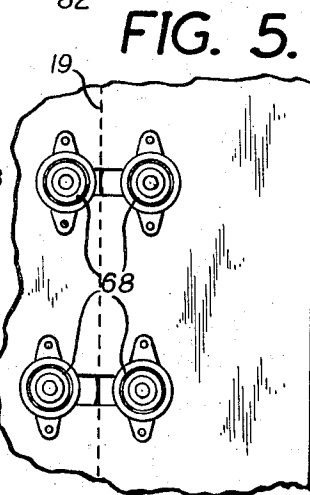
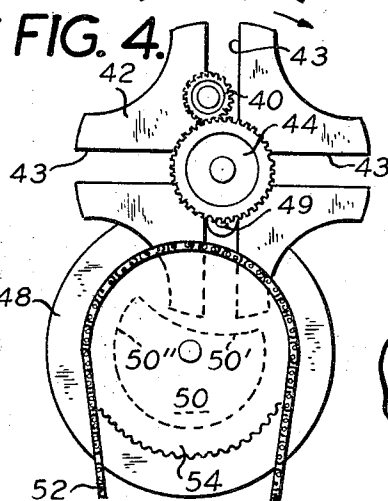
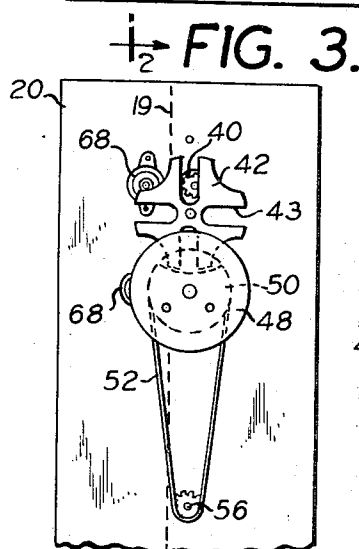
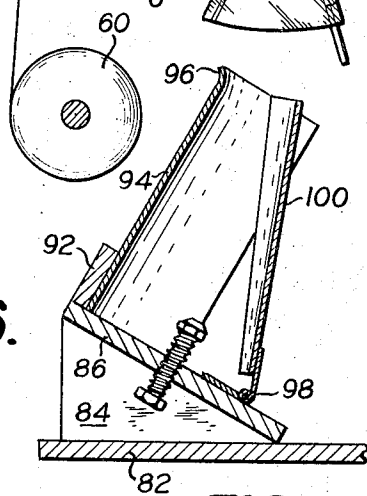


FIG. 7.

FIG. 6.



BAND DISPENSING APPARATUS

RELATED APPLICATION

This application is a continuation-in-part of copending application Ser. No. 245,858 filed Apr. 20, 1972, now abandoned.

BACKGROUND

Blow molded plastic bottles are currently widely used for packaging of kinds of liquid and powder products for consumer and industrial use. These liquid and powder products include chemicals, laundry products, anti-freeze, just to mention a few.

Pre-labeling blow molded bottles using a silk screen technique has been generally limited to one color due to the cost involved, is expensive and creates the need to store labeled bottles thus requiring unnecessary inventory control.

Pre-printed plastic band labels are being increasingly used to obviate the above problems. In our copending application Ser. No. 147,029, filed May 26, 1971, which is a continuation-in-part of application, Ser. No. 105,840, filed Jan. 12, 1971, now abandoned, the advantages of using pre-printed plastic band labels are discussed and a device for positioning a container and applying a band label thereto is disclosed. This device has met with considerable commercial acceptance and has given rise to the need for dispensing the labels in an opened condition onto the label applying device which, up to this time, has been done by hand. Thus, the present invention provides apparatus for greatly increasing the efficiency of a band labeling operation by individually dispensing labels automatically in an opened condition onto band applying devices such as that disclosed in our above-mentioned copending application Ser. No. 147,129.

Devices have been proposed for dispensing opened band members, such as labels and container neck bands, for example, in U.S. Pat. Nos. 2,787,104 and 3,523,052. However, these devices are expensive requiring considerable capital investment and for this reason have not come into general commercial use, especially the device proposed in U.S. Pat. No. 3,523,052.

SUMMARY

The present invention provides apparatus for automatically dispensing individual tubular band members such as plastic band labels and heat shrinkable plastic neck bands from a continuous supply of band members severably attached to one another in strip form. The apparatus of the invention broadly comprises first means adapted to grip and advance said band members, second means adapted to sever and advance individual band members advanced beyond said first means and separator means riding feely in and between said first and second means for separating said band members prior to said first means and for dispensing same in a substantially opened condition after said second means.

More particularly, the apparatus of the invention comprises a first pair of pressure contact roll means; a second pair of pressure contact roll means below said first pair of roll means; means to drive said first pair of roll means at a predetermined dispensing speed; means to drive said second pair of roll means at a speed greater than the dispensing speed; band separator

means suspended in the nip of said first pair of roll means and extending downward between said first and second pairs of roll means and terminating in spreader means suspended below said second pair of roll means; said strip of tubular bands being adapted to be passed between said first and second pairs of roll means and over said separator means and to be individually severed from said strip between said pairs of roll means and individually dispensed downward between said second pair of roll means and over said spreader means in a substantially opened condition.

A further embodiment of the invention is directed to a device for spreading and opening tubular band members passing thereover comprising a first downwardly inclined flat member and a second member attached to the rear thereof and extending downwardly from a point near the upper end of said first member. In an alternate embodiment, the second member can be curved and downwardly inclined in the opposite direction of the first member.

DESCRIPTION OF THE DRAWING

FIG. 1 is a front elevational view of apparatus of the invention, and also shows the use of our above described device for applying bands to containers;

FIG. 2 is a vertical sectional view taken along line 2-2 of FIG. 1;

FIG. 3 is a side view showing preferred means for driving the two pairs of contact rolls;

FIG. 4 is a detailed side view of the drive means as shown in FIG. 3;

FIG. 5 is a side view of the apparatus shown in FIG. 1 partly broken away and opposite to the side shown in FIG. 3;

FIG. 6 is a top view of the preferred spreader or mandrel device of the invention; and

FIG. 7 is an elevational view partly broken away of a preferred embodiment of the invention with respect to the apparatus of the invention shown in FIG. 1.

DESCRIPTION

Referring now to the drawing and in particular to FIGS. 1 and 2, the apparatus of the invention is shown to include a first pair of pressure contact rolls 16 and a second pair of pressure contact rolls 18 spaced apart and positioned vertically below the first pair of rolls 16. Tubular band members, for example, plastic band labels are preferably supplied in a continuous roll 60 which is threaded over guide bars 26, idler guide roll 24, through guide device 22 which is adapted to direct the strip of bands to the separator means suspended in the nip of the roll 16.

The separator means is shown to include a bar 14 which rides freely in the upper nip of the roll 16 and has a plurality of downwardly extending rods 12 which pass freely between both pairs of rolls 16 and 18 by virtue of corresponding vertical grooves 17 in each pair of rolls. A single centrally located rod 12 can be utilized and it is preferred to use a plurality of rods such as the three rods 12 shown in FIG. 1 to stabilize the separator means for trouble free operation. The vertical grooves 17 in the rolls 16 and 18 correspond to the number of rods 12 employed and are dimensioned such that the rods 12 do not interfere with the pressure contact function of both pairs of rolls 16 and 18.

Connected at the lower end of the rods 12 is the preferred separator or mandrel 10 of the invention which

is shown in FIG. 2 as preferably positioned closely adjacent the lower nip of the rolls 18. The mandrel 10, referring now to FIGS. 1, 2 and 6 is shown to include a first downwardly inclined flat member 8 with a second member 6 attached to the rear side of the flat member 8 and extending downwardly from a point near the upper end of the first member 8. The member 8 can be flexibly attached to the member 6 and can be a rod or strip. Thus, the member 6 can be positioned as shown in FIG. 2 to be inclined in the opposite direction from the first member 8 or at any angle from the vertical axis outward depending on the label and the degree of opening desired.

Guide plates 28 are shown in FIGS. 1 and 2 between the pairs of rolls 16 and 18 and are used to direct the bands to the nip of the second pair of rolls 18.

Commercially available band labels often have a tendency to cling together due to static electricity and for this reason, it is preferred to employ static eliminators such as the static eliminator bars 30 shown in FIGS. 1 and 2 positioned on both sides of the upper area of the mandrel 10. To ensure that the static eliminators will function as desired, the mandrel 10 preferably includes means to prevent intimate contact with the mandrel 10. One such means is shown in FIG. 2 wherein the lower ends of the rods 12 are enlarged at 2 in a wedge shaped fashion.

The pairs of rolls 16 and 18 are mounted in pressure contact with each other in housing 20 by means of ball bearings 68 as shown in FIGS. 1, 3 and 5. The housing 20 can be hinged along dotted lines 19 shown in FIGS. 3 and 5 so that the separator means can be readily unchanged to accommodate different size tubular band members.

FIG. 7 shows a preferred embodiment wherein electric motor M_1 drives upper rolls 16 at a predetermined dispensing speed and electric motor M_2 drives lower rolls 18 at a speed greater than the dispensing speed of rolls 16. In this embodiment both pair of rolls are driven continuously with the lower rolls 18 moving faster than upper rolls 16. The net effect is to sever individual bands from the strip between the rolls. Thus, as each band is grasped between rolls 18 it is severed from the next succeeding band which is still held between upper rolls 16. The severing takes place because of the relative difference in rotational speed between the two sets of rollers; the lower rolls 18 rotate faster than the upper rolls 16.

FIGS. 3 and 4 illustrate a Geneva gear system for intermittently driving the rolls 16 in a predetermined cycle which is determined by the height or width of the tubular band members being dispensed. Gear 54 is mounted on one of the axials of the rolls 18 and is driven by way of member 52 by means of drive connection 56. The drive can be provided by electric motor or similar means connected to drive member 56. Mounted on the same axial as the gear 54 is cam carrier 48 with cam 49 mounted thereon. Also on the same axial is crescent shaped member 50 which rotates with the cam carrier 48. Gear 40 is mounted for rotation with one of the rolls 16 and meshes with gear 44 which is co-axially mounted on 46 with the star wheel 42 having diagonal openings 43 therein. The gear arrangement shown in FIG. 4 is a Geneva drive system and in operation cam carrier 48 rotates engaging cam 49 with one of the grooves 43. Portion 50' of the crescent shaped member 50 permits the star wheel 42 to rotate while it is en-

gaged by cam 49. When cam 49 disengages from a groove 43 the convex portion 40' of member 50 comes into sliding register with the corresponding concave portions of the star wheel 42 between adjacent grooves 43. During this sliding register the star wheel is in a rest or stop mode and advancing motion is imparted to the rolls 16 when the cam 49 comes into register with the groove 43.

It is also possible to positively drive both of rolls 18 and to intermittently positively drive both of rolls 16. While the Geneva drive has been shown as the preferred embodiment for intermittently driving rolls 16 in a predetermined cycle other suitable known means can also be employed. For example, an electric motor with preset stop and go switch means can also be used.

In operation a strip of tubular band members from roll 60 is threaded over guide bars 26 and idler roll 24 through guide means 22 over bar 14 between rolls 16 and over rods 12. Continuing downwardly, the band members continue to pass over rod members 12 between guide members 28 into the nip of rolls 18 and then downward between the static eliminators 30 over the mandrel 10 from which the opened band member is dispensed. The device is set preferably so that the rolls 16 move at the desired dispensing speed and the faster moving rolls 18 pull on the tubular band 64 causing severance to take place approximately in the area indicated by reference numeral 66 which is closer to rolls 16 than to rolls 18. The severed individual band members 64 are then individually dispensed downward over mandrel 10 as is clearly shown in FIG. 2.

The device of the invention can be used to dispense opened band members onto automatic, semiautomatic, or hand operated band applying devices, for example, for applying band labels to containers or for applying heat shrinkable neck bands to containers.

In the embodiment shown in FIGS. 1, 2 and 7 the device of the invention is utilized to dispense opened band labels onto the container positioning and label applying device disclosed in our above mentioned co-pending application Ser. No. 147,029.

The band label applying device shown in FIGS. 1 and 2 includes a base member 82 upon which is mounted a rib 84 which carries support 86 which is positioned at an angle of approximately 30° with respect to the base 82. The screw and nut shown threaded in the member 86 acts as an adjustable stop for containers inserted into the device. Collar 92 acts as a stop for band labels which are dropped onto the device from the mandrel 10. Curved member 94 which tapers outwardly at 96 is mounted at right angles on the base 86. A tongue member 100 is hingeably attached at 98 to the base 86 and is shown in FIG. 2 positioned approximately under the mandrel 10. As a band label drops onto the device from mandrel 10 it slides loosely down onto the curved member 94 and against stop 92. With the band label in position, the operator grasps a container (not shown) and also grasps the upper end of the tongue or pull member 100 pulling the same towards him and then inserting the container in the space defined by the tongue and the curved member 94. The container is now removed from the device and the tongue and curved portion 94 guide the label onto the container until it is clear of the device.

The use of automatic apparatus to receive the dispensed opened tubular band member from the apparatus of the invention and to apply same to a container

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or similar article is also possible. Such apparatus could include a split cone shaped member positioned below the mandrel to receive the open band. Such a cone shaped member could then be opened and moved downward to surround a container and transfer the band member thereto. The container can be automatically moved into position by conveyor means and can also travel vertically up and down using appropriate automatic devices to receive the band member.

What is claimed is:

1. Apparatus for individually dispensing tubular band members from a continuous supply of said bands severably attached to one another in strip form which comprises:

- a. a first pair of pressure contact roll means;
- b. a second pair of pressure contact roll means below said first pair of roll means;
- c. means to drive said first pair of roll means at a predetermined dispensing speed;
- d. means to drive said second pair of roll means at a speed greater than said dispensing speed;
- e. band separator means suspended in the nip of said first pair of roll means and extending downward between said first and second pairs of roll means and terminating in spreader means suspended below said second pair of roll means;
- f. said strip of tubular band being adapted to be passed between said first and second pairs of roll means and over said separator means and to be individually severed from said strip between said pairs of roll means and individually dispensed downward between said pair of roll means and over said spreader means in a substantially opened condition.

2. Apparatus of claim 1 which includes guide means

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above said first pair of roll means adapted to direct said bands to said separator means suspended in the nip thereof.

3. Apparatus of claim 1 which includes guide means between said pairs of roll means adapted to direct said bands to the nip of said second pair of roll means.

4. Apparatus of claim 1 wherein said separator means is suspended between said first pair of roll means by bar means adapted to ride freely in the nip of said first pair of roll means, said bar means having at least one downwardly extending rod means passing between both pairs of roll means and attached to said spreader means, each of said pairs of roll means having vertical grooves to permit said rod means to pass therebetween.

5. Apparatus of claim 1 wherein the first pair of roll means are adapted to be intermittently driven and the means to drive said first pair of roll means are adapted to drive same in a predetermined cycle.

6. Apparatus of claim 5 wherein the means to drive said first pair of rolls is Geneva gear means.

7. Apparatus for individually dispensing tubular band members from a continuous supply of said bands severably attached to one another in strip form which comprises first means adapted to grip and advance said band members, second means adapted to sever and advance individual band members advanced beyond said first means and separator means riding freely in and between said first and second means for separating said band members prior to said first means and for dispensing same in a substantially opened condition after said second means.

8. Apparatus of claim 7 wherein said first means are adapted to intermittently advance said band members.

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