

12

EUROPEAN PATENT APPLICATION

21 Application number: 84300148.8

51 Int. Cl.³: **B 31 B 1/62**
B 05 C 5/02

22 Date of filing: 10.01.84

30 Priority: 10.01.83 US 456958

43 Date of publication of application:
18.07.84 Bulletin 84/29

84 Designated Contracting States:
AT BE CH DE FR GB IT LI LU NL SE

71 Applicant: **CONTINENTAL CAN COMPANY, INC.**
51 Harbor Plaza
Stamford Connecticut 06904(US)

72 Inventor: **Walter, John**
9815 South Artesian Avenue
Evergreen Park Illinois 60642(US)

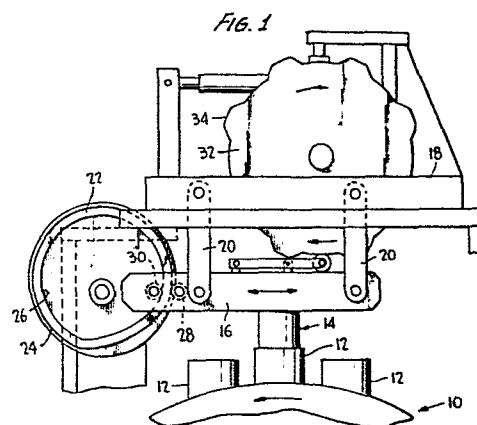
72 Inventor: **Roth, Donald J.**
17 Pleasant Valley Lane
Westport Connecticut, 06880(US)

72 Inventor: **Kubis, Charles S.**
108 Birch Hill Road
Weston Connecticut 06883(US)

74 Representative: **Palmer, Roger et al,**
PAGE, WHITE & FARRER 5 Plough Place New Fetter Lane
London EC4A 1HY(GB)

54 Improved adhesive applicator.

57 This relates to an adhesive applicator for applying a band of adhesive to a cylindrical surface. The applicator includes a body having an open end closed by a resiliently retained valve. There is a pump which delivers a preset quantity of adhesive into the open end of the body upon each actuation, and the valve is automatically opened by the addition of the adhesive into the open end of the body.



IMPROVED ADHESIVE APPLICATOR

This invention particularly relates to the application of a thin band of adhesive to an interior cylindrical surface such as that of a dome unit for a
5 container.

In accordance with this invention, a dome unit is applied to the adhesive applicator in telescoped relation to the body of the applicator, and thereafter a pre-selected amount of adhesive is pumped into a
10 filled open end of the body, which open end is closed by a valve of the poppet type that is resiliently urged towards a closed position. When the additional adhesive is directed into the open end of the body, it forces the valve to an open position. When the additional adhe-
15 sive is directed into the open end of the body, it forces the valve to an open position with the result that adhesive from the open end of the body flows out between the body and an adjacent portion of the then displaced valve onto the surrounding cylindrical surface. If the cylindrical
20 surface is moved in timed relation to the actuation of the pump piston, then the width of the band of adhesive can be controlled.

One of the principal features of the invention is that the same amount of adhesive can be applied upon
25 each actuation of the applicator in that the pump of the actuator will pump exactly the same amount of adhesive upon each and every actuation thereof. By making the relative movement between the applicator and the cylindrical surface exactly the same each time, the contour
30 (thickness) of the adhesive band will be repeated.

The adhesive applicator is primarily intended for applying a hot melt adhesive, and accordingly the body has associated therewith suitable heater means to maintain the body and thus the hot melt adhesive therein
5 at the same temperature. Further, the valve may be provided with a hollow stem in which a heater is located and about which the adhesive flows from the pump cylinder into the body open end.

The construction of the adhesive applicator is
10 such that the pump piston may be repeatedly actuated the same amount by a multiple lobe cam.

With the above and other objects in view that will hereinafter appear, the nature of the invention will be more clearly understood by reference to the following
15 detailed description, the appended claims, and the several views illustrated in the accompanying drawings.

IN THE DRAWINGS:

Figure 1 is an elevational view showing the general environment in which the adhesive applicator
20 functions.

Figure 2 is an enlarged fragmentary sectional view taken through the adhesive applicator, and shows the same in position for applying a band of adhesive to the interior of a cylindrical portion of a container dome.

25 Figure 3 is an enlarged fragmentary sectional view taken through the lower part of the adhesive applicator, with the valve having been displaced and the adhesive flowing around the valve onto the container dome cylindrical surface.

30 Figure 4 is an enlarged fragmentary view of the container dome inverted from its position of Figures 2, 3, and shows the configuration of the applied band of adhesive.

Figure 5 is a sectional view similar to Figure 4,
35 and shows the dome applied to a container body.

Figure 6 is a fragmentary sectional view through another container dome showing a modified adhesive band cross section.

Referring now to the drawings in detail, reference will first be made to Figure 1 wherein there is illustrated an endless conveyor 10 of the Ferris wheel type which carries a plurality of carriers 12, the carriers 12 being equally spaced about the periphery of the container 10, although only three such carriers have been illustrated.

The carriers 12 pass in sequence below the adhesive applicator 14 which is the subject of this invention and present container domes carried thereby to the adhesive applicator 14 in the manner best illustrated in Figure 2 and described in detail hereinafter.

When the motion of the container domes to which the adhesive band is being applied is to be continuous, it is necessary that the adhesive applicator 14 be mounted for movement with an associated carrier 12. Thus, the adhesive applicator 14 is carried by a pair of bars 16 of a parallel bar arrangement which includes upper fixed, spaced bars 18 to which the bars 16 are pivotally connected by means of links 20. Thus, the bars 16 remain parallel to the bars 18 at all times.

The bars 16, which are interconnected, move back and forth in unison by way of a rotating cam 22 which has an outer cam surface 24 and an inner cam surface 26 which are engaged by cam followers 28 and 30, respectively, carried by one of the bars 16.

In a manner to be described hereinafter, the adhesive applicator 14 is to be actuated in timed sequence to its swinging movement and its cooperation with the carriers 12 by means of a rotating cam 32. The cam 32 has plural lugs 34 and, in the illustrated embodiment of the invention, there are eight such lugs 34 so that the cam 32 rotates at one-eighth of the revolutions of the cam 22.

Referring now to Figure 2, it will be seen that the adhesive applicator 14 includes a body 36 which is preferably in the form of a cylindrical member. The body 36 is provided at the bottom thereof with a recess 38
5 which defines an open end surrounded by a cylindrical lower portion 40 of the body 36. As is best shown in Figure 3, the body lower portion has the interior thereof so configured that the cavity 38 has an inner cylindrical wall 42 and a lowermost outwardly flaring wall 44
10 with the wall 44 defining a valve seat. The cavity 42 also has a generally conical top wall 46.

The open lower end of the body 36 is closed by means of a valve generally identified by the numeral 48. The valve 48 is of the poppet type and includes a relatively thick rigid head 50 and a tubular valve stem 52.
15 The valve stem 52 is guided for axial movement within a bore 54 extending entirely through the body 36 from the cavity 38 through the upper end of the body. The valve 48 is resiliently urged to a closed position by means of a suitable spring element 56 which, in the illustrated
20 embodiment of the invention, is in the form of a Belleville washer. The Belleville washer 58 extends between the upper end of the body 36 and a collar 58 which is held in place by a snap ring 60.

25 It will be seen that the valve head 50 also has a generally conical upper surface 62 which generally matches but is spaced from the upper wall of the cavity 38. The valve head 50 has an inner or upper cylindrical surface 64 which matches the cylindrical surface 42 of
30 the body 36 so that the valve head 50 is guided by the surface 42. The surface 64 is provided with a series of circumferentially spaced, axially extending notches or slots 66 so that adhesive may flow from the cavity 38 around the valve head 50 when the valve 48 is in an open
35 position, which open position is illustrated in Figure 3.

The valve head 50 has a relatively thick rim 68 which defines, in conjunction with a flared surface 70, a sealing edge or surface 72 which engages and seats against the valve seat 44.

5 It is intended that the volume of adhesive which is applied upon each operation of the applicator 14 remain constant. To this end there is provided a pump unit 74 which includes a pump cylinder 76 formed in the body 36 and opening out of the top end. The lower end of the
10 pump cylinder 76 opens into a diagonal passageway 78 which extends downwardly and towards the interior of the body 36 and terminates in an annular passageway 80 directly surrounding the valve stem 52 and being in the form of an enlargement of the bore 54. The annular passageway 80
15 opens axially into the cavity 38.

The body 36 also has a supply passage 82 which opens into the lower part of the pump cylinder 76 and which is normally partially closed by a pump piston 84 which extends into the pump cylinder 76 from the upper
20 end of the body 36.

As previously described, the adhesive applicator 14 is actuated by a rotating cam 32 having a plurality of lobes 34. The cam 32 is engaged by a cam follower 86 which is carried by a lever 88 having its opposite end pivotally
25 mounted on a pivot pin 90 carried by a pair of arms 92 which extend upwardly from the bars 16. At this time it is pointed out that the body 36 is suitably fixedly secured to and between the bars 16 and is preferably insulated therefrom by an insulator 94.

30 The upper end of the pump piston 84 is connected by a pivot pin 96 to linkage 98 which, in turn, is connected to an intermediate portion of the lever 48 by a pivot pin 100. Thus, when the cam follower 86 rides up onto one of the lobes 34, the lever 88 will pivot about
35 the pivot pin 90, depressing the linkage 98 which, in turn, will move the piston 84 downwardly a predetermined amount upon each actuation thereof.

When the piston 84 moves downwardly in the cylinder 76, it shuts off the communication between the supply passage 82 and the pump cylinder 76 and thereafter forces a preselected volume of the adhesive into the cavity 38. Since the cavity 38 and the passages 78 and 80 are filled, as well as the lower part of the cylinder 76, it will be seen that the additional adhesive pumped into the cavity 38 cannot be retained within the cavity 38 and the pressure of the flowing adhesive is such as to overcome the force of the spring element 56 to permit the valve 48 to move downwardly and unseat from the seat 44 with the result that adhesive flowing into the cavity 38 will force the adhesive already therein around the valve head 50, past the valve seat 44 and out around the periphery of the valve head rim 68, as shown in Figure 3.

In accordance with this invention, the adhesive applicator 14 is intended to apply a band of adhesive onto an interior cylindrical surface. The primary interior surface for which the adhesive applicator 14 has been developed is an interior surface 102 of a cylindrical lower portion 104 of a container dome 106 which is best shown in cross section in Figure 2. The container dome 106 has a neck portion 108 which is intended to receive a combined dispensing and closure unit (not shown).

The dome 106 is carried by one of the carriers 12. The specifics of the carrier 12 do not form part of this invention. It is to be understood, however, that each carrier 12 does include an axially movable support 110 in which a dome 106 is seated for presentation to the adhesive applicator 14.

In accordance with this invention, when the carrier 12 is aligned with the adhesive applicator 14, the support 110 is axially projected upwardly so as to telescope the cylindrical lower portion 104 of the dome 106 over the body 36 as shown in Figure 2. With the dome 106 being properly positioned relative to the adhesive

applicator body 36, the pump assembly 74 is actuated with the result that adhesive flow around the periphery of the valve head 50 onto the inner surface 102 is initiated.

When the dome 106 is not immediately retracted, the
5 initially applied portion of the adhesive band, which band is now identified by the numeral 112 and is best shown in Figure 4, will have a thickened starting portion 114 which is desirable. As soon as the dome begins to move out of its telescoped relation with respect to the adhesive
10 applicator 14, the thickness of the band 112 will reduce and will be constant until the band is terminated.

At this time it is pointed out that it is feasible to initiate separating movement of the dome 106 from the adhesive applicator 14 either before or at the same
15 time the piston 84 becomes in a position operative to open the valve 48. Then, after a preselected movement of the dome 106, the movement may be slowed down or temporarily stopped to provide the adhesive band 116 of Figure 6 with an intermediate enlargement 118. The movement of the
20 dome 106 relative to the adhesive applicator 14 will then continue and the adhesive will be further applied until the pumping action discontinues.

Referring now to Figure 5, it will be seen that when the dome 106 has the cylindrical lower portion 104
25 thereof telescoped over a necked-in cylindrical upper portion 120 of a container body 122, the space between the cylindrical portions 104 and 120 will be filled with adhesive while the thickened portion 114 of the adhesive band 112 will have embedded therein the free raw edge 124
30 of the container body upper end. Further, there will be a certain degree of downward flow of the adhesive beyond the original position of the band as is obvious from a comparison of Figures 4 and 5. This is, in part, due to the fact that at the time the dome 106 is applied to the
35 container body 122, the fit between the two cylindrical portions 104 and 120 is an interference fit.

Although only a preferred embodiment of the invention has been specifically illustrated and described herein, it is to be understood that minor variations may be made in the adhesive applicator without departing from
5 the spirit and scope of the invention as defined by the appended claims.

I claim:

1. Apparatus for dispensing and applying a band of adhesive onto an internal cylindrical surface, said apparatus comprising a body having an open end terminating in an outward flaring valve seat, a valve member having a head and a stem, said valve stem supporting said valve head for axial movement between sealing engagement with said valve seat and spaced therefrom for permitting adhesive flow from said open end around the periphery of said valve head, spring means extending between said valve stem and said body constantly resiliently urging said valve head against said valve seat to normally prevent adhesive flow from said body open end, a pump cylinder in said body in communication with said body open end, a pump piston in said pump cylinder, and means for reciprocating said pump piston to direct adhesive into said body open end to only fill said body open end by a preselected amount to automatically unseat said valve and to dispense a prescribed annulus of adhesive.
2. Apparatus according to claim 1 wherein there is a device for presenting a container end unit open end cylindrical portion to said body in telescoped relation surrounding said valve head for directly receiving the band of adhesive.
3. Apparatus according to claim 2 wherein said body and said device are axially relatively movable during the actuation of said pump piston to control the width of the band of adhesive.
4. Apparatus according to claim 1 wherein there is an adhesive flow passage from said pump cylinder to said body open end with said passage extending around said valve stem, and said valve stem has heater means for controlling the temperature of adhesive in said body open end.
5. A method of applying a band of adhesive to an internal cylindrical surface, said method comprising the steps of providing a body having an open end closed

by a resiliently retained valve, telescoping the cylindrical surface over the body surrounding the periphery of the valve, and introducing additional adhesive into the body open end to unseat the valve and effect extrusion of a band of adhesive generally surrounding the periphery of the valve.

6. A method according to claim 5 wherein the volume of the additional adhesive is preselected and constant.

7. A method according to claim 6 wherein the body and the cylindrical surface are moved axially relative to each other to control the width of the applied band of adhesive.

8. A method according to claim 5 wherein the body and the cylindrical surface are moved axially relative to each other to control the width of the applied band of adhesive.

9. A method according to claim 7 wherein the body and the cylindrical surface are temporarily stationary relative to each other to provide for a thickening of the applied band of adhesive.

FIG. 1

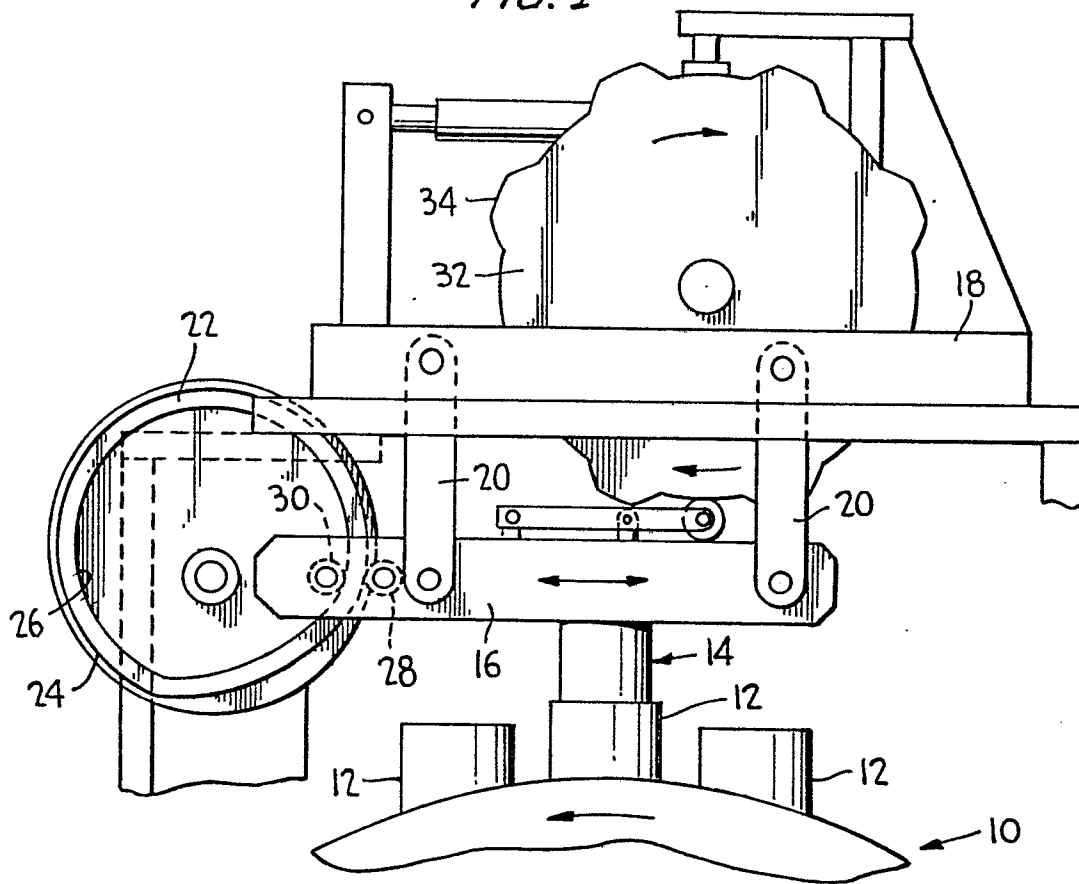


FIG. 4

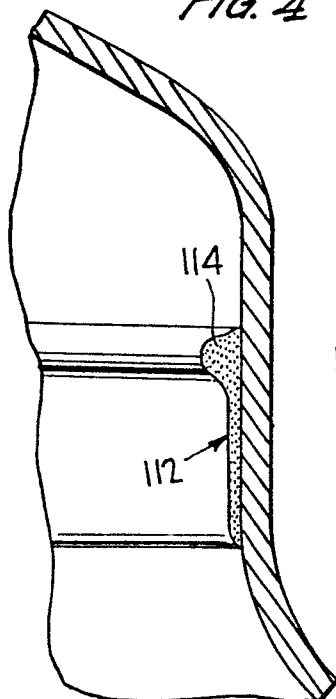


FIG. 6

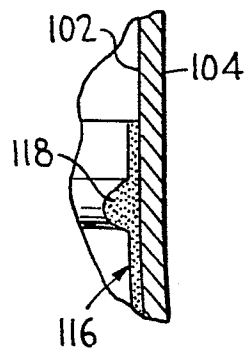


FIG. 6

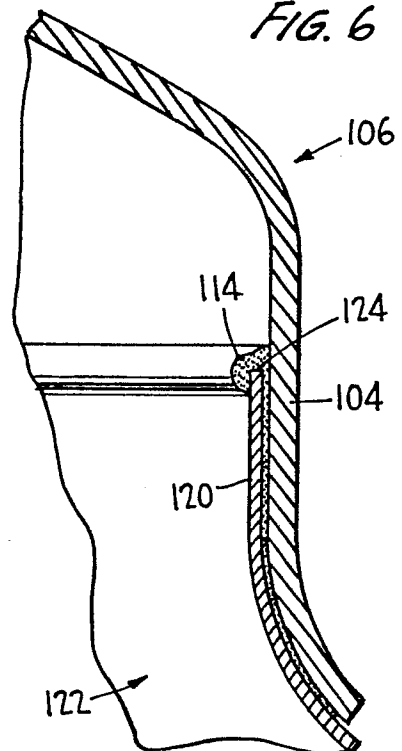


FIG. 3



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)
Y	US-A- 249 328 (HARRISON) * Whole document *	1,2,5	B 31 B 1/62 B 05 C 5/02
Y	--- US-A-3 637 137 (CHEBUHAR) * Whole document *	1,2,5	
Y	--- FR-A-2 477 909 (SARL POMEON) * Whole document *	1,2,3, 5,7,8	
A	--- US-A-3 658 029 (KELLY) * Abstract; figures *	6	
A	--- US-A-3 387 348 (KILGALLON) * Column 4, lines 53-66; column 6, lines 16-34; figures 1,2 *	1,4	
A	--- US-A-2 684 049 (HOLLIS) * Column 4, line 59 - column 5, line 7; figures *	1	
A	--- US-A-1 384 048 (COATES) -----		
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 12-04-1984	Examiner PEETERS S.
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			