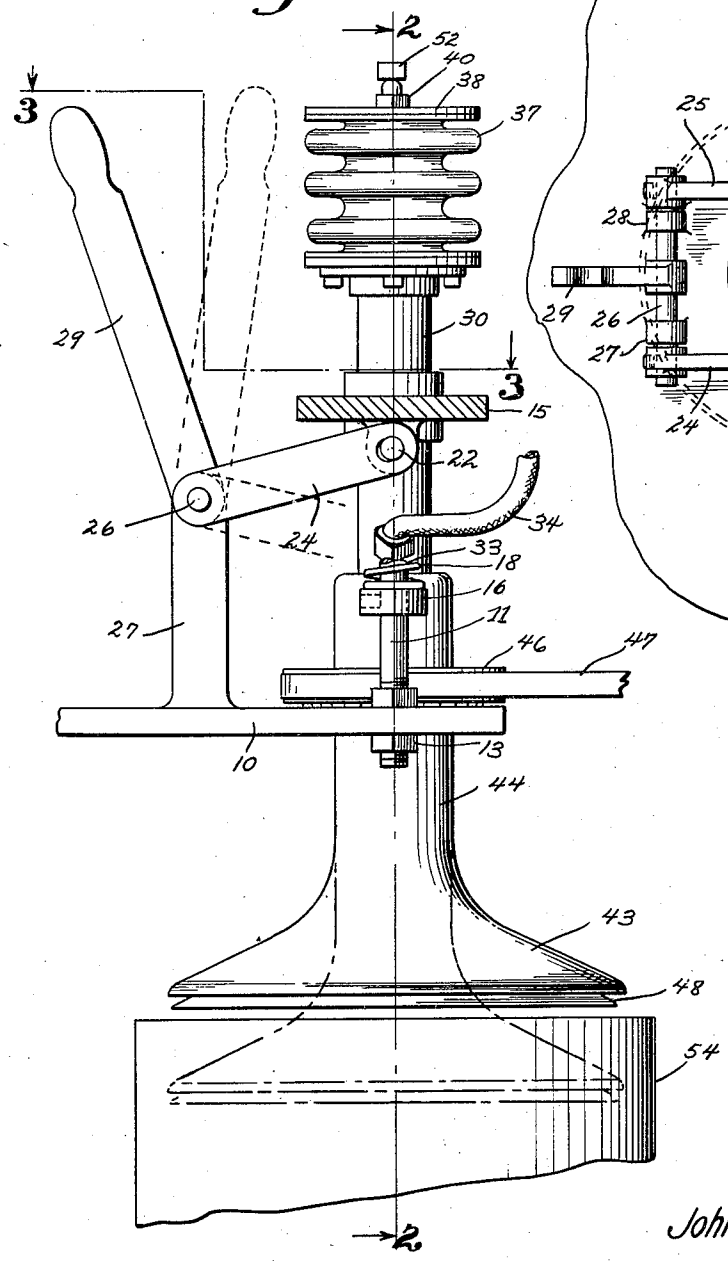
Jan. 24, 1950 J. K. M. HARRISON 2,495,328

ADHESIVE APPLICATOR

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Fig. 1.



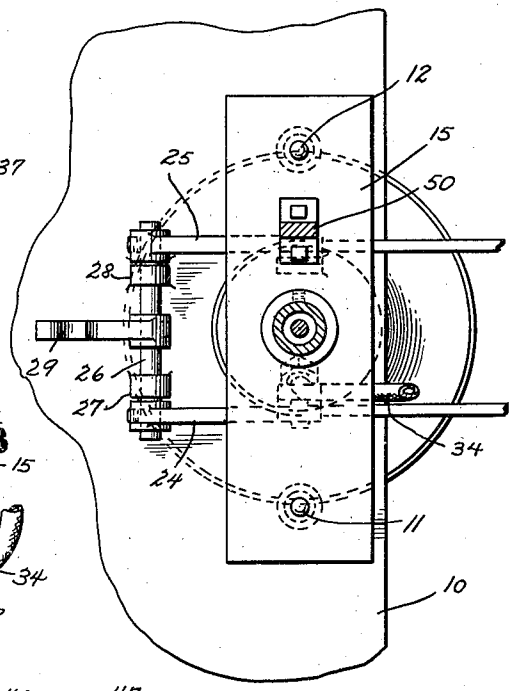


Fig. 3.

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ADHESIVE APPLICATOR

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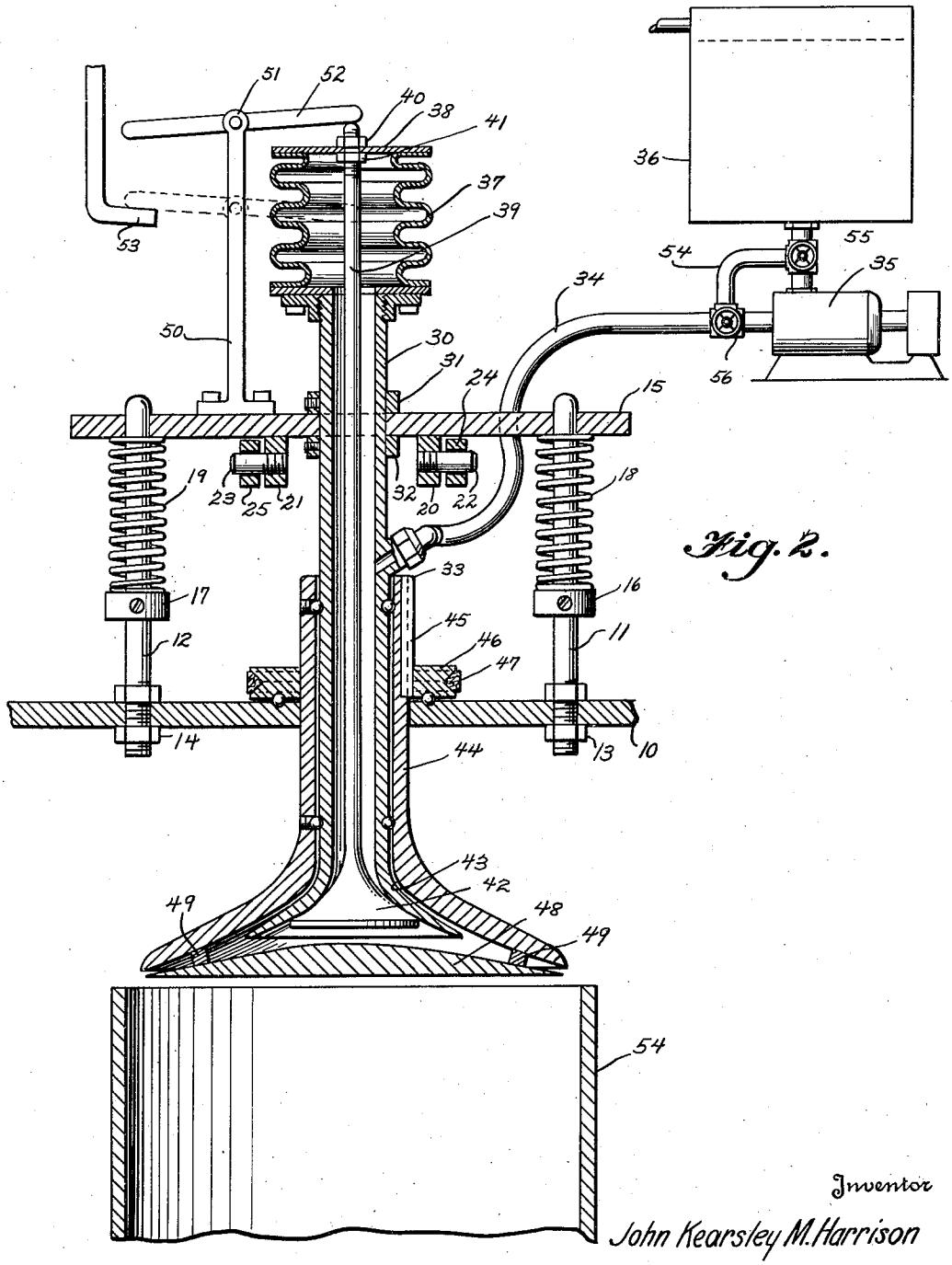


Fig. 2.

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ADHESIVE APPLICATOR

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Application November 5, 1948, Serial No. 58,383

9 Claims. (Cl. 91—12)

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This invention relates to adhesive applicators and more particularly to a machine for applying a band of adhesive within a tubular container as a step precedent to the attachment of the container end closure.

In the manufacture of non-metallic containers of the type in which a tube is formed, closed at one end, then filled from the other end and finally closed at said other end, a problem is presented in the application of the adhesive which is used to bond in position the end closure which is inserted after completion of the filling operation. This problem arises from the very nature of the operation to be performed which requires that the adhesive be supplied rapidly, evenly and in such quantity and so located within the container that no opportunity is afforded for the adhesive to flow into or mix with the contents of the container.

In order to prevent mixing of the adhesive with the contents of the container, it has long been customary to employ adhesives of high viscosity. While this prevents the adhesive applied to the interior of the container from mixing with the container contents, it creates an additional problem of feeding the adhesive at an adequate rate and in uniform quantities to the point of use.

It is to the solution of the adhesive supply problem that the present invention is directed, and it is an object of the present invention to provide apparatus adapted for use either with fully automatic or fully manual filling and closing machinery whereby adhesive of any desired composition and physical properties is supplied in a convenient and reliable manner to form an accurately located band of adhesive within a container.

Other objects and advantages of this invention will be apparent upon consideration of the following detailed description of an embodiment thereof in conjunction with the annexed drawings wherein:

Figure 1 is a view in side elevation of a manual adhesive applicator constructed in accordance with the present invention;

Figure 2 is a view in vertical section taken on the line 2—2 of Figure 1; and

Figure 3 is a view in section taken on the line 3—3 of Figure 2.

Referring now in greater detail to the drawings, the numeral 10 designates a stationary platform which is disposed in fixed spaced relationship above a conveying mechanism, not shown, which supplies containers which have been filled and which are to be supplied with adhesive preparatory to the insertion of the end closure disc. The adhesive applicator of the present invention is resiliently supported from the platform 10 by standards 11 and 12 which are bolted at 13 and 14 to the platform 10 and which extend upwardly therefrom and pass through a support plate 15. Standards 11 and 12 are provided, respectively, with adjustable locking collars 16 and 17, and between these collars and the plate 15 there are disposed coil springs 18 and 19. It is therefore apparent that the plate 15 is resiliently supported by the springs 18 and 19 which are, in turn, supported by the collars 16 and 17, which through the standards 11 and 12 are supported from the platform 10. It is likewise apparent that, depending upon the position of the collars and the resulting adjustment of the thrust of the springs 18 and 19, the normal or repose level of the platform 15 can be predetermined.

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Attached to the platform 15, or integral therewith, are a pair of ears 20 and 21 which support oppositely extending studs 22 and 23. A lever 24 is pivotally mounted over the stud 22, and a similar lever 25 is pivotally mounted over the stud 23, and these two levers are keyed at their opposite ends to a shaft 26 which is pivotally mounted in bearings provided in the upper ends of two standards 27 and 28 which extend upwardly from the fixed platform 10. Intermediate the bearings 27 and 28, another lever 29 is mounted, and this lever is attached to the shaft 26 for movement therewith.

It is now apparent that, if the lever 29 is moved clockwise from the Figure 1 position, the shaft 26 will be moved clockwise, and this movement, imparted to the levers 24 and 25, will cause the plate 15 to be moved downwardly against the action of springs 18 and 19. Similarly, release of the lever 29 from the broken-line position of Figure 1 will permit the springs 18 and 19 to operate to restore the plate 15 to its normal position which, as was stated before, can be somewhat predetermined by the position of collars 16 and 17.

Mounted on the plate 15 there is a tube 30 which constitutes an important part of the adhesive applicator. The tube is shown as held by locking collars 31 and 32 acting on it from opposite sides of the plate 15. It is apparent, however, that any other means for rigidly supporting the tube 30 can be used in lieu of that specifically shown. The tube 30 is provided at a point below the locking collar 32 with an outwardly extending connection or nipple 33 to which there is attached a flexible adhesive supply conduit 34,

The adhesive supply conduit leads through a positive displacement type pump 35 into an adhesive storage tank 36.

The upper end of the tube 30 is attached to a Sylphon bellows 37, and the top plate 38 of the bellows receives and holds a valve stem 39 which is attached to the plate 38 by locking nuts 40 and 41, or otherwise as may be expedient in any given installation. The valve stem 39, remote from the end which is mounted in the plate 38, is provided with a valve 42 which seats against a valve seat provided in the lower end of tube 30. A rotatable sleeve 44 having a bell mouth 43 is mounted over the tube 30 for rotation with respect thereto, but is locked against relative axial movement with respect to said tube. The sleeve 44 is provided with an elongate key 45, and through this key it is connected to a sheave 46 which receives a belt 47 by which the sheave 46 and through it the sleeve 44 can be rotated. The bell mouth 43 of the sleeve 44 is provided with a mouth enclosure member 48 which is held in spaced relationship from the mouth of the bell by studs 49. The studs 49 so space the member 48 from the bell mouth 43 as to provide an annular slot for the centrifugal distribution of adhesive.

The plate 15, in addition to supporting the tube 30, also supports a standard 50 which, at its upper end, is provided with a bearing 51 supporting a lever 52 for rocking movement. One end of this lever is in a position to coact with the upper end of the valve stem 39, and the other end is positioned to coact with a stop member 53 which is mounted in fixed position from any convenient support, such as from the platform 10.

In operation, a container, such as the tubular container 54 shown in Figures 1 and 2 of the drawings, comes into vertical registry below the bell mouth 43 of the sleeve 44. If now adhesive is to be applied to the interior of this container, the belt 47 is caused to be driven so that the sleeve 44 and all parts associated with it are caused to rotate. This rotation, of course, is in the full-line position of Figure 1 and is still in the plane above the top edge of the container. If now the lever 29 is moved to the right, as viewed in Figure 1, to the broken-line position shown in Figure 1, the bell mouth 43 is lowered to the broken-line position of Figure 1. As this movement is accomplished, all of the parts which are supported directly or indirectly from the plate 15 move downwardly. Thus, the relative positions of the sleeve 30, the sleeve 44 and the valve 42 remain the same as they are in Figure 2, the valve being biased to closed position by the bellows 37. However, after the movement has proceeded to such an extent that the lever 52 strikes the stop 53, the lever 52 is rocked in a clockwise direction as shown in Figure 2, causing a depression of the valve stem 39 which is entirely independent of the bodily movement of that valve stem brought about by the operation of the lever 29. As the valve stem is depressed, the valve opens up an annular space between itself and the seat at the lower end of tube 30. Since the bell mouth is rapidly rotating at this time, it is apparent that, as soon as the valve 42 is moved to an open position, adhesive is discharged through the annular space defined between the valve and its seat, and that this adhesive is thrown out by centrifugal force through the annular slot between the bell mouth and the member 48.

Depending upon the viscosity and nature of the adhesive used, the adhesive may be supplied by air pressure from the tank 36 through the tube 34, or may be supplied by operation of the pump 35. Since either of these expedients is contemplated, a shunt pipe 54 is shown in Figure 2, and valves 55 and 56 are associated with this pipe in such a way that the liquid may go from the tank directly to the conduit 34 or through the pump 35. In any event, the liquid under pressure is retained within the tube 30 until the time for discharge occurs, at which time the collapse of the bellows 31 imparts an initial impulse to the adhesive to assist the pressure of the tank 36 or the pump 35 and insure a prompt and equal distribution of the adhesive for centrifugal discharge to form an annular band within the upper interior of the tube 54.

While the invention has been described with reference to a manually operated embodiment thereof, that is, an embodiment in which the lever 29 is manually moved, it is apparent that the lever 29, or its equivalent, may be machine operated in timed sequence with the filling and closing operations so that the bell mouth will be lowered and the valve opened in timed relation with the arrival of tubes requiring a band of adhesive to hold their end caps in position.

What is claimed is:

1. Apparatus for applying a band of adhesive to the interior of a container which comprises a hollow supporting tube, a rotary centrifugal adhesive distributor mounted thereover, means for introducing adhesive under pressure into said supporting tube, valve means controlling flow from said tube to said distributor, and valve-operating means including a driven portion within the tube, a driving portion without the tube and an intermediate bellows establishing a driving connection between the driven portion and the driving portion and sealing the tube against undesired out-leakage of adhesive.

2. Apparatus for applying a band of adhesive to the interior of a container which comprises a hollow supporting tube, a rotary centrifugal adhesive distributor mounted thereover, means for introducing adhesive under pressure into said supporting tube, valve means controlling flow from said tube to said distributor, means for reciprocating said tube, valve-operating means including a driven portion within the tube, a driving portion without the tube and an intermediate bellows establishing a driving connection between the driven portion and the driving portion and sealing the tube against undesired out-leakage of adhesive, and means responsive to tube reciprocatory movement in one direction for activating said valve-operating means in a valve-opening direction, said bellows normally resiliently maintaining said valve in closed position.

3. Apparatus for applying a band of adhesive to the interior of a container which comprises a hollow supporting tube, a rotary centrifugal adhesive distributor mounted thereover, an adhesive storage container, means for putting adhesive in said container under gas pressure, means for introducing adhesive under gas pressure into said hollow supporting tube, valve means controlling flow from said tube to said distributor, and valve-operating means including a driven portion within the tube, a driving portion without the tube and an intervening bellows connecting the driving and driven portions, said bellows normally maintaining the valve in its closed position and sealing the sleeve against undesired out-leakage of adhesive.

4. Apparatus for applying a band of adhesive to the interior of a container which comprises a

hollow supporting tube, a rotary centrifugal adhesive distributor mounted thereover, a positive displacement pump for introducing adhesive under pressure into said hollow supporting tube, valve means controlling flow from said tube distributor, and valve-operating means including a driven portion within the tube, a driving portion without the tube and an intervening bellows connecting the driving and driven portions together, sealing the sleeve against undesired outleakage of adhesive and serving to bias the valve to its closed position.

5. Apparatus for applying a band of adhesive to the interior of a container comprising a stationary platform, a plate mounted from said platform for reciprocation toward and away from the platform, a hollow supporting tube fixedly mounted on said plate, resilient means normally biasing said plate to a predetermined position relative to said platform, means for displacing said plate toward said platform against said bias, a centrifugal adhesive distributor mounted for rotation on said supporting tube and adapted to receive adhesive from said tube for distribution to the interior of a container, means for rotating said distributor, valve means for controlling flow from said tube to said distributor, means including a flexible conduit for introducing adhesive under pressure into said tube, and valve-operating means including a driven portion within the tube, a driving portion supported on said plate and lying without the tube and a bellows connecting said driving and driven portions, sealing the sleeve against leakage and normally biasing the valve to closed position, and means in the path of movement of said driving portion as said plate is moved toward the platform for actuating said driving portion to open said valve.

6. Apparatus for applying a band of adhesive to the interior of a container or the like which comprises a stationary platform, a sleeve having a bell mouth, said sleeve being rotatably mounted within said platform, a tube mounted within said sleeve fixedly mounted relative to said platform and terminating short of the mouth thereof in a valve seat, a bellows closing the other end of said tube, a valve coacting with said seat, a valve stem connected at one end to said valve, extending through said tube and connected at its other end to said bellows, means for introducing adhesive under pressure into said tube, means for rotating said sleeve, means for reciprocating said tube, and means responsive to movement of said tube in one direction for collapsing said bellows to open said valve, said bellows serving normally to bias said valve in closed position.

7. Apparatus for applying a band of adhesive to the interior of a container or the like which comprises a stationary platform, a sleeve having a bell mouth, said sleeve being rotatably mounted within said platform, a tube mounted within said sleeve fixedly mounted relative to said platform and terminating short of the mouth thereof in a valve seat, a bellows closing the other end of said tube, a valve coacting with said seat, a valve

stem connected at one end to said valve, extending through said tube and connected at its other end to said bellows, an adhesive storage tank, means to put the adhesive in said tank under gas pressure, means for introducing adhesive under gas pressure into said tube, means for rotating said sleeve, means for reciprocating said tube, and means responsive to movement of said tube in one direction for collapsing said bellows to open said valve, said valve being biased to the closing position by said bellows.

8. Apparatus for applying a band of adhesive to the interior of a container or the like which comprises a stationary platform, a sleeve having a bell mouth, said sleeve being rotatably mounted within said platform, a tube mounted within said sleeve fixedly mounted relative to said platform and terminating short of the mouth thereof in a valve seat, a bellows closing the other end of said tube, a valve coacting with said seat, a valve stem connected at one end to said valve, extending through said tube and connected at its other end to said bellows, an adhesive storage container, a positive displacement pump, means connecting the container to the pump inlet, means connecting the pump outlet to said tube, means for rotating said sleeve, means for reciprocating said tube, and means responsive to movement of said tube in one direction for collapsing said bellows to open said valve, said bellows normally biasing said valve to closed position.

9. Apparatus for applying a band of adhesive to the interior of a container or the like which comprises a stationary platform, a sleeve having a bell mouth, said sleeve being rotatably mounted within said platform, a tube mounted within said sleeve fixedly mounted relative to said platform and terminating short of the valve thereof in a valve seat, a bellows closing the other end of said tube, a valve coacting with said seat, a valve stem connected at one end of said valve, extending through said tube and connected at its other end to said bellows, an adhesive storage container, means for introducing air under pressure into said container, a positive displacement pump, selective means for establishing direct communication between said container and said tube, or communication through said pump, means for rotating said sleeve, means for reciprocating said tube, and means responsive to movement of said tube in one direction for collapsing said bellows to open said valve, said bellows normally biasing said valve to closed position.

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