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G. A. McNAB
GLUE APPLICATOR

2,480,663

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2 Sheets-Sheet 1

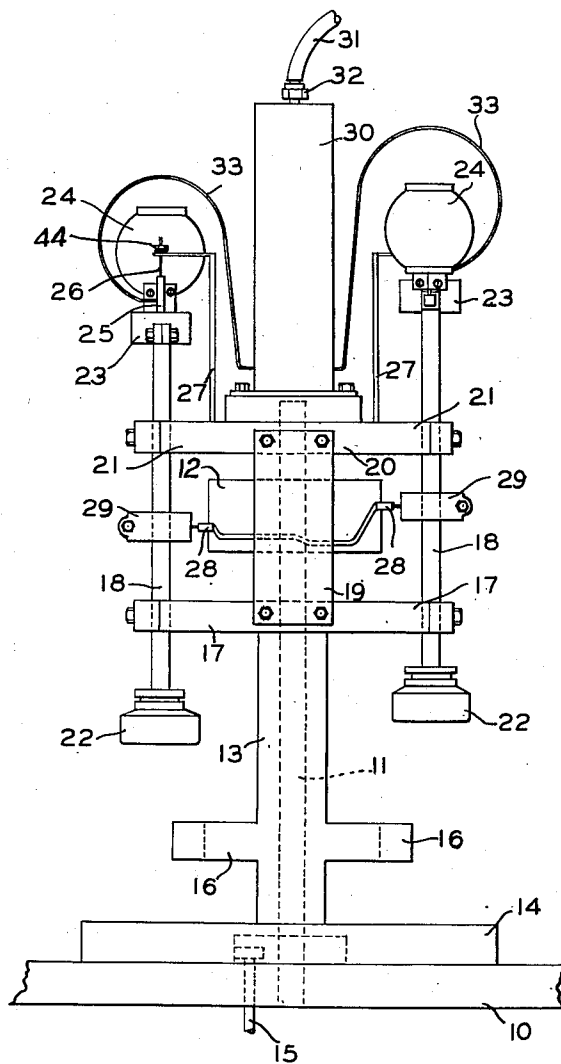


FIG. 1

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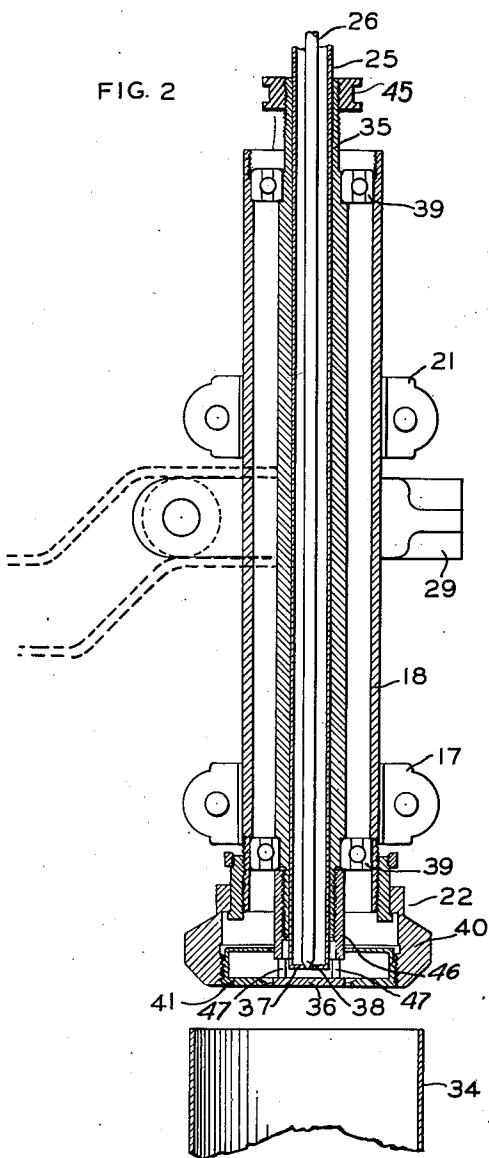
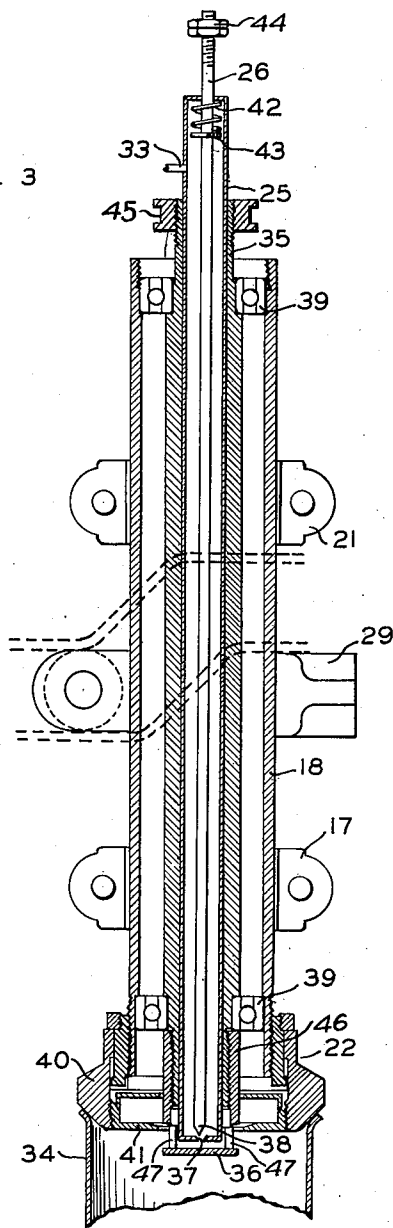


FIG. 3



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GLUE APPLICATOR

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1 Claim. (Cl. 91—44)

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This invention relates to a machine for applying glue or like liquid to the interior of a tubular element, such as a spirally wound tube adapted to be employed as the body of a container formed of paper or other similar sheet material.

The machine of this invention is specifically designed as an element of a continuous line for the production and filling of tubular paper containers and will be herein described in connection with that exemplary operation; it being understood that the invention is not limited thereto, but resides in the combination of mechanical elements hereinafter described.

In the production and filling of paper containers, a body portion may be advantageously formed by spiral winding of chipboard or the like on a mandrel. Simultaneously with the formation of the paper tube, the same is usually lined with a moisture resistant material such as parchment and a bonding and moisture proofing material may be applied to the several laminations forming the tube wall as these are fed to the mandrel. The spirally wound tube is then cut to suitable lengths, moisture-proofing applied to the cut ends, and the lengths are supplied to a line for inserting and sealing end members and for filling the container between insertion of the two ends. Typically, the end of the container body is flared slightly and a ring of adhesive is applied to the interior of the tubular body just below the upper edge. An end closure disc is then inserted at the ring of glue and the end of the body is spun in and over to seal the closure disc in place. The container is then inverted, filled and the steps of flaring, applying glue, insertion of disc and sealing are repeated on the open end to finish the container.

The present machine is intended to be used at two stations on such an assembly line for simultaneously flaring the end of the tubular body and applying a ring of glue thereto prior to insertion of the end discs. As a practical matter, the ring of glue is best applied in a high speed assembly line by means to throw or spray a narrow stream of glue against the sides from a point inside the tubular body. The amount of glue must be restricted to the quantity needed, to avoid fouling the container, its contents and the machine. Additionally, the projection of glue must be restricted to the time the projecting

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device is inside the container. Otherwise, glue is transferred to various parts of the line, fouling the exteriors of the containers and interfering with operating parts of the line resulting in undue spoilage of containers, and in extreme cases, damage to the machines in the line.

The embodiment of the invention specifically shown here is designed for use in a line employing a series of rotary turrets, each constituting a station for performing one or more operations. It will readily be seen, however, that the invention can be embodied in linear assembly lines and any other type of manufacture where several steps are performed in series.

The invention provides a rotary member for projecting a narrow stream of glue to the inside of a tubular body element while the projecting means is within the said member and for protecting against loss of glue from the device when retracted from the tubular element. The nature and advantages of the invention and the manner in which the difficulties noted above are overcome will be apparent from consideration of a typical embodiment shown in the annexed drawings, wherein:

Figure 1 is an elevation of a turret according to the invention;

Figure 2 is a section through the reciprocating casing of the operative parts of the assembly of Figure 1; and

Figure 3 is a section similar to that of Figure 2 showing the device in a different position.

Referring specifically to Figure 1, the turret is mounted in a line on a base plate 10 from which projects a shaft 11 fixed in the plate 10 and carrying a cam 12 keyed to the shaft 11. The moving parts of the turret are carried by a frame 13 projecting from a rotary table 14 which is driven from shaft 15. Recessed arms 16 are formed to receive tubular body elements for forming containers which rest on the rotary table 14.

Arms 17 project from the frame 13 above the recessed arms 16 and carry bearings at their outer ends to permit reciprocating motion of casings 18 in the bearings as guides. Plates 19, are securely fastened to a portion of the frame extending beyond the cam 12 and carry a plate 20 from which project two arms 21 similar in nature and function to the arms 17.

A tube engaging head 22 is mounted at the lower end of each of the casings 18 for flaring and applying glue to tubular container bodies in the manner described in more detail hereinafter. At the top of each of the casings 18 is a cap 23 carrying a motor 24. A glue tube 25 projects from the top of the cap 23 and is rigidly fixed thereto and a valve stem 26 passes through the top of glue tube 25. An arm 27 mounted on plate 20 has a forked end to receive the stem 26 and lock nuts 44 are so adjusted that they will rest on the arm 27 when casing 18 is at the bottom of the stroke imparted to it by cam 12 through followers 28 mounted on clamps 29 fixed to casings 18. A glue reservoir 30 is mounted on plate 20 and maintained under pressure from tube 31 connected to the reservoir by rotary union 32. Glue under pressure flows from reservoir 30 by flexible tubes 33 to the glue tubes 25.

Figures 2 and 3 illustrate how the device operates, Figure 2 showing the casing in retracted or neutral position above a tubular container body and Figure 3 showing the casing in extended operative position. Within the casing 18 is a hollow spindle 35 having its upper end threaded to receive a pulley 45 by which it is driven from motor 24. The lower end of spindle 35 is engaged by a threaded collar 46. Pins 47 depending from the lower edge of collar 46 carry a plate 36. Plate 36 is thus caused to rotate with spindle 35 and therefore throws glue outward in a narrow stream by centrifugal force.

The glue tube 25 extends down through the hollow rotating spindle 35 to a point above the plate 36 and has a valve seat at its lower end to receive needle valve 38 forming the lower extremity of valve rod 26. The hollow spindle is mounted in the casing 18 with ball bearings 39 to permit rapid rotation of the spindle. The head 22 comprises a collar 40 mounted to slide on the casing 18 and carries an annular glue catcher 41 adapted to surround the rotating plate 36 when the device is in the neutral inoperative position with the collar 40 at its lowest point with respect to casing 18.

Operation of the device may well be discussed in connection with Figure 1, referring to Figures 2 and 3 for details. A tubular body element (or a filled container, depending on which of these two stages is considered), is transferred onto the rotating table 14 by conventional means. As the table rotates, roller 28 follows the groove in cam 12, thus causing casing 18 to slide down in the bearings on arms 17 and 21. The machine is so adjusted that collar 40 engages the top of the container wall as the casing 18 approaches the limit of downward movement and the casing slides down through collar 40 to expose rotating plate 36 inside the container wall. The spindle 35 and plate 36 rigidly supported therefrom are driven at high speed, for example 5500 R. P. M. and glue deposited on the plate from the glue tube is thrown with considerable force against the container wall in a narrow stream. Glue is supplied

only at the bottom of the stroke when the lock-nuts on the top of valve stem 26 engage the forked end of arm 27.

As the turret continues to revolve, the casing is raised sufficiently to raise the lock-nuts off the end of arm 27 and a spring 42, bearing on a plate 43 secured to the valve stem 26, causes the valve to seat tightly and halt the flow of glue to plate 36. This first rise in the groove of cam 12 is insufficient to allow collar 40 or glue catcher 41 to interfere with the throwing action of plate 36 which continues for a period until the follower 28 meets a further rise in the groove of cam 12 and lifts the head 22 clear of the container wall. The glue throwing plate is now surrounded by glue catcher 41 and any glue which may be projected from the latter will be received in the glue catcher and prevented from fouling machinery or containers. In actual use, very little glue is retained by the plate 36 on withdrawal from the inside of the container, but accumulations from many successive operations will seriously affect the manufacturing processes if not caught by some retaining means in the head 22. It is, of course, desirable to clean the glue catcher from time to time, but the purpose of cleaning is primarily for removal of solidified glue. Liquid glue will drip from the glue catcher onto the rotating plate and either be thrown back into the glue catcher or onto the interior of a container body.

I claim:

In a glue applicator, a rotary table, positioning means on said table for positioning a tubular member in vertical position on said table, a frame carried by said table, reciprocating means mounted for vertical reciprocation on said frame above said positioning means, cam means for inducing vertical reciprocation of said reciprocating means coordinated to rotation of said table, a spindle mounted for rotation in said reciprocating means, means for rotating said spindle, a centrifugal plate at the bottom of said spindle mounted thereon for rotation therewith, means to supply a fluid to said plate when said reciprocating means is at the bottom of its stroke, a collar slidably mounted on the lower end of said reciprocating means about said plate and adapted to slide up said reciprocating means to expose said plate and a recessed fluid catcher in said collar to catch fluid thrown from said plate when said plate is within said collar.

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