

May 15, 1945.

H. W. MARTIN

2,376,069

ADHESIVE APPLYING MACHINE

Filed Oct. 15, 1943

Fig. 1

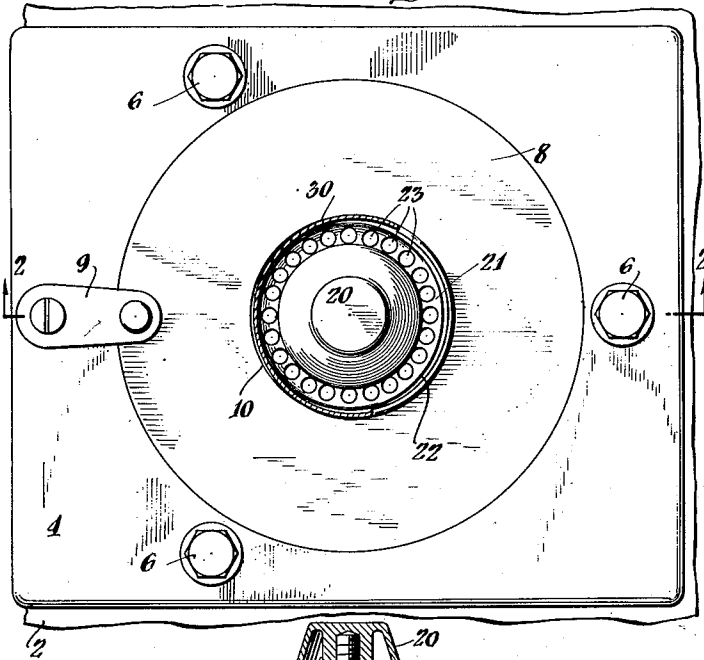


Fig. 3

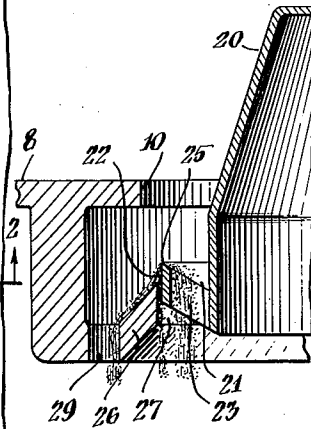


Fig. 4

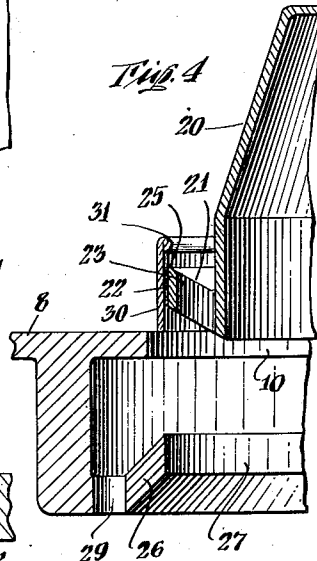


Fig. 2

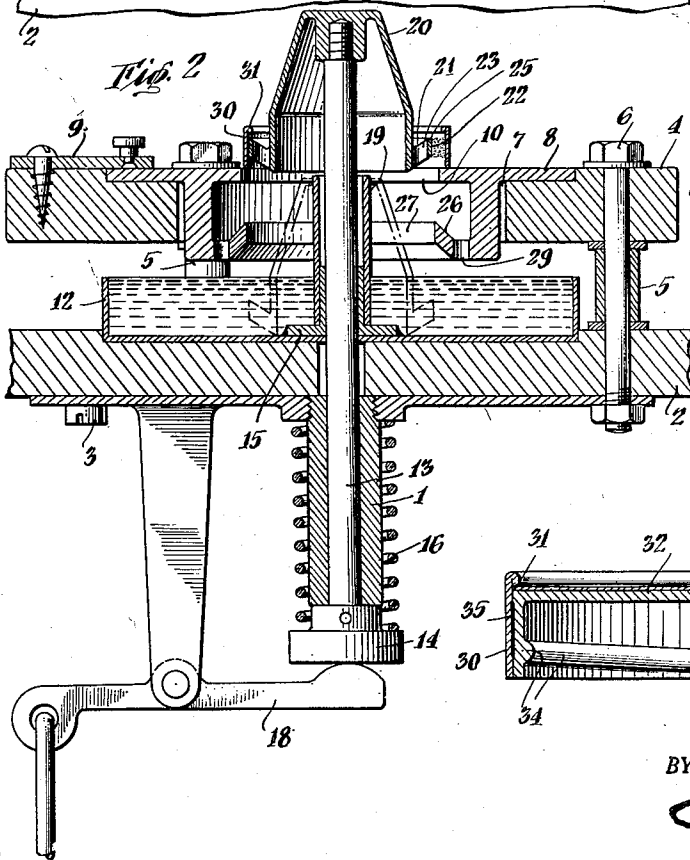
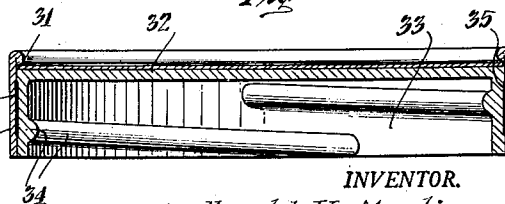


Fig. 5



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2,376,069

ADHESIVE APPLYING MACHINE

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Application October 15, 1943, Serial No. 506,386

12 Claims. (Cl. 91—47)

This invention relates to a gluing machine and has for its object to provide a new and improved machine for rapidly and efficiently applying an adhesive to a predetermined part of an article without requiring special knowledge or skill on the part of the operator.

Another object of the invention is to provide a machine of the above type for applying an adhesive to the inner surface of an annular band or the like in such a way that the band may then be slipped over and secured to a support without smearing.

Still another object is to provide a machine of the type specified for use in the manufacture of paper caps for capping jars, bottles and the like, whereby an adhesive may be properly applied to the inner surface of an annular band for securing same upon the annular skirt or flange of the cap for reinforcing purposes.

Various other objects and advantages will be apparent as the nature of the invention is more fully disclosed.

The invention is particularly useful in the manufacture of composite paper caps of the type disclosed in a copending application of Carl W. Goodwin, Serial No. 504,557, filed October 1, 1943, comprising a diaphragm portion and an upstanding annular skirt formed in a single piece, and having an annular paper band surrounding the outer surface of the skirt for reinforcing same. In the interest of economy it is desirable to glue the annular bands to the caps as rapidly as possible, but at the same time it is essential to confine the adhesive substance to the precise parts to be joined and to avoid smearing the outer surfaces of the caps which might thereby become stuck together or to foreign substances with resulting loss in production.

In one embodiment of the invention, disclosed herein for purposes of illustration, my machine includes a platform having a circular opening smaller in diameter than the annular band which is to be treated with adhesive, and beneath this opening is a reservoir for the adhesive which may be a water-soluble glue, although the term "glue" as employed herein is to be understood as referring to any of a wide variety of adhesive substances. An applicator, which in this embodiment of the invention has a cylindrical outer surface, is adapted to pick up glue from the reservoir and to be raised by a foot treadle or other suitable means to a position above the platform where the annular band to be treated may be dropped over the glue-coated surface of the ap-

plicator and manipulated in an instant to transfer the glue to the precise part of the band where it is needed.

In this preferred embodiment of the invention the applicator, in rising from the reservoir, passes through a close-fitting ring or cylinder which acts as a doctoring device to remove the excess glue and allow it to drop back into the reservoir before the applicator emerges onto the platform. Furthermore, the applicator itself is preferably provided with a conical inner wall which meets the cylindrical outer surface in a sharp knife-like annular edge so that any glue picked up by such edge will flow down the conical inner wall of the applicator and drain back into the reservoir. As a result, the glue-coated cylindrical outer surface of the applicator is the only part of the applicator which can possibly come in contact with the band to be treated, and the foregoing and other constructional features of the machine insure that said band will only be coated in the precise area which is intended.

Although the novel features which are believed to be characteristic of the invention are pointed out more particularly in the claims appended hereto, the nature and scope of the invention may be better understood by referring to the following description, taken in connection with the accompanying drawing forming a part thereof, in which a specific embodiment has been set forth for purposes of illustration.

In the drawing:

Fig. 1 is a plan view of the machine showing an annular paper band, partly in section, in position for gluing;

Fig. 2 is a vertical section through the machine, taken on line 2—2 of Fig. 1;

Fig. 3 is a detail sectional view of the applicator and the doctor device for removing the excess adhesive therefrom;

Fig. 4 is a similar view showing the applicator raised above the platform in position for applying the adhesive to the band; and

Fig. 5 is a sectional view through a finished paper cap with the outer annular band glued in place.

In the following description certain specific terms are used for convenience in referring to the various details of the invention. These terms, however, are to be interpreted as broadly as the state of the art will permit.

The apparatus shown in the drawing comprises a vertical bearing bracket 1 supporting a horizontal shelf 2, which is secured thereto by bolts 3.

A horizontal table top or platform 4 is mounted above the shelf 2, being separated therefrom by spacers 5, and is secured thereto by bolts 6.

The table top 4 has a central opening 7 in which is seated a plate or casting 8 having its upper surface flush with the table top and locked in place by a suitable clamp 9 as shown in Figs. 1 and 2.

The plate 8 has a circular opening 10 which is smaller in diameter than the paper band to be treated, as will be more readily apparent from the ensuing description. Mounted on the shelf 2, directly beneath the opening 10 in plate 8, is a reservoir 12 comprising a cup-shaped container for the adhesive to be dispensed.

A vertically movable shaft 13 is mounted axially of the opening 10 in plate 8, being journaled in bearing 1. This shaft extends upwardly through a flanged collar 15 in reservoir 12, as shown in Fig. 2. A coil spring 16 surrounding bearing 1 and acting against a collar 14 on the end of shaft 13 normally holds the shaft in its down position so that the glue applicator, hereinafter described, is normally seated in reservoir 12 and the glue thereon is prevented from hardening from exposure to air. The collar 14 on shaft 13, by engaging the bottom of bearing 1, limits the upward movement of the shaft, and the precise distance of travel may be regulated by adjusting the position of collar 14 on the shaft 13.

A sleeve or bushing 19 surrounds the collar 15 in reservoir 12 and extends well above the reservoir to a point adjacent the top of platform 4 to shield the shaft 13 from the adhesive material. A hood 20 having a downwardly sloping outer wall is secured to the top of shaft 13 and is adapted in all positions of the shaft to overlie and shield the top of sleeve 19 against the ingress of adhesive.

An applicator comprising a dished surface 21 and a cylindrical outer surface 22 is carried by, or formed integrally with, the lower end of hood 20, so that any adhesive picked up by the hood 20 will flow down the sloping wall of said hood into the dished surface 21 of the applicator. A plurality of holes 23 are formed in the dished surface 21 adjacent its juncture with hood 20, as shown in Fig. 1, so that such adhesive will drain back into the reservoir 12. The cylindrical outer surface 22 of the applicator meets the dished surface 21 in a sharp knife-like annular edge 25, for a purpose hereinafter described.

A doctor member 26 having a cylindrical scraping surface 27 is carried by, or formed integrally with, the plate 8 of table top 4 in axial alignment with the shaft 13 and the cylindrical outer surface 22 of the applicator, as shown in Fig. 2. The cylindrical scraping surface 27 of the doctor member is only slightly greater in diameter than the cylindrical surface 22 of the applicator, the precise clearance between these surfaces determining the thickness of the layer of adhesive which will remain on the surface 22 of the applicator when it is raised to the operative position above the table top 4, as shown in Fig. 2.

The shaft 13 is actuated in any suitable manner, as by a foot treadle acting on a pivoted lever 18, the lever serving to shorten the foot stroke. Normally, the spring 16 holds the shaft down, with the applicator in the glue. When the foot treadle or other operating device is released to lower the shaft 13 to this position, the hood 20 and the applicator carried thereby are lowered into reservoir 12, as shown in dotted lines in Fig. 2. When shaft 13 is raised to the elevated position shown in Fig. 2, the adhesive-coated appli-

cator passes through the cylindrical wall 27 of doctor member 26, so that excess adhesive is scraped off the outer surface 22 of the applicator and drops back into reservoir 12, as shown in Fig. 3.

In the embodiment illustrated, the doctor member 26 has a downwardly sloping surface and a plurality of holes 29 are formed about the outer periphery of this surface, whereby the excess adhesive flowing over the doctor member will also be drained back into the reservoir as illustrated in Fig. 3. As a result, when the applicator reaches the elevated position shown in Figs. 2 and 4, the outer cylindrical surface 22 of said applicator will contain a predetermined even layer of adhesive for application to the inner surface of the annular band, as will now be described.

The article to which the adhesive is to be applied as illustrated in Figs. 1, 2 and 4 as comprising an annular paper band 30 having a turned-down beaded edge 31, as disclosed in the above-mentioned application Serial No. 504,557. The band 30 forms part of the paper cap for jars, bottles and the like, which is shown in Fig. 5 and comprises a diaphragm portion 32 and an upstanding marginal flange or skirt 33 having integral screw threads 34 formed on its inner surface. The purpose of my gluing machine is to apply a ring of adhesive 35 to the inner surface of the annular band 30, so that, when the band is subsequently telescoped over the skirt 33 of the cap, it will firmly adhere thereto in a unitary structure, as shown in Fig. 5.

Accordingly, when the shaft 13 of the machine is elevated in the manner described above, raising the hood 20 and applicator 21 to the operative position shown in Fig. 2, the operator grasps a band 30 from an available supply and slips it over the hood 20, as shown in Figs. 2 and 4. The diameter of the outer surface 22 of the applicator is smaller than that of the band 30, permitting the operator to slide the band eccentrically over the platform, so that with a few such manipulations a continuous ring of adhesive 35 is formed on the inner surface of the band.

The width of the cylindrical surface 22 of the applicator is preferably less than that of the band 30, as illustrated in Figs. 2 and 4, and the applicator is preferably raised above the platform sufficiently to confine the application of the adhesive to the central portion of the band, it being desirable to prevent the adhesive from encroaching upon the lower edge of the band as previously explained.

Since the cylindrical outer surface 22 of the applicator forms a sharp knife-like edge 25 with the dished surface thereof, the band 30 to be glued will rest upon the platform and may be freely manipulated in contact with the surface 22 of the applicator without contacting any other part of the applicator, thus avoiding any danger of smearing the outer surface or edge of the band. After gluing the band in the manner described, the operator simply removes the band from the machine and telescopes it over the skirt 33 of the cap, and, since the layer of adhesive 35 is confined to the inner portion of the annulus, as described above, this final assembling operation is easily accomplished without any danger of smearing.

Although a specific embodiment of the invention has been shown for purposes of illustration it is to be understood that the invention is capable of various uses and that changes and modifications may be made therein as will be readily apparent to a person skilled in the art. The

invention is only to be limited in accordance with the scope of the appended claims.

What is claimed is:

1. A machine for applying adhesive comprising a platform having an opening therein, a reservoir for the adhesive disposed beneath said opening, an applicator mounted to be moved from within said reservoir to a position above said opening to permit the application of adhesive to an article resting on said platform, and means between said reservoir and said platform, for scraping excess adhesive from said applicator.

2. In a machine for applying an adhesive to the inner surface of an annular band, a platform having an opening narrower than the diameter of the band to be treated, a reservoir for the adhesive disposed beneath said opening, an applicator having a cylindrical outer surface mounted to be moved from within said reservoir to a position slightly above said opening to permit an annular band resting on said platform to surround said applicator and to be manipulated in contact with the cylindrical surface thereof without falling through said opening, and means between said reservoir and said platform for scraping excess adhesive from said applicator.

3. In a machine for applying an adhesive to the inner surface of an annular band, a platform having a circular opening smaller in diameter than the band to be treated, a reservoir for the adhesive disposed beneath the opening in said platform, an applicator having a cylindrical outer surface mounted to be moved from within said reservoir to a position slightly above the opening in said platform to permit an annular band resting on said platform to surround said applicator and to be manipulated in contact with the cylindrical surface thereof without falling through said opening, and a cylindrical doctor member of only slightly greater diameter than said applicator mounted in alignment therewith between said reservoir and said platform for scraping excess adhesive from said applicator.

4. In a machine for applying adhesive to the inner surface of an annular band, a horizontal platform having an opening smaller than the diameter of the band to be treated, a reservoir for the adhesive disposed beneath said opening, a vertically movable shaft mounted axially of said opening and extending upwardly through said reservoir, and an applicator carried by said shaft having a dished top surface positioned to lie in said reservoir in the downward position of said shaft and having means for draining adhesive back into said reservoir when said shaft is raised, said applicator having a cylindrical outer surface to engage an annular band resting on said platform around said applicator.

5. In a machine for applying adhesive to the inner surface of an annular band, a horizontal platform having an opening smaller than the diameter of the band to be treated, a reservoir for the adhesive disposed beneath said opening, a vertically movable shaft mounted axially of said opening and extending upwardly through said reservoir, and an applicator carried by said shaft having a dished top surface positioned to lie in said reservoir in the downward position of said shaft and having means for draining adhesive back into said reservoir when said shaft is raised, said applicator having a cylindrical outer surface to engage said band meeting said

dished surface in a sharp knife-like annular edge.

6. In a machine for applying adhesive to the inner surface of an annular band, a horizontal platform having an opening smaller than the diameter of the band to be treated, a reservoir for the adhesive disposed beneath said opening, a vertically movable shaft mounted axially of said opening and extending upwardly through said reservoir, a hood having a downwardly sloping outer wall secured to the top of said shaft, and an applicator carried by said hood having a dished top surface positioned to lie in said reservoir in the downward position of said shaft and having means for draining adhesive back into said reservoir when said shaft is raised, said applicator having a cylindrical outer surface to engage said band meeting said dished surface in a sharp knife-like annular edge.

7. In a machine for applying adhesive to the inner surface of an annular band, a horizontal platform having an opening smaller than the diameter of the band to be treated, a reservoir for the adhesive disposed beneath said opening, a vertically movable shaft mounted axially of said opening and extending upwardly through said reservoir, a hood having a downwardly sloping outer wall secured to the top of said shaft, an applicator carried by said hood having a dished top surface positioned to lie in said reservoir in the downward position of said shaft and having means for draining adhesive back into said reservoir when said shaft is raised, said applicator having a cylindrical outer surface to engage said band meeting said dished surface in a sharp knife-like annular edge, and means between said reservoir and said platform for scraping excess adhesive from said applicator.

8. In a machine for applying adhesive to the inner surface of an annular band, a horizontal platform having an opening smaller than the diameter of the band to be treated, a reservoir for the adhesive disposed beneath said opening, a vertically movable shaft mounted axially of said opening and extending upwardly through said reservoir, a hood having a downwardly sloping outer wall secured to the top of said shaft, an applicator carried by said hood having a dished top surface positioned to lie in said reservoir in the downward position of said shaft and containing a plurality of holes adjacent its juncture with said hood for draining adhesive back into said reservoir when said shaft is raised, said applicator having a cylindrical outer surface to engage said band meeting said dished surface in a sharp knife-like annular edge, and means between said reservoir and said platform for scraping excess adhesive from said applicator.

9. In a machine for applying adhesive to the inner surface of an annular band, a horizontal platform having a circular opening smaller in diameter than the band to be treated, a reservoir for the adhesive disposed beneath the opening in said platform, a vertically movable shaft mounted axially of said opening and extending upwardly through said reservoir, a sleeve in said reservoir surrounding said shaft to a point above said reservoir to shield said shaft from said adhesive, a hood having a downwardly sloping outer wall secured to the top of said shaft, an applicator carried by said hood having a dished top surface positioned to lie in said reservoir in the downward position of said shaft and containing a plurality of holes adjacent its juncture with said hood for draining adhesive back into said reservoir when said shaft is raised, said applicator having a cy-

lindrical outer surface to engage said band meeting said dished surface in a sharp knife-like annular edge, and means between said reservoir and said platform for scraping excess adhesive from said applicator.

10. In a machine for applying adhesive to the inner surface of an annular band, a horizontal platform having a circular opening smaller in diameter than the band to be treated, a reservoir for the adhesive disposed beneath the opening in said platform, a vertically movable shaft mounted axially of said opening and extending upwardly through said reservoir, a sleeve in said reservoir surrounding said shaft to a point above said reservoir to shield said shaft from said adhesive, a hood having a downwardly sloping outer wall secured to the top of said shaft, an applicator carried by said hood having a dished top surface positioned to lie in said reservoir in the downward position of said shaft and containing a plurality of holes adjacent its juncture with said hood for draining adhesive back into said reservoir when said shaft is raised, said applicator having a cylindrical outer surface to engage said band meeting said dished surface in a sharp knife-like annular edge, and a cylindrical doctor member of only slightly greater diameter than said applicator mounted in alignment therewith between said reservoir and said platform for scraping excess adhesive from said applicator.

11. In a machine for applying adhesive to the inner surface of an annular band, a horizontal platform having a circular opening smaller in diameter than the band to be treated, a reservoir for the adhesive disposed beneath the opening in said platform, a vertically movable shaft mounted axially of said opening and extending upwardly through said reservoir, a spring acting on said shaft to normally hold same in its downward position, a sleeve in said reservoir surrounding said shaft to a point above said reservoir to shield said shaft from said adhesive, a hood having a downwardly sloping outer wall secured to the top of said shaft, an applicator carried by said hood having a dished top surface positioned to lie in

said reservoir in the downward position of said shaft and containing a plurality of holes adjacent its juncture with said hood for draining adhesive back into said reservoir when said shaft is raised, said applicator having a cylindrical outer surface to engage said band meeting said dished surface in a sharp knife-like annular edge, and a cylindrical doctor member of only slightly greater diameter than said applicator mounted in alignment therewith between said reservoir and said platform for scraping excess adhesive from said applicator.

12. In a machine for applying adhesive to the inner surface of an annular band, a horizontal platform having a circular opening smaller in diameter than the band to be treated, a reservoir for the adhesive disposed beneath the opening in said platform, a vertically movable shaft mounted axially of said opening and extending upwardly through said reservoir, a spring acting on said shaft to normally hold same in its downward position, a sleeve in said reservoir surrounding said shaft to a point above said reservoir to shield said shaft from said adhesive, a hood having a downwardly sloping outer wall secured to the top of said shaft, an applicator carried by said hood having a dished top surface positioned to lie in said reservoir in the downward position of said shaft and containing a plurality of holes adjacent its juncture with said hood for draining adhesive back into said reservoir when said shaft is raised, said applicator having a cylindrical outer surface to engage said band meeting said dished surface in a sharp knife-like annular edge, and a doctor member having a cylindrical scraping surface of only slightly greater diameter than said applicator mounted in alignment therewith between said reservoir and said platform for scraping excess adhesive from said applicator, said doctor member having a downwardly sloping outer surface and holes formed outwardly thereof for draining said excess adhesive back into said reservoir.

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