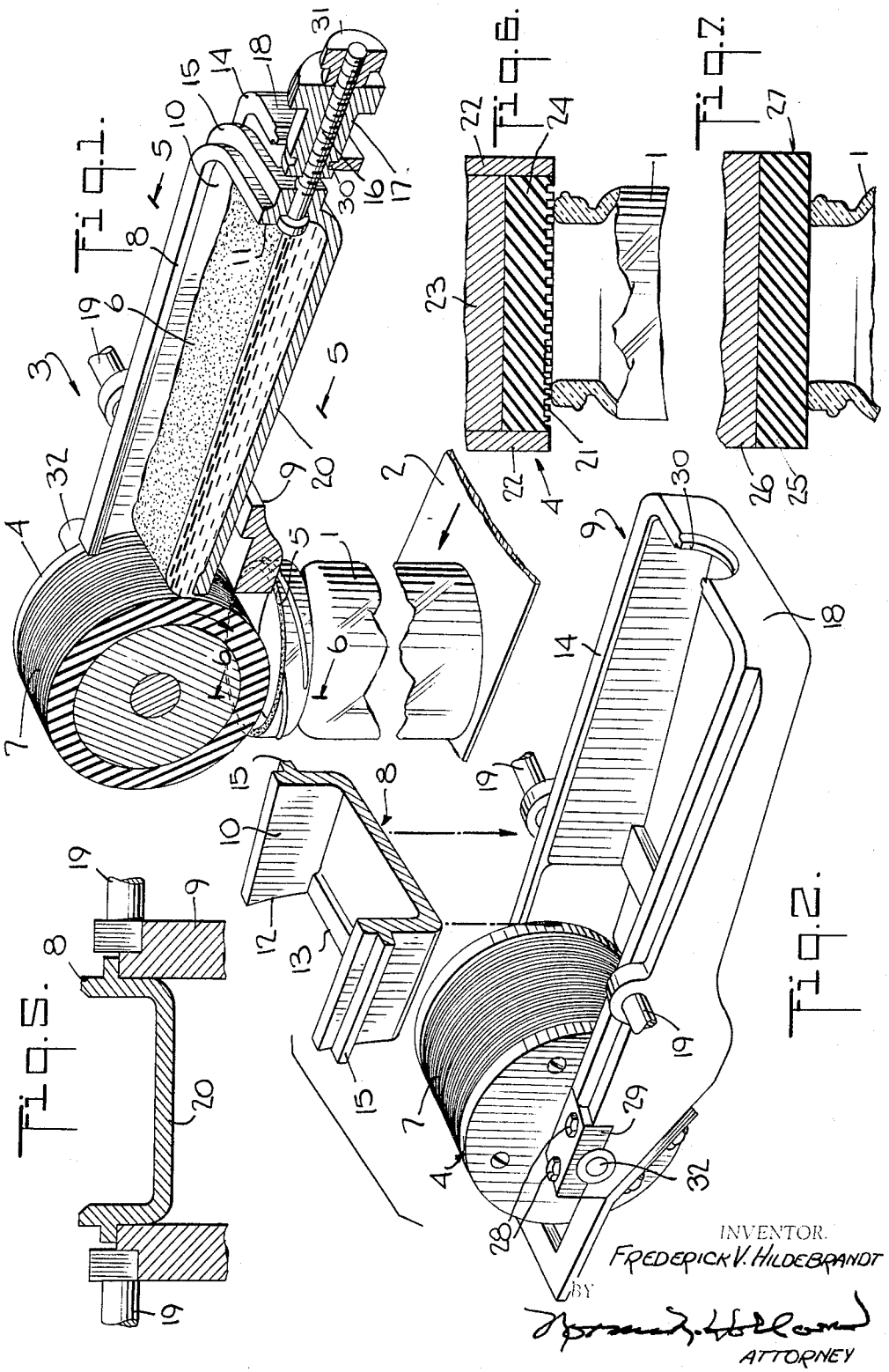
Nov. 29, 1966 F. V. HILDERBRANDT 3,288,108

FLUID APPLICATOR

Filed July 1, 1964 2 Sheets-Sheet 1



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Filed July 1, 1964 2 Sheets-Sheet 2

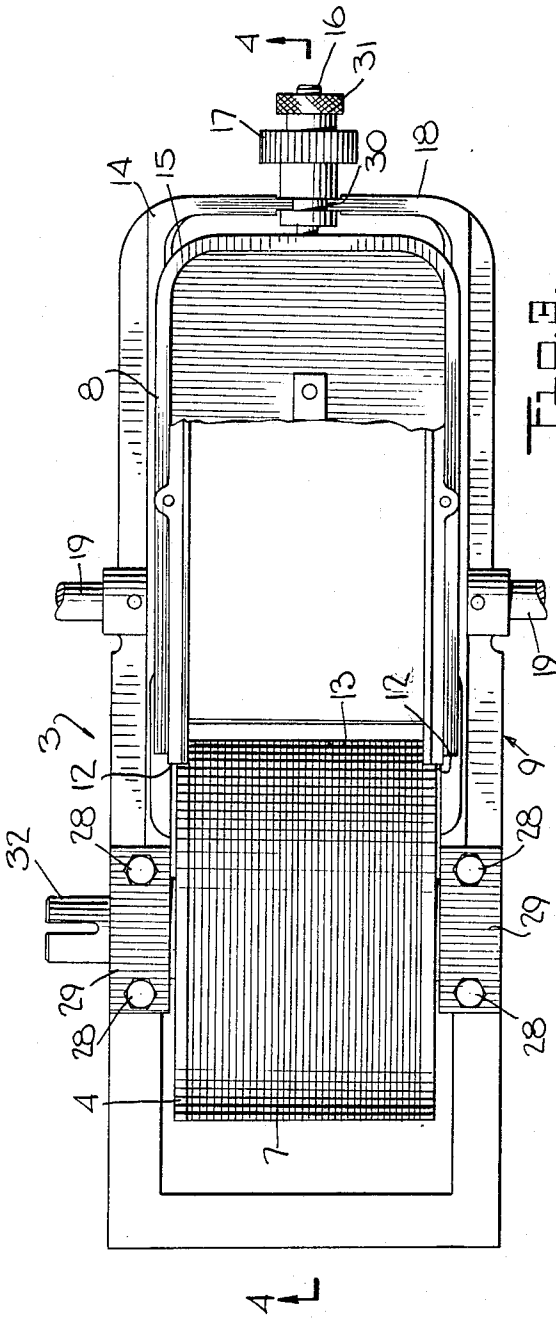

Fig. 3.

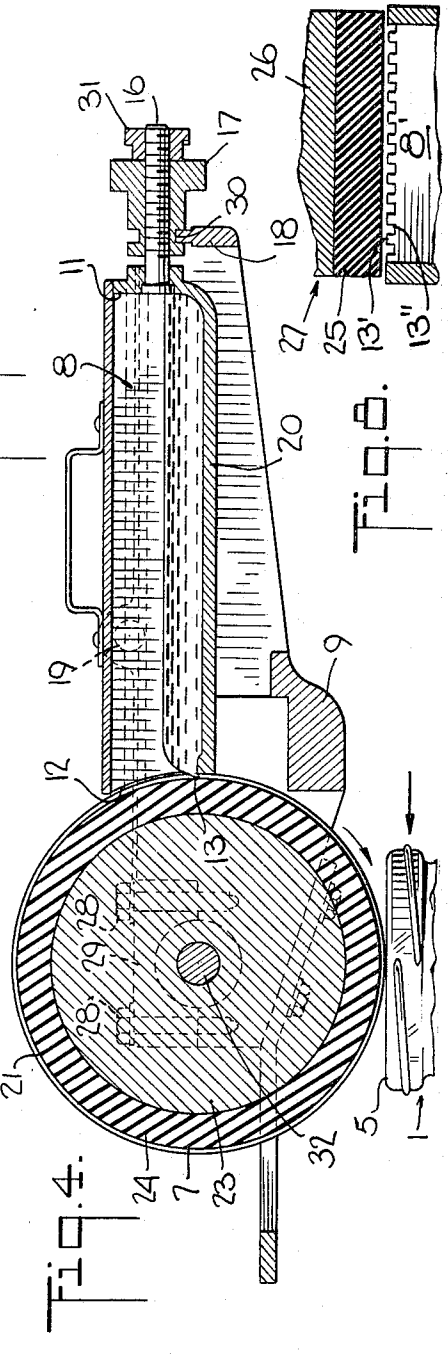

Fig. 4.

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3,288,108

FLUID APPLICATOR

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4 Claims. (Cl. 118—258)

The present invention relates to an improved means for applying fluid coatings and more particularly to an improved roller mechanism and a cooperating fluid reservoir adapted for applying coatings such as adhesive or ink and the like.

It is now common practice to apply thin membranes to the rims of glass containers such as coffee jars and the liks by gluing a sheet of glassine paper to the container rim to provide an air tight seal for the package. The present invention is particularly useful in this operation and it will be described for this use. It is clear that the applicator may be used in a similar way for coating other articles with various liquids.

The sealing membranes or safety seals are applied to the container tops by automatic machinery after the containers have been filled and prior to the application of the closure caps. It has been found convenient to apply the safety seals by causing filled jars to move on a suitable conveyor beneath a glue applying roller so that the revolving roller rolls across the top or rim of the container and applies a film of adhesive of predetermined thickness. Such an adhesive applying roller means is shown for example, in United States Patents 2,952,239 and 3,048,145.

The present invention is an improvement upon the adhesive applying means described in these patents and provides an improved device combining a fluid reservoir with a metering means for transferring adhesive or other fluid from the reservoir to the roller in a film having a predetermined and constant thickness.

In order to provide for the effective application of an air tight sealing membrane, it is important that the adhesive film used to secure the membrane or sealing disc to the container mouth be of sufficient thickness and of uniform distribution to provide a complete seal entirely around the container rim. At the same time, it is important that the adhesive be confined to the container's rim and that no adhesive enter the container through spillage caused by excess adhesive layer thickness or by the dripping or splashing of adhesive improperly metered during the transfer of the adhesive from the adhesive reservoir to the turning roller.

Accordingly an object of the present invention is to provide an improved coating mechanism.

Another object of the present invention is to provide an improved liquid coating mechanism including a cooperating application roller and a liquid reservoir.

Another object of the present invention is to provide a liquid reservoir for a coating roller with a simplified mounting and coating thickness metering means.

Another object of the present invention is to provide an improved adhesive applying mechanism with simplified roller adjusting and removing means.

Other and further objects of the invention will be obvious upon an understanding of the illustrative embodiment about to be described, or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

A preferred embodiment of the invention has been chosen for purposes of illustration and description and is shown in the accompanying drawings, forming a part of the specification, wherein:

FIG. 1 is a perspective view partially in section of a preferred embodiment of the present invention;

FIG. 2 is a perspective view of the mechanism of FIG. 1 illustrating the adhesive reservoir in section and removed from the mechanism;

FIG. 3 is a top plan view of the adhesive applying mechanism of FIG. 1;

FIG. 4 is a sectional view taken along line 4—4 on FIG. 3;

FIG. 5 is a sectional view taken along line 5—5 of FIG. 1;

FIG. 6 is a sectional view taken along line 6—6 of FIG. 1;

FIG. 7 is a sectional view corresponding to FIG. 6 illustrating another embodiment of the adhesive applying roller; and

FIG. 8 is a fragmentary view partially in section of another embodiment of the adhesive reservoir of the invention.

FIG. 1 illustrates a filled container **1** being carried on a moving conveyor **2** beneath the adhesive applying mechanism **3** so that the rotating roller **4** rolls across the container rim **5** and deposits a ring of adhesive **6** on the rim **5**. The cylindrical outer surface **7** of the roller **4** contacts the liquid adhesive **6** which is held in the adhesive reservoir **8** and the roller **4** and the reservoir **8** are mounted in adjustably spaced relationship in a frame **9** shown in FIG. 1 and more clearly illustrated in FIG. 2.

The preferred embodiment of the adhesive reservoir **8** comprises a unitary vessel having sidewalls **10** and an end wall **11** and having an open applicator end with edges **12** and **13** positioned adjacent to the roll surface **7**. As will be more fully described below, the thickness of the adhesive on the roller surface is controlled by the adjustable positioning of the reservoir edge **13** (FIG. 4) with respect to the roller surface **7**. This positioning is accomplished in the preferred embodiment by slidably mounting the reservoir **8** on the rim **14** of the frame **9** on spaced support flanges **15**. These flanges **15** permit the reservoir **8** to slide toward and away from the roller surface **7** under the control of the positioning screw **16** connected to the end wall **11** of the reservoir **8** and threadedly coupled to a rotatable knob **17** mounted in the end **18** of the supporting frame **9**. Rotation of the knob **17** in one direction advances the reservoir **8** towards the roller surface **7** to reduce the adhesive film thickness and rotation in the opposite direction withdraws the reservoir **8** from the roller surface **7** to provide for thicker adhesive coatings. The entire adhesive assembly mechanism **3** is mounted above the conveyor **2** at a predetermined height in a suitable cradle (not shown) on mounting pins **19**. The mounting cradle preferably provides for upward movement of the entire assembly against a suitable resilient positioning means in a mounting not part of the present invention such as is illustrated in the above mentioned Patent Numbers 2,952,239 and 3,048,145.

The cooperation of the edges **12** of the reservoir sidewalls **10** and the metering edge **13** on the reservoir bottom surface **20** is best illustrated in FIGS. 3 and 4. When the roller **4** is in its adhesive applying position, the arc-shaped sidewall edges **12** are positioned a slight distance away from roller surface **7** and the metering edge **13** of the reservoir **8** is also positioned in a precisely regulated and spaced position with respect to the surface **7** of the rotating roller **4** by the above described adjusting screw **16**.

As seen in FIG. 3, the two sidewalls **10** are positioned inwardly of the roller **4** edges and the viscous nature of the adhesive **6** and the rotational movement of the roller surface **7** prevent the passage of the adhesive **6** through the slight spacing between the reservoir edges **12** and the roller surface **7**. The movement of the roller surface **7** past the metering edge **13** of the reservoir **8** carries the adhesive **6** which is in contact with the roller surface **7** past the metering edge **13** in a thickness deter-

mined by the metering edge **13** position and carries this layer of adhesive onto the rim **5** of the container **1** as the container rim **5** moves beneath the roller **4** at the same speed as the speed of the roller surface.

The roller **4** illustrated in the preferred embodiment has a series of circumferential grooves **21** (FIG. 6) which facilitate the application of the adhesive **6** to the jar rim **5**. This improvement is described in Patent Number 2,952,-239 and forms no part of the present invention as the improved adhesive applying device of the present invention operates effectively with both grooved and smooth surfaced rollers.

FIGS. 6 and 7 illustrate the adhesive applying roller **4** in engagement with the rim of a container **1**. In the embodiment shown in FIG. 6, the roller **4** has rigid end plates **22** removably connected to a center spindle **23**. The resilient cover **24** is mounted on the spindle **23** and is confined between end plates **22**.

FIG. 7 shows another embodiment of the roller formed by a novel process wherein the end plates such as illustrated for the embodiment of FIG. 6 are eliminated and the rubber container engaging cover **25** is preferably molded directly onto a preformed hub **26** which preferably is made of an extremely light material such as aluminimum to provide for an overall roller with extremely low inertia. The rubber-like cover may also be preformed with or without a thin cylindrical center sleeve and pressed onto the hub **26**. The cover may also be formed of a shrinkable material which is shrunk-fit onto the hub **26** when a replacement is desired. The roller **27** illustrated in FIG. 7 is seen to have a smooth surface as such a surface also provides for the satisfactory application of adhesive in many uses using the novel mechanism of the invention in the same manner as does the grooved roller illustrated in FIGS. 1 to 6. The roller **27** may also be grooved if desired.

FIG. 8 illustrates another embodiment of the reservoir **8'** with a modified edge **13'** at the open applicator end of the reservoir **8'**. In this embodiment, a series of slots **13''** are provided to form a serrated edge which faces the roller **27**. With this combination, the adhesive passes onto the smooth roller surface with a series of ridges thereby giving an improved container rim coverage as is obtained with a grooved roller surface as illustrated at **21** in FIG. 6.

The construction described above is seen to be of particular value in continuous high speed operations such as high speed container sealing work since the simplicity of the parts insures continuous trouble free operation and also permits ready and accurate adjustment during the operating periods. In addition the two main elements of the adhesive applying mechanism, that is, the adhesive applying roller **4** and adhesive reservoir **8** are readily removed from the frame **9** for inspection and replacement in a matter of minutes and when replaced or returned to the frame, readjustment to the predetermined and preferred operating conditions may be immediately obtained by the most simple adjustments.

As clearly illustrated in FIGS. 2 and 4, the roller may be lifted from the frame by the removal of four bolts **28** which hold the bearing block **29** in place above the roller mounting axle **32**. Since the adhesive reservoir **8** is resting on the edge **14** of the frame **9** it also may be readily removed. The knob **17** in the frame end **18** which provides for the above described reservoir positioning is removably mounted in a slot **30** in the frame **9** so that it may be lifted free of the frame when the reservoir **8** itself is removed for inspection or cleaning. A locknut **31** is preferably provided on the screw **16**.

It will be seen that an improved adhesive applying mechanism has been provided wherein an accurate and simplified adhesive coating thickness adjustment is provided which may be operated during adhesive application and which is operable independently of the level of adhesive in the reservoir so that when necessary, continuing adjustments may be made for adhesive film thickness during actual operation of the unit even at great speeds and during the regular packaging run or other article handling operations.

The improved mechanism is also particularly advantageous as it provides these improvements in operation and control with a simple structure comprising a minimum number of parts and also wherein the parts are arranged for simple removal and replacement by experienced operating personnel and in a short period. This not only permits removal and inspection of both the roller and the reservoir, but it also permits substitution of one roller or reservoir for another with only an extremely short period being necessary for interchange. There is, thus, no need for expensive interruptions to sealing operations where unforeseen interruptions are extremely serious, not only due to lost production but also due to related stoppages in the other sealing operations including product supply and container and cap supply and manipulation.

As various changes may be made in the form, construction and arrangement of the parts herein without departing from the spirit and scope of the invention as set forth in the claims and without sacrificing any of its advantages, it is to be understood that all matter hereinabove is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim:

1. A liquid adhesive coating mechanism comprising the combination of a frame member, an adhesive applying roller rotatably mounted thereon, an adhesive reservoir member having an adhesive metering edge formed at its front end and mounted adjacent to said roller for applying adhesive thereto, means mounting said reservoir member on said frame member for longitudinal sliding movement toward and away from said roller to adjust the thickness of adhesive flowing over said metering edge, and means for adjustably fixing the position of said reservoir member on said frame member comprising engaged screw threaded elements, connections between said screw threaded elements and the respective frame and reservoir members, one of said connections including an open slot from which said screw threaded elements may be removed for lifting said reservoir member from said frame member.

2. The combination claimed in claim **1** in which said screw threaded elements comprise a screw extending from the reservoir member and a knob threaded on said screw and resting rotatably in an upwardly open slot formed in said frame member.

3. The combination claimed in claim **1** in which said reservoir mounting means comprises bearing surfaces on said frame, and flange means on said reservoir slidably engaging said bearing surfaces.

4. The combination claimed in claim **1** in which said metering edge of said reservoir comprises serrations for forming an adhesive coating on said roller of non-uniform thickness.

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