April 19, 1938. W. I. McGOWAN ET AL 2,114,309

CONTAINER CLOSURE LINING MACHINE

Filed Nov. 7, 1935 2 Sheets-Sheet 1

Fig. 1.

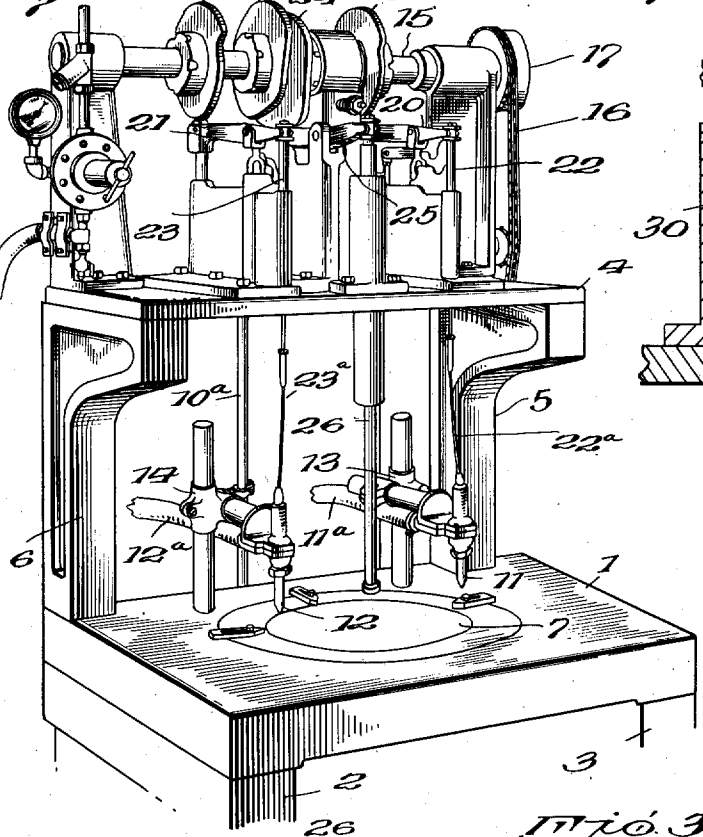


Fig. 4.

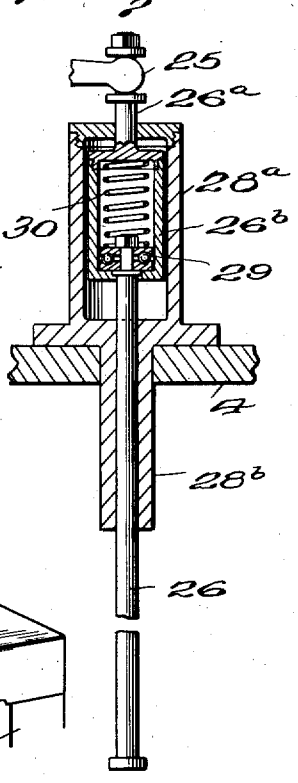


Fig. 2.

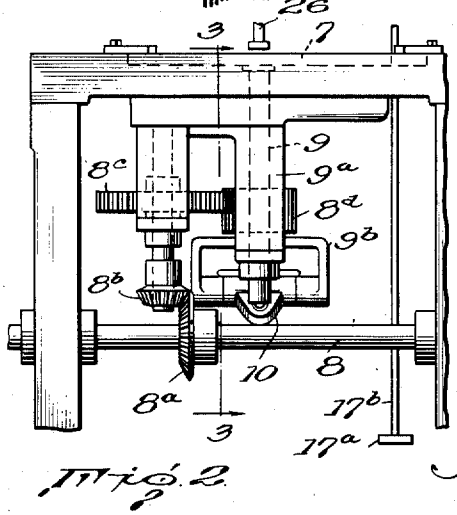
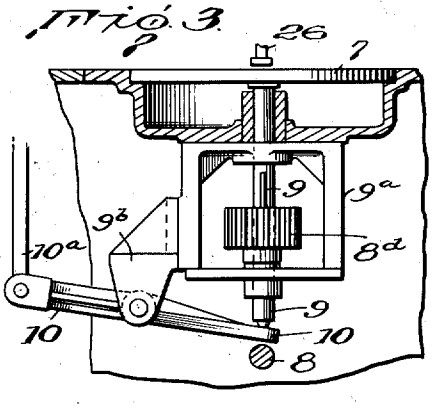


Fig. 3.



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Fig. 5.

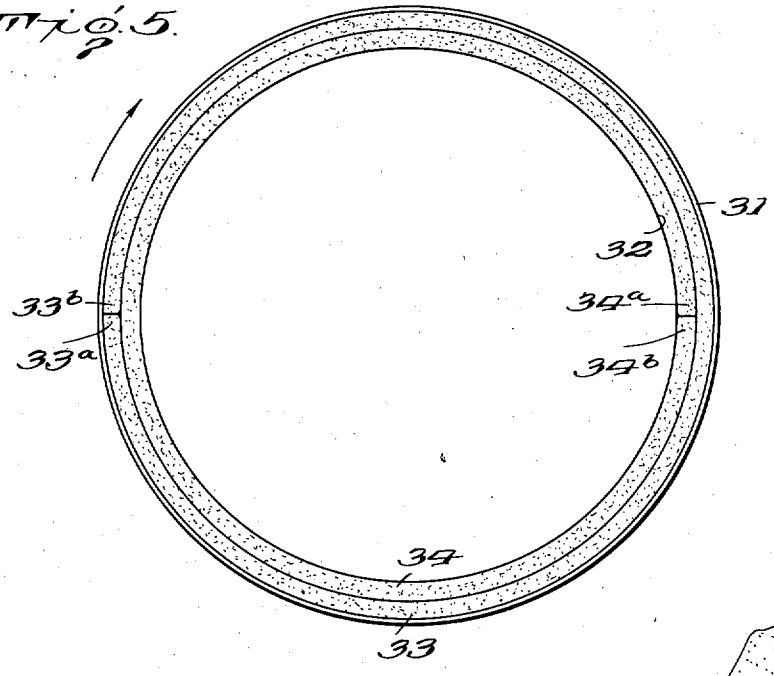


Fig. 6.

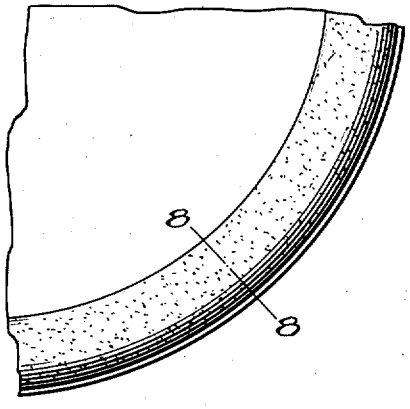
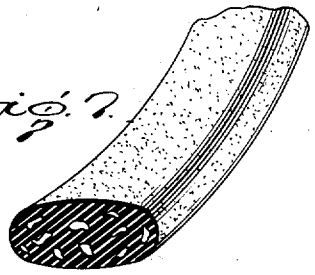


Fig. 7.



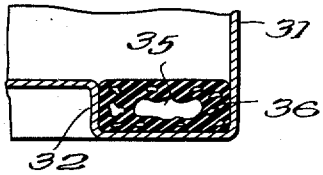


Fig. 8.

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UNITED STATES PATENT OFFICE

2,114,309

CONTAINER CLOSURE LINING MACHINE

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Cambridge, Mass.

Application November 7, 1935, Serial No. 48,676

6 Claims. (Cl. 113—80)

This invention relates to container closures and particularly to apparatus and means to apply large quantities of viscous sealing compound to drum or pail covers.

Generally speaking, drum and pail covers have been supplied with moulded gaskets, or with a gasket formed from rubber tubing. Moulded gaskets are quite expensive and are difficult to hold in place. Tube gaskets are even more troublesome since a small pin must be fitted into the open ends before a ring can be formed, and a gap in the gasket always remains.

When, however, such covers have been "lined" with can sealing compound on lining machines it has proved very difficult to apply enough compound to form the gasket without either leaving a gap at the ends of the stream or forming a bump in the gasket due to the overlapping of the ends of the stream of compound.

It is an object of this invention to provide means to apply large quantities of viscous compound to large container covers or ends; to apply the compound to any size container end in such a manner that gaps or bumps are not formed; to speed the lining operation and to reduce the cost of lining large covers. These and other objects will become apparent as the specification proceeds.

This application contains subject matter divided out of our copending application Serial No. 755,242 filed November 28, 1934 and is a continuation in part of our earlier filed application.

A preferred embodiment of our invention is illustrated in the accompanying drawings, in which:

Figure 1 is a perspective view showing the upper part of the lining machine;

Figure 2 is a fragmentary view in elevation illustrating the construction of the lower part of the machine;

Figure 3 is a fragmentary view taken along line 3—3 of Figure 2;

Figure 4 is an enlarged sectional view showing the construction of the chuck pad;

Figure 5 is a top view of container closure after application of the sealing compound;

Figure 6 shows a sector of the cover or closure after the heating operation;

Figure 7 shows a small portion of our improved seal; and

Figure 8 is a sectional view through the cover on line 8—8 of Figure 6.

In the following description, the term "end" is used to designate both the cover and the bottom of containers, in conformity with trade terminology.

Referring to Figure 1, the frame of the machine consists of a horizontal table 1 supported by vertical standards 2 and 3, and a smaller horizontal table 4 supported by vertical standards 5 and 6 mounted upon table 1. A rotatable disk or chuck 7 is mounted in a circular opening formed in the horizontal table 1 and is driven by suitable gearing from a power shaft 8, see Figure 2. The ends to be lined are placed upon and rotated by the chuck 7.

The arrangement for driving the chuck 7 from the shaft 8 is shown in Figure 2 and consists of two bevel gears 8a and 8b which drive a stub shaft on which is mounted spur gear 8c which in turn meshes with pinion gear 8d secured to the shaft 9 on which the chuck 7 is mounted. The shaft 9 is journaled in a yoke member 9a mounted below the table 1, and provision is made for shifting the shaft 9 axially to raise the chuck 7 above the surface of the table 1. The gear 8d is made wider than the gear 8c in order to maintain proper meshing relation between these two gears when the chuck is elevated. A second yoke bracket 9b supported from yoke 9a supports a rocker arm 10 which serves to raise and lower the chuck 7, and this rocker arm is operated from a suitable cam through the push rod 10a, see Figure 3.

Two valved nozzles 11 and 12 are mounted upon adjustable brackets 13 and 14 and are located above the plane of rotation of the chuck 7 and at diametrically opposed points with respect to the axis of rotation of the chuck. The nozzles 11 and 12 are supplied with viscous sealing compound under pressure through hose connections 11a and 12a, the valves in the nozzles being normally closed to permit discharge of the compound. A cam shaft 15 is suitably journaled in brackets mounted upon table 4 and is driven in timed relation with power shaft 8 by a chain 16 acting through a clutch 17 mounted at the end of the cam shaft. The clutch 17 is controlled by the pedal 17a, Figure 2, operating through rod 17b and suitable levers, and the clutch is of such construction that a momentary depression and release of the pedal 17a causes the clutch to engage and rotate the cam shaft 15 one complete revolution and then disengage.

The cam shaft 15 carries two identical cams 18 and 19 which act through rocker arms 20 and 21, pull rods 22 and 23, and wire connections 22a and 23a to open the valves in nozzles 11 and 12. The raised surfaces on the cams 18 and 19

are designed with respect to the speed of rotation of the chuck 7 so the valves are maintained open for only one complete revolution of the chuck.

The cam shaft 15 also carries a cam 24 which acts through a rocker arm 25 to operate the chuck pad 26 located immediately above the axis of rotation of the disk 7. A fourth cam 27 acts through a suitable follower and push rod 10a to raise and lower the chuck 7 during its operation. The arrangement permitting the chuck 7 to be raised and lowered during rotation has been described above in connection with Figures 2 and 3.

The chuck pad 26 is provided with a compressible link section between the rocker arm 25 and the lower end of the pad, the details of which are illustrated in Figure 4. The chuck pad is slideably supported in a member having a hollow upper section 28a and a lower stem section 28b extending through the table 4. The upper part 26a of the pad 26 is provided with a cage section 26b mounted in the hollow support 28a, and the upper end of the rod 26 passes through the lower end of the cage 26b and is secured to inner race of a ballbearing 29 which is freely slideable within the cage 26b. A spring 30 is located within the cage 26b and serves to force the two sections of the chuck pad apart, while permitting the lower stem section of the pad to be moved upwardly against the action of the spring without moving the rocker arm 25. The construction described is like that shown in U. S. patent to Dewey 1,748,914, but other constructions of compressible section may be employed if desired.

Operation of the machine is as follows: The normal position of the various elements of the machine is shown in Figure 1, and it will be seen that the chuck 7 is normally in its lowered position flush with the surface of the table 1, and the chuck pad 26 is in raised position. When it is desired to line a closure end, the end is placed upon the chuck 7 in inverted position. The treadle 17a is then operated momentarily which causes an engagement of the clutch 17, thus setting into operation the cam shaft 15. The cam 24 first causes the chuck pad 26 to descend and clamp the end against the chuck 7, then the cam 27 operates to raise the chuck 7 while it is rotating into a position to receive compound from the nozzles 11 and 12, then cams 18 and 19 simultaneously open the nozzles 11 and 12 for only one complete revolution of the chuck 7, and, during the remaining part of the revolution of the cam shaft 15, the chuck 7 is lowered to its normal position.

Figure 5 shows one manner in which the two streams of compound may be applied to an end. As shown in this figure and in Figure 8, the end is provided with a gasket channel bounded on one side by the outer lip 31 and on the other side by the wall 32. When the gasket channel is wide, as in the case of a pail end, the adjustment of the nozzles 11 and 12 is such that either one, say for example, 12, delivers compound close to the lip 31, while nozzle 11 is adjusted to deliver compound closely adjacent the wall 32. If the rotation of the chuck is in the direction shown by the arrow in Figure 5, two streams of sealing compound will be deposited in the channel forming concentric rings of compound, the ring 33 being formed by the nozzle 12 and the ring 34 is formed by the nozzle 11. The ring 33 begins at the point 33a and ends at the point 33b in abutting relation to the beginning end. Similarly, the ring 34 begins at 34a and ends at 34b in abutting relation with the beginning end. The two streams of viscous compound almost immediately merge into a single viscous mass as shown in Figure 6, the margins between the rings and the abutting termini or joints in the rings fading away. By thus forming the gasket of a plurality of rings of sealing compound with the ring joints or termini displaced from each other, a uniform gasket is obtained without the necessity for overlapping the material at any point.

In case the gasket channel is narrow, the side-by-side arrangement of the delivered streams is not necessary, but one stream may overlie the other.

The nature of the sealing compound is not important, but for large containers we prefer to use a special compound disclosed in our copending application Serial No. 14,796, filed April 5, 1935, consisting essentially of a water dispersion of latex containing a film forming agent and an accelerator.

After the lining operation, the ends are immediately placed in an oven and held at a temperature of 200° to 230° F. from two to three hours. As the heat is first applied, a tough film quickly forms on the exposed surface of the gasket, and, as the water is vaporized in the interior of the compound, the steam presses outwardly against the film and expands the gasket. The cross-section of the gasket illustrated in Figure 7 shows a spongy structure assumed by the gasket when the compound is heated from 200° to 220° F. Figure 8 illustrates a section of the gasket in position in the channel of the end. This figure shows the tubular form which the gasket assumes when the compound is heated quickly between 220° and 230° F. and shows the irregular bore 35 surrounded by a pore filled mass 36. The skin which forms upon the upper surface of the gasket is smooth, continuous and quite glassy in appearance. The compound is of such nature that the rubber cures in the temperature range given and during the time indicated.

The utility of our machine is not limited necessarily to the application of large bodies of viscous compound but finds general application wherever it is desired to avoid laps or joints in the application of can sealing compound, and while we have set forth the principle of our invention and illustrated a preferred embodiment thereof, it is obvious to one skilled in the art that various modifications may be made without departing from the spirit of the invention.

What we claim is:

1. In a lining machine, means to rotate an end, a plurality of nozzles arranged to deposit in the channel of said end a plurality of contiguous rings of lining compound, said nozzles being spaced apart along the channel of said end, and means operated in synchronism with the rotation of said chuck to cause discharge of compound from each of said nozzles for one complete revolution only of said chuck, the discharges from said nozzles being in such timed relation that the termini of said deposited rings are displaced from each other along said channel.

2. In a lining machine, a rotatable chuck adapted to turn an end, a compound delivery nozzle arranged to deposit a ring of compound in the channel of said end, a second nozzle arranged to deposit in said channel a second ring of compound contiguous with the first ring, said second nozzle being spaced from said first nozzle along

said channel, valves for controlling the flow of compound from said nozzles, and means to cause the simultaneous opening of said valves for one complete revolution of said chuck and thereupon simultaneously close said valves.

3. In a lining machine, a rotatable chuck adapted to turn an end, a compound delivery nozzle arranged to deposit a ring of compound in the channel of said end, a second nozzle arranged to deposit in said channel a second ring of compound contiguous with the first ring, valves for controlling the flow of compound from said nozzles, means for rotating said chuck, and means operated in synchronism with the rotation of said chuck for opening each of said valves for one complete revolution of said chuck and thereupon closing each valve and for controlling said valves in timed relation so that the termini or joints in said rings are displaced from each other along the channel of said end.

4. In a lining machine, a disc supported for rotation in a horizontal plane, a nozzle arranged above the plane of the disc and displaced from the axis of rotation thereof, a second nozzle arranged above the plane of the disc at a point substantially diametrically opposite the first nozzle, means for supplying lining compound to said nozzles, means to rotate said disc, and means for causing said nozzles to simultaneously discharge lining compound during one complete revolution only of said disc.

5. In a lining machine, a disc supported for rotation in a horizontal plane, a nozzle arranged above the plane of the disc and displaced from the axis of rotation thereof, a second nozzle arranged above the plane of the disc at a point substantially diametrically opposite the first nozzle but at a different radial distance from the axis of rotation of said disc, means for supplying lining compound to said nozzles, means to rotate said disc, and means for causing said nozzles to simultaneously discharge lining compound during one complete revolution of said disc.

6. In a lining machine, a disc supported for rotation in a horizontal plane, a nozzle arranged above the plane of the disc and displaced from the axis of rotation thereof, a second nozzle arranged above the plane of the disc at a point substantially diametrically opposite the first nozzle, means for supplying lining compound to said nozzles including a pair of normally closed valves, a power shaft for rotating said disc, a cam shaft driven from said power shaft, and means including cams on said cam shaft for simultaneously opening and maintaining open said valves during one complete revolution of said disc and then closing said valves.

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ALBERT J. PUSCHIN.

CERTIFICATE OF CORRECTION.

Patent No. 2,114,309. April 19, 1938.

WILLIAM I. McGOWAN, ET AL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, second column, line 39, for the word "permit" read prevent; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 24th day of May, A. D. 1938.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.

said channel, valves for controlling the flow of compound from said nozzles, and means to cause the simultaneous opening of said valves for one complete revolution of said chuck and thereupon simultaneously close said valves.

3. In a lining machine, a rotatable chuck adapted to turn an end, a compound delivery nozzle arranged to deposit a ring of compound in the channel of said end, a second nozzle arranged to deposit in said channel a second ring of compound contiguous with the first ring, valves for controlling the flow of compound from said nozzles, means for rotating said chuck, and means operated in synchronism with the rotation of said chuck for opening each of said valves for one complete revolution of said chuck and thereupon closing each valve and for controlling said valves in timed relation so that the termini or joints in said rings are displaced from each other along the channel of said end.

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5. In a lining machine, a disc supported for rotation in a horizontal plane, a nozzle arranged above the plane of the disc and displaced from the axis of rotation thereof, a second nozzle arranged above the plane of the disc at a point substantially diametrically opposite the first nozzle but at a different radial distance from the axis of rotation of said disc, means for supplying lining compound to said nozzles, means to rotate said disc, and means for causing said nozzles to simultaneously discharge lining compound during one complete revolution of said disc.

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