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METHOD OF APPLYING A PROTECTIVE ENAMEL TO CAN ENDS

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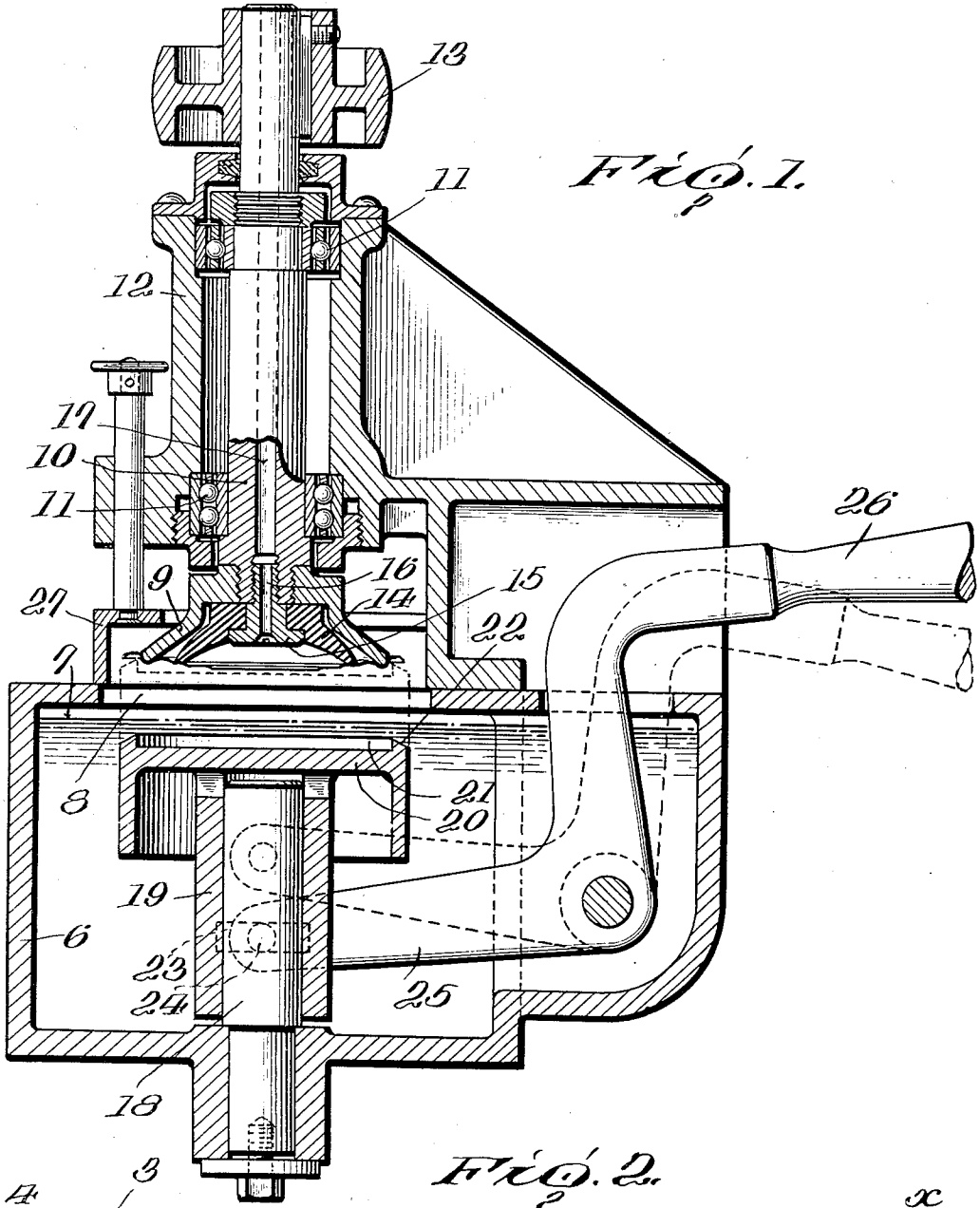


FIG. 1.

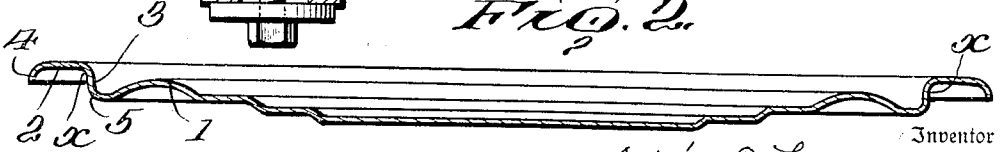


FIG. 2.

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METHOD OF APPLYING A PROTECTIVE ENAMEL TO CAN ENDS

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2 Claims. (Cl. 91—68)

The invention relates to new and useful improvements in a method for applying a protective enamel to the inner face of a can end. Two methods are used at the present time for applying a protective coating to the can end. In one, the metal is coated in the sheet, after which the sheet is die cut to produce the end. In this method, the strain incident to the drawing of the metal for forming the necessary depression in the end to receive the chuck used in double seaming is likely to break the enamel at points so that pin-holding of the end occurs, when the end is subjected to reagents, which react upon metals but have no effect upon the protective enamel. The other method of coating can ends is to spray the enamel on the end. Considerable difficulty has been experienced in covering the end uniformly by spraying, and particularly in covering the wall at the inner side of the channel in the end formed by the depression necessary to receive the chuck.

An object of the present invention is to provide a method of coating can ends with a protective enamel so that the end when shaped and ready for application to the can body will be coated throughout with a substantially uniform thickness of enamel.

In the drawing—

Figure 1 is a vertical sectional view through one form of the apparatus which may be used in the applying of the coating to the can end, and

Fig. 2 shows a cross sectional view through a can end with a coating applied thereto.

The invention has to do with the coating of can ends which are to be attached to the can body for forming and closing the can. The can body is preferably cylindrical, and is provided with a flange at each end thereof. The can end is secured to the flanged can body by double seaming. In Fig. 2 of the drawing, a can end is shown which consists of a central portion 1 and a channel portion 2. The end is provided with a depression to receive the chuck used in joining the end to the can body by double seaming. This depression provides a vertical wall 3 which forms the inner wall of the channel 2 and which leads into the inner portion 1 of the end. At the outer side of the channel, the end is curled as indicated at 4. It is desirable to coat the end on the inner face thereof all the way across the central portion, the under face of the channel, and also the inner face of the vertical wall 3. When the metal is coated in the sheet and afterwards formed into an end, the enamel coating is particularly strained at the shoulder 5 between the vertical wall 3 of the channel and the inner portion of the end. This straining of the enamel coating often ruptures the coating, so that when the end is applied and the food product contacts with the end, the metal is attacked at the ruptured part of the enamel, and pinholes are formed through the end.

Efforts have been made to coat the end by spraying, but it is very difficult to throw a coating by a spray against the inner face of the vertical wall 3. Furthermore, when the end is sprayed, the coating produced is of variable thickness, as an excess amount of coating must be used in order to coat the end.

The present invention has to do with a method of coating the end whereby the enamel is applied to the end in excess of the quantity necessary to produce the desired thickness of coating, and is applied particularly to the vertical inner wall of the channel. After the coating is applied, the end is rapidly rotated for distributing the enamel over the end and dispelling the surplus therefrom.

The method may be carried out by an apparatus such as shown in the drawing, which includes a tank 6 containing in liquid form the enamel which is to be applied to the end. The level of the enamel is indicated by the line 7. The tank has an opening 8 therethrough. Directly above the opening 8 is a chuck 9. This chuck 9 is attached to a spindle 10 mounted for rotation in bearings 11, 11 carried by a bracket 12 which is secured to the tank. Attached to the spindle 10 is a pulley 13 by which the spindle may be rotated. The chuck 9 is shaped so as to engage the end adjacent the vertical wall 3 and within the chuck is a suction pad 14 secured to the spindle by means of a headed bolt 15 having a port 16 therethrough leading to a port 17 through the spindle. This is to enable a vacuum to be drawn on the channel within the pad after the pad contacts with the end. By the suction pull on the chamber, the end is firmly gripped and held in contact with the chuck 9.

Located within the tank is a standard 18. Mounted on the standard is a sleeve 19 carrying a head 20. The head 20 is provided with a recess 21 in its upper face, and the annular rim encircling the recess is tapered as indicated at 22. The sleeve 19 carries a pin which is provided with transverse slots 23. A pin 24 carried by a lever 25 engages said slot. Attached to the lever 25 is a handle 26 which extends above the tank. When this handle is depressed to the position shown in broken lines, the head 20 is lifted. The head 20

is normally beneath the surface of the enamel, and as it is lifted and raised above the surface of the enamel, the recess 21 in the upper face of the head will be filled with the enamel and carry the same up into contact with the can end. Thus it is that the enamel bath is raised so as to contact with the can end all the way across the end from the vertical wall 3 at one side thereof to the vertical wall 3 at the other side thereof. The coating will be carried up the vertical wall to the point indicated at *x* in Fig. 2. This insures that the enamel will adhere to the can end throughout the central region and well up on to the vertical wall 3. After the enamel has been applied to the end, the head 20 is locked, and the chuck 9 is rotated very rapidly. The rapid rotation of the chuck will cause the enamel coating to flow outwardly because of the centrifugal force acting thereon, and distribute the enamel coating all the way to the outer edge of the channel, and the surplus coating will be discharged from the lower edge of the can end. When the bath of enamel is brought into contact with the can end, more enamel will adhere thereto than is necessary for producing the desired thickness of coating. The amount that will adhere to the end depends upon the viscosity of the enamel. When the end is rotated, the coating will be uniformly distributed to the desired thickness and the surplus will be expelled. The amount which is expelled from the end depends upon the speed of rotation of the end. By changing the viscosity and regulating the speed of rotation, the desired thickness of enamel coating may be obtained. Surrounding the chuck 9 is a hood 27 which remains stationary, but which can be raised and lowered in any suitable way so as to permit the insertion of the end beneath the chuck. The purpose of the hood is to collect the enamel which is thrown from the end and cause the same to drain back into the tank. The enamel thrown from the end will contact with the inner vertical wall of the hood and will run down said vertical wall into the tank. After the end has been coated and the coating distributed in the manner described above, the end is then baked in the usual way.

Instead of applying the coating by lifting a bath into contact with the end, it will be understood that it may be applied in other ways, as by spraying. The essential feature resides in the coating of the inner vertical wall of the channel with a surplus amount of coating, and the rapid rotation of the end for distributing the coating and expelling the surplus therefrom.

The apparatus described will, of course, be automatic in its operation, and will be provided with means for placing the end and for removing the same after it is coated. The apparatus disclosed is solely for the purpose of illustrating the steps in the improved method.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent, is—

1. The method of applying a protective enamel to the inner face of a can end having a channel at the peripheral edge thereof consisting in supporting a can end at the outer face thereof and causing the inner face only of said end to contact with a bath of enamel whereby a quantity in excess of that necessary to produce the desired thickness is caused to adhere to said can end, removing the end from contact with the enamel bath and rapidly rotating the end for distributing the enamel uniformly over the surface of the end across the channel and expelling the surplus from the peripheral edge of the can end.

2. The method of applying a protective enamel to the inner face of a can end having a channel portion at the peripheral edge thereof consisting in supporting the can end at the upper face thereof and causing the under face only of the can end to contact with a restricted bath of enamel throughout the central portion of the end and extending to the channel, whereby a quantity in excess of that necessary to produce the desired thickness is caused to adhere to the can end, removing the can end from contact with the enamel bath and rapidly rotating the end for distributing the enamel uniformly over the surface of the end and across the channel and expelling the surplus from the peripheral edge of the can end.

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