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E. H. BARKER ET AL

2,229,631

MACHINE FOR COATING THE INNER SURFACE OF CONTAINERS

Filed June 1, 1939

2 Sheets-Sheet 1

FIG. 2.

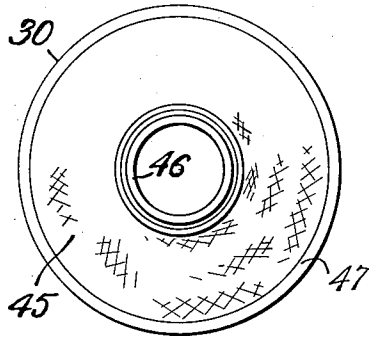


FIG. 3.

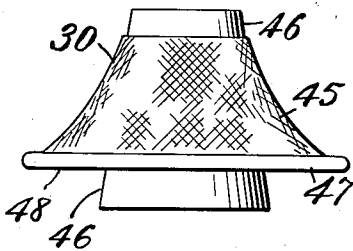
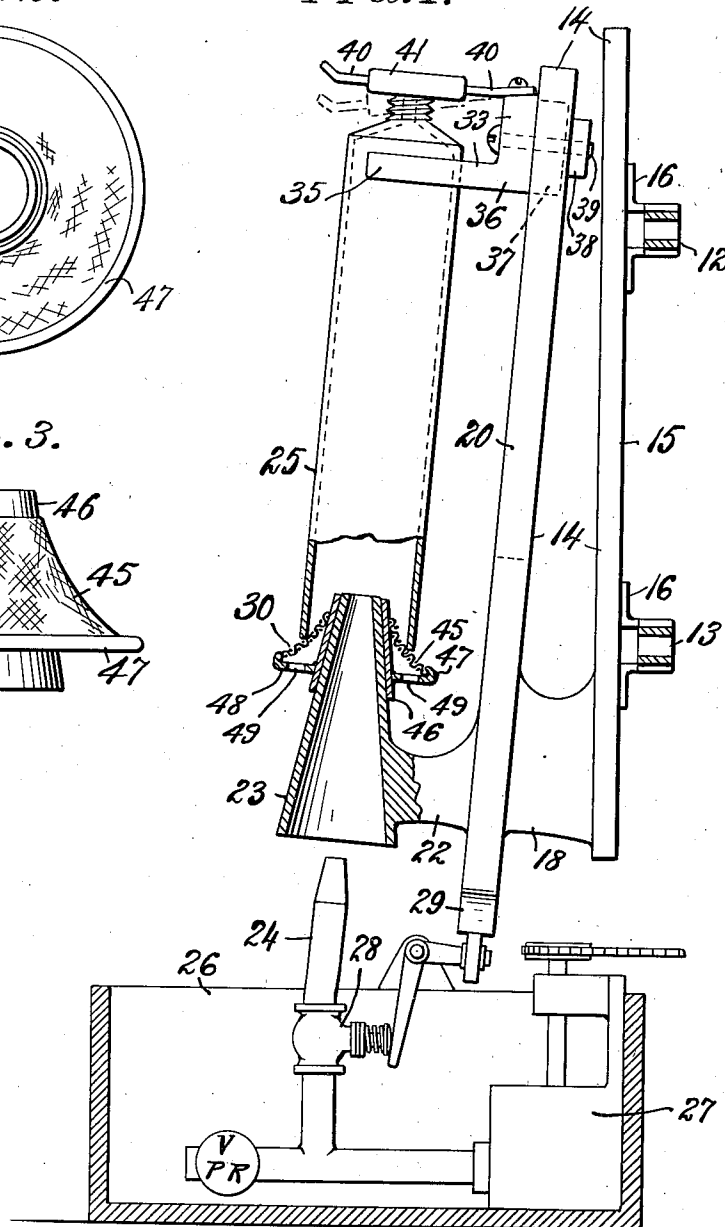


FIG. 1.



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2 Sheets-Sheet 2

FIG. 4.

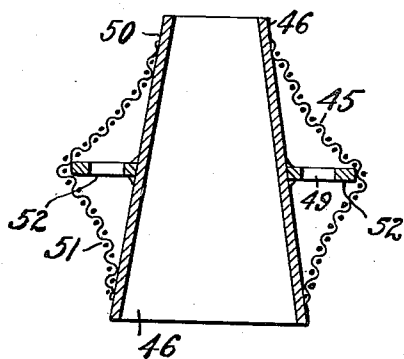


FIG. 8.

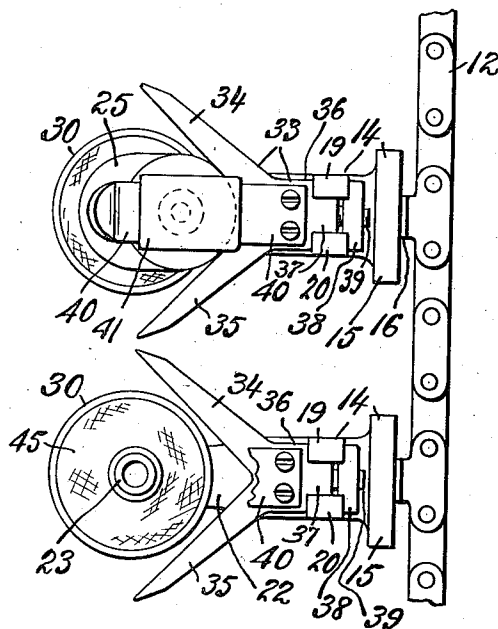


FIG. 7.

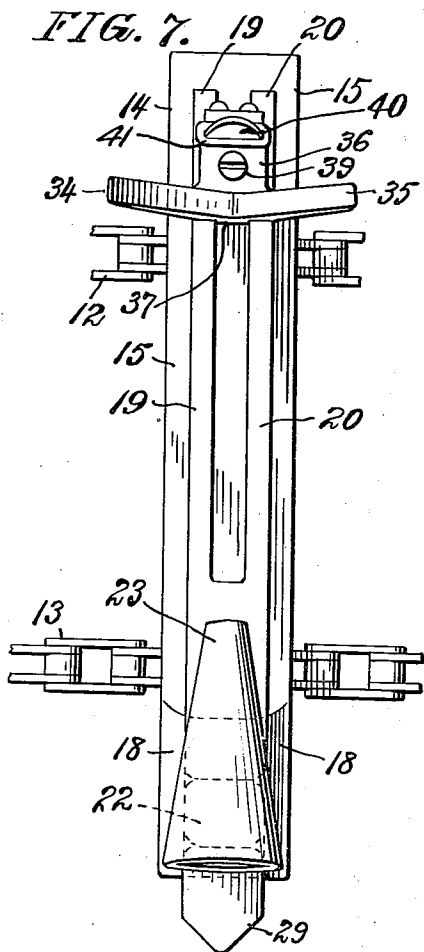


FIG. 5.

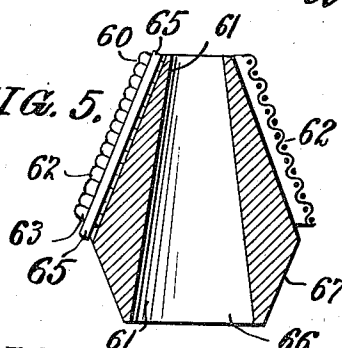
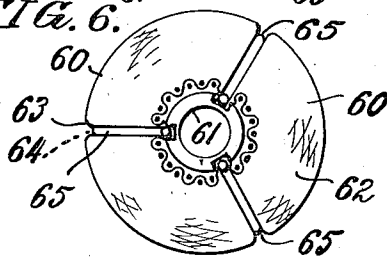


FIG. 6.



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UNITED STATES PATENT OFFICE

2,229,631

MACHINE FOR COATING THE INNER
SURFACE OF CONTAINERSEdwin H. Barker, Moylan, Pa., and Harry Born,
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Application June 1, 1939, Serial No. 276,770

5 Claims. (Cl. 91-60)

Our invention relates to improvements in machines for coating the inner surface of containers, such as cans and collapsible tubes, with a coating of protective material.

5 Heretofore in all such machines it has been impossible, except by very expensive mechanisms, to obtain a uniform coating, particularly at the lower edge of the container where a thick heavy ring of material accumulates. Said thick ring
10 of material upon the container makes it difficult to properly seal the container.

The object of our invention is to provide novel means for applying a coating of material of uniform thickness upon the entire inner surface of
15 the container.

A further object is to provide a simple and efficient means for removing the excess material from the lower edge of the container from which the excess material is drained, thereby eliminat-
20 ing the thick ring of material from the container.

A further object is to provide a novel form of support for the container, said support comprising a porous structure having a high degree of capillarity, through the pores of which the coating material will be drawn from the surface of
25 the container adjacent to the points of contact between the container and the support.

A further object is to construct a novel work carrier forming a unit of an endless conveyor belt of a coating machine. Said work holder including a conical tube upon which the container support is detachably mounted, and through which the coating material is directed from a stationary nozzle into the container to
30 be coated.

These together with various other novel features of construction and arrangement of the parts, which will be hereinafter more fully described and claimed, constitute our invention.

40 Referring to the accompanying drawings: Fig. 1 is a vertical sectional view of the novel work carrier and container support. Fig. 2 is an enlarged plan view of the container support shown in Fig. 1. Fig. 3 is a side elevation of Fig. 2.
45 Fig. 4 is a vertical sectional view of a different form of container support. Fig. 5 is a vertical sectional view showing a still different form of container support. Fig. 6 is a plan view of Fig. 5. Fig. 7 is a front elevation of Fig. 1, with the container and container support removed. Fig.
50 8 is a plan view showing two work carriers with container supports thereon, and a container mounted upon one of said supports.

In the drawings in which like reference characters refer to like parts, 12 and 13 represent

portions of sprocket chains forming part of an endless conveyor belt, upon which is mounted a series of work carriers 14, each comprising a vertical plate 15, having angle plates 16 attached to the plate 15 and forming links of the chains 12 and 13.

The plate 15 is provided upon its lower portion with a bearing 18, on which is supported parallel guide bars 19 and 20. An extension bearing 22 is mounted upon said bars and forms a support for a conical tube 23, through which tube the coating material is injected from a stationary nozzle 24, shown in Fig. 1, into the container 25 which is to be coated. Said container 25 is mounted upon the work carrier 14, immediately above the tube 23, with the lower open end of the container supported upon the container support, which latter surrounds the tube 23.

The injection nozzle 24 is arranged above a tank 26, containing the coating material, which material is heated by suitable means not shown in the drawings. A pump 27 is provided for forcing the material from the tank through the nozzle 24 upon the opening of a control valve 28, adapted to be actuated by a cam 29 formed upon the bearing 18, of the work carrier, when the latter comes to rest with the inlet tube 23 above the nozzle 24. The tube 23 is conical and provides a large inlet opening at the lower end thereof which permits of slight variations in the alignment between the tube 23 and the nozzle 24. The conical tube 23 directs the coating material toward the relatively smaller outlet at the upper end of the tube.

A novel container support 30 is detachably mounted upon the inlet tube 23, and is adapted for supporting the container 25 with the open end of the latter resting upon the support 30 and embracing the upper end of the tube 23. The coating material is injected by the nozzle 24 through the axial passageway formed through the tube 23 and the container support 30 for coating the inner surface of the container 25.

A V-shaped rest bracket 33 comprises arms 34 and 35 extending from a head 36, which latter is slidably mounted upon the upper portion of the guide bars 19 and 20. Said head 36 has a tongue 37 extending between said bars and is adapted to be secured upon said bars by a clamp plate 38 and a screw 39 extending through the head and engaging the plate 38. The container 25 is placed upon the support 30 and the upper portion of the container is adapted to be embraced by the arms 34 and 35.

The guide bars 19 and 20 are slightly inclined

from a vertical line so that the container will rest upon the support 30 until the container is automatically engaged by a spring plate 40, secured at one end thereof upon the head 36.

5 A resilient pad 41 embraces the plate 40 and forms a valve adapted to close the neck of the container 25, and also holds the container upon the work carrier, when said plate 40 is released from cam mechanism, not shown in the drawings.

10 The container supports shown in Figs. 1 to 6 comprise porous structures, each provided with an axial bore adapted to surround the tube 23, through which the coating material is injected into the container 25. Said porous body forming
15 said support provides means for removing the excess coating material from the container. The excess material will be drawn through the pores of the support structure by means of capillary attraction and gravity, and it will flow down the outside surface of the tube 23 and drip into the tank 26.

The container supports are preferably in the form of cones adapting them for containers of
25 different sizes. The supporting surface of the conical support is in contact with the lower inner edge of the container 25, and said supporting surface is porous, and consists of closely spaced points of support with capillary apertures formed
30 between said points of support, through which apertures the excess coating material is drawn from the surface of the container which is in contact with said points of support, thereby removing the thick ring of material from the lower
35 edge of the container.

The container supports shown in Figs. 1 to 6, and 8, are constructed with supporting surfaces
45 45, in the form of wire mesh, or screening, having capillary apertures through which the excess coating material is removed from the container 25.

The wire mesh cone shaped member 45 is mounted upon a sleeve 46, which is adapted to be detachably mounted upon the inlet tube 23. A
45 disk 48 is secured to the sleeve 46, as shown in Figs. 1 to 3. The member 45 is secured at its base to the periphery of the disk 48, which latter has an upwardly turned flange 47 to which the lower edge of said member 45 is secured. The
50 truncated top of the member 45 is secured to the upper portion of the sleeve 46 by soldering or brazing. The disk 48 is provided with holes 49, through which the excess material freely passes.

The container support 50, shown in Fig. 4, is similar to that shown in Figs. 1 to 3, with the addition of an inverted conical member 51, also
55 formed of wire mesh, with its truncated lower portion converging with and secured upon the lower portion of the sleeve 46, for directing the coating material from the periphery of the disk
60 52 toward the axis of the sleeve 46, so that it will flow down the tube 23 and tend to reduce the splashing of the material as it drips into the tank 26.

65 The supporting surface 45 is formed of closely spaced points of support throughout said surface, and said surface is provided with capillary apertures formed between said points of support. The lower open end of the container 25 rests
70 upon said points of support, and the capillary apertures insure the complete drainage of the coating material from the inner surface of the container, thereby eliminating the thick ring of material which would otherwise tend to form upon the lower edge of the container.

The container support 60, shown in Figs. 5 and 6, comprises a relatively thick conical sleeve
61, formed of iron, or like material adapted for retaining heat. A conical member 62, formed of wire mesh, is mounted in spaced parallel relation
5 with the outer conical surface of the sleeve 61. The wire mesh cone 62 is made in segments, each having radially positioned edge portions 63, projecting inwardly, and secured in grooves 64
10 formed in the outer conical surface of the sleeve 61, by means of locking rods 65. There is an annular space formed between the cone 62 and the outer surface of the sleeve 61 for the excess
15 coating material to flow from the inner surface of the container 25 when the latter is resting upon the conical surface of the wire mesh cone 62. The sleeve 61 is provided with an axial opening
20 66 adapted to fit over the tube 23. Said sleeve 61 is also provided with an inverted conical portion 67 adapted for directing the excess material from the lower edge portion of the cone 62 toward the axis of the sleeve 61 and the lower portion of the tube 23. The sleeve 61 forms
25 a heat retaining body which assists the flow of the excess material through the wire mesh cone 62 from the surface of the container 25 which is in contact with the cone 62.

The operation of the machine is as follows: The conveyor belt is moved intermittently, the
30 containers are placed with their open ends upon the container supports and the upper portions of the containers embraced by the arms of the work rest brackets on the work carriers. As the belt advances the work carriers, the spring plates
35 40 are lowered upon the containers and close the openings in the necks of the containers and also hold the containers upon the work carriers.

The coating material is heated in the tank and placed under pressure by the pump, the control valve is opened when inlet tube 23 is at rest
40 directly above the nozzle. The coating material is injected upwardly through the axis of the container support and the tube 23 into the container for coating the inner surface of the latter.
45 The excess material falls by gravity upon the porous container support and it is absorbed thereby, very much as a piece of blotting paper absorbs liquid. As the work carrier is moved from above the nozzle the excess material flows
50 from the container through the porous container support and drips into the tank to be reheated and used again.

The coating machine constructed as above described permits the use of a small quantity of
55 the heated coating material, thus reducing the danger of fire and the possible injury to the operators, and the small quantity of material can be maintained in proper working condition at a low operating cost.

60 Various changes in the construction and arrangement of the parts may be made without departing from our invention.

We claim:

1. A container support for machines for coating
65 the inner surface of containers, comprising a body having a conical surface upon which the lower edge portion of the container is adapted to be mounted, said body having closely spaced
70 points of support formed throughout said surface adapted to engage the container, said body having capillary pores located between said points of support adapted for the passage of excess material from the container through said pores, and
75 said body having an axial bore through which

the coating material is adapted to be injected into the container.

2. A container support for machines for coating the inner surface of containers, comprising an axially positioned sleeve, a truncated cone 5 formed of wire mesh surrounding said sleeve and forming an annular support for the container, and means for securing the cone upon the sleeve.

3. A container support for machines for coating the inner surface of containers, comprising 10 a sleeve through which coating material is adapted to be injected into the open end of the container positioned above the sleeve, a truncated cone formed of wire mesh adapted for supporting the container, a disk concentrically 15 mounted upon said sleeve, means securing the base of said cone to the periphery of the disk, and said disk having apertures formed through the same for the discharge of excess coating material from the container.

4. A container support for machines for coat-

ing the inner surface of containers, comprising a sleeve, a structure formed of wire mesh surrounding said sleeve, said structure having a medial portion of relatively larger diameter than said sleeve, said structure having conical end 5 portions tapering in opposite directions from said medial portion toward the opposite ends of said sleeve, and means for securing the contracted end portions of said structure to the sleeve.

5. A container support for machines for coating the inner surface of containers, comprising 10 a sleeve having an axial bore through which the coating material is adapted to be injected into the open end of a container positioned above said sleeve, said sleeve having an outer conical sur- 15 face, a conical porous member adapted for supporting said container, and means for mounting said member upon the sleeve in spaced parallel relation with said conical surface of said sleeve.

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