June 15, 1937. A. L. KRONQUEST ET AL 2,084,094

MACHINE FOR COATING CANS

Filed Dec. 31, 1935 4 Sheets-Sheet 1

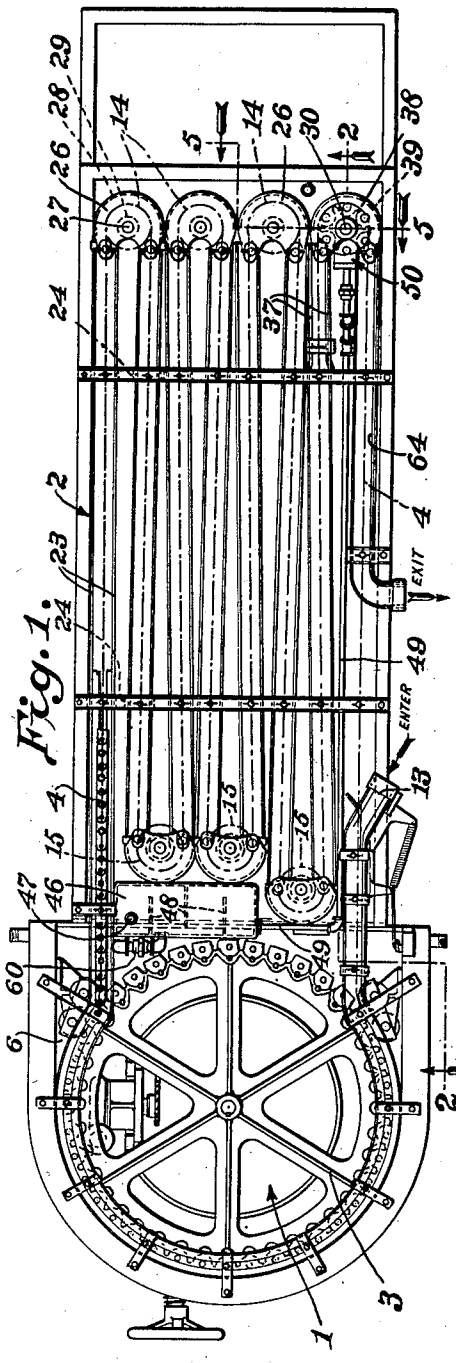

Fig. 1.

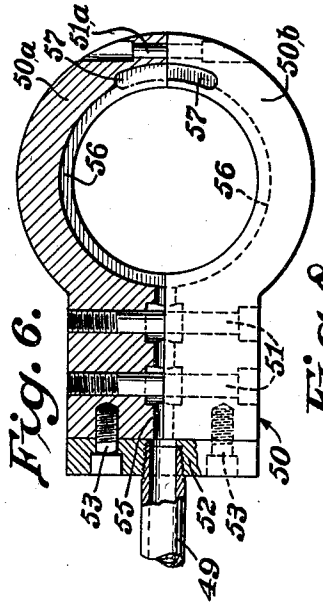

Fig. 6.

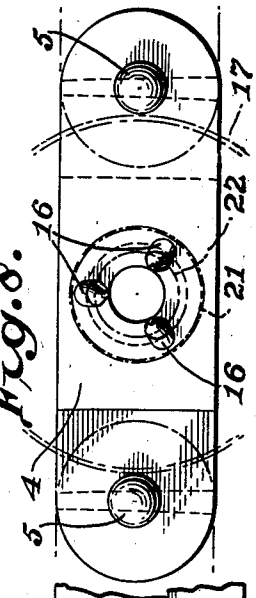

Fig. 8.

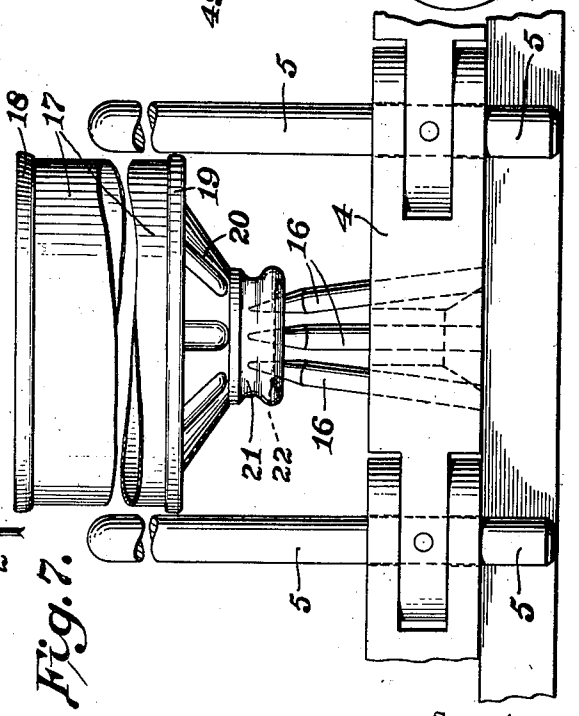

Fig. 7.

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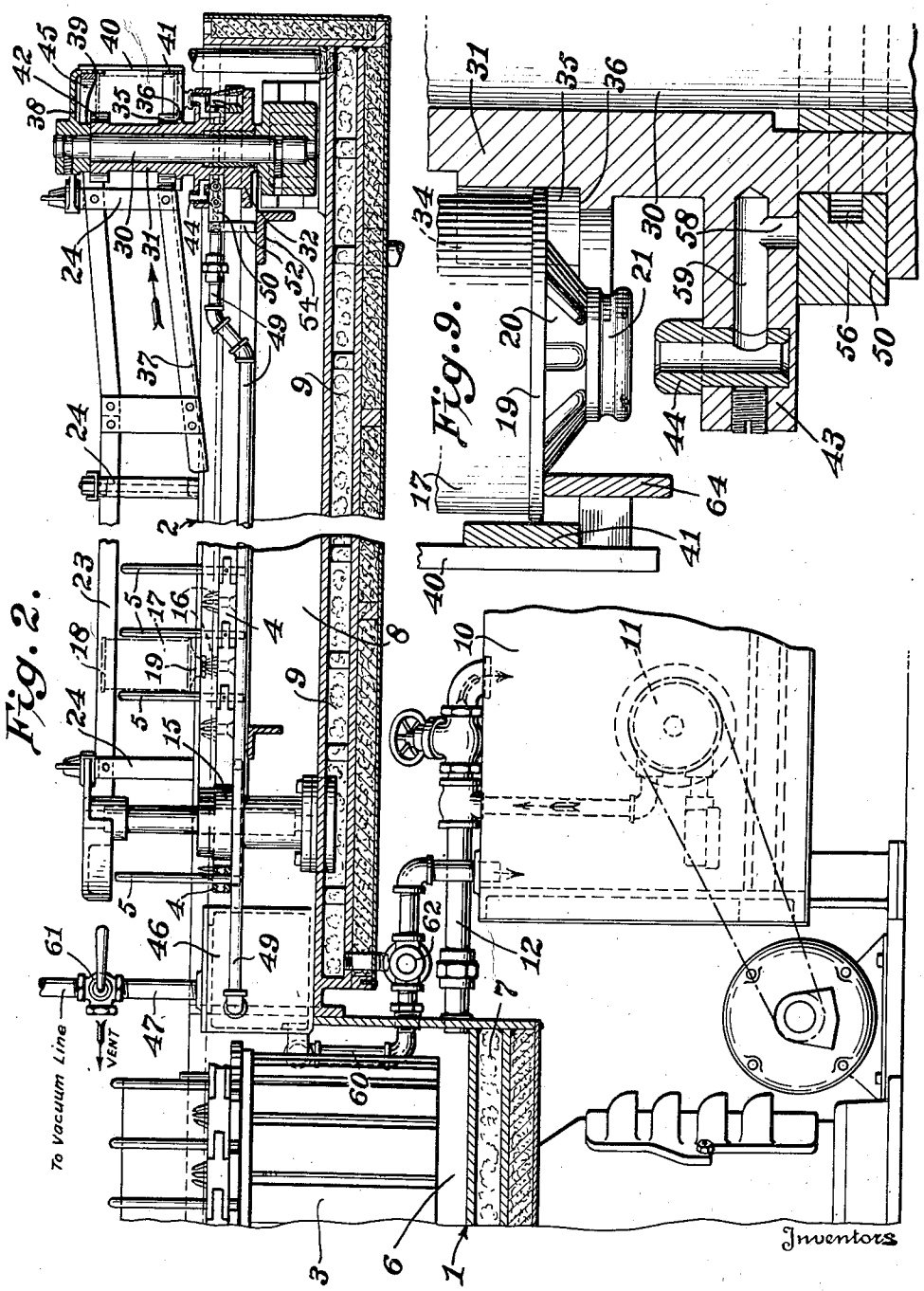
June 15, 1937. A. L. KRONQUEST ET AL 2,084,094

MACHINE FOR COATING CANS

Filed Dec. 31, 1935 4 Sheets-Sheet 2



June 15, 1937. A. L. KRONQUEST ET AL 2,084,094

MACHINE FOR COATING CANS

Filed Dec. 31, 1935 4 Sheets-Sheet 3

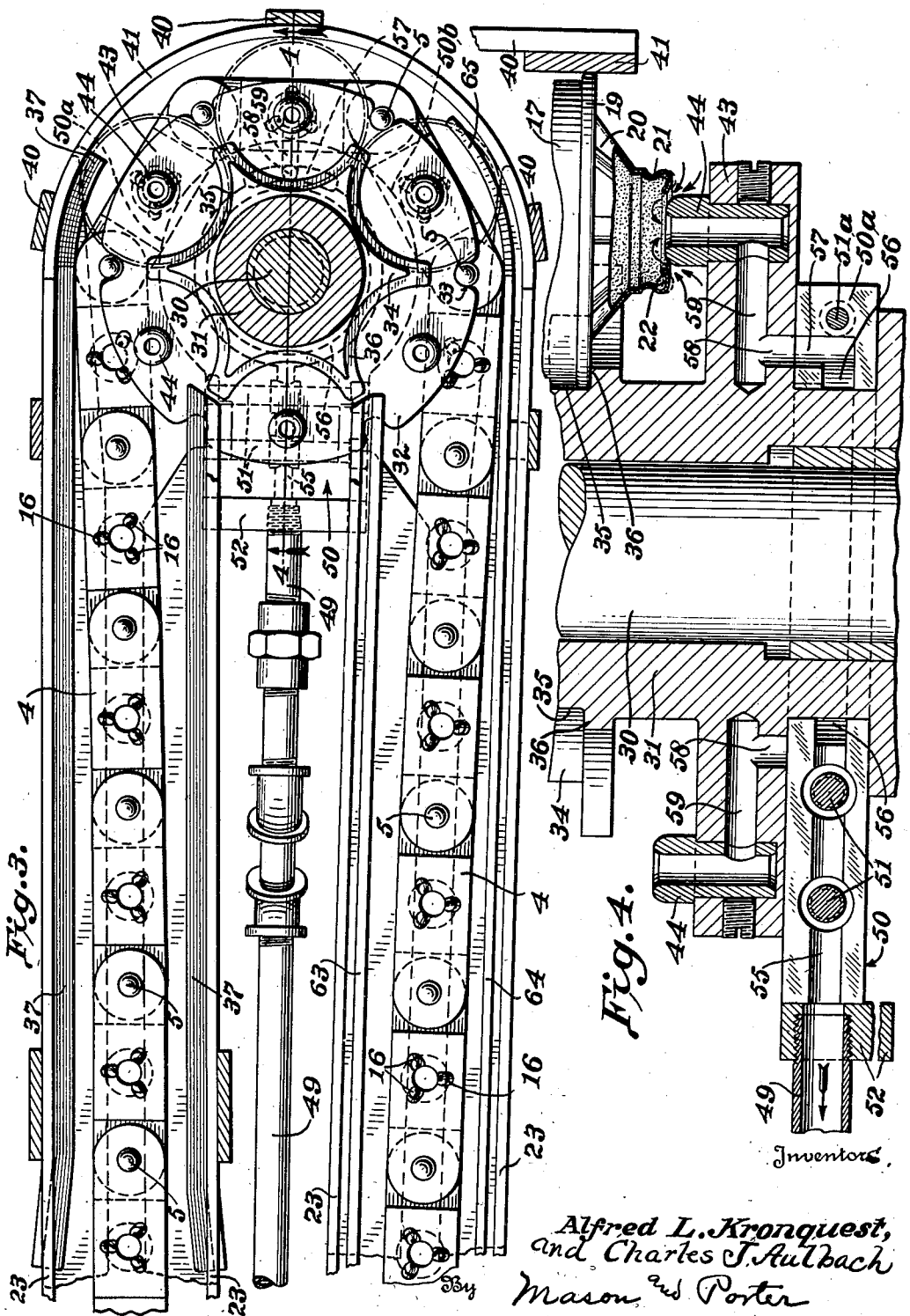


Fig. 3.

Fig. 4.

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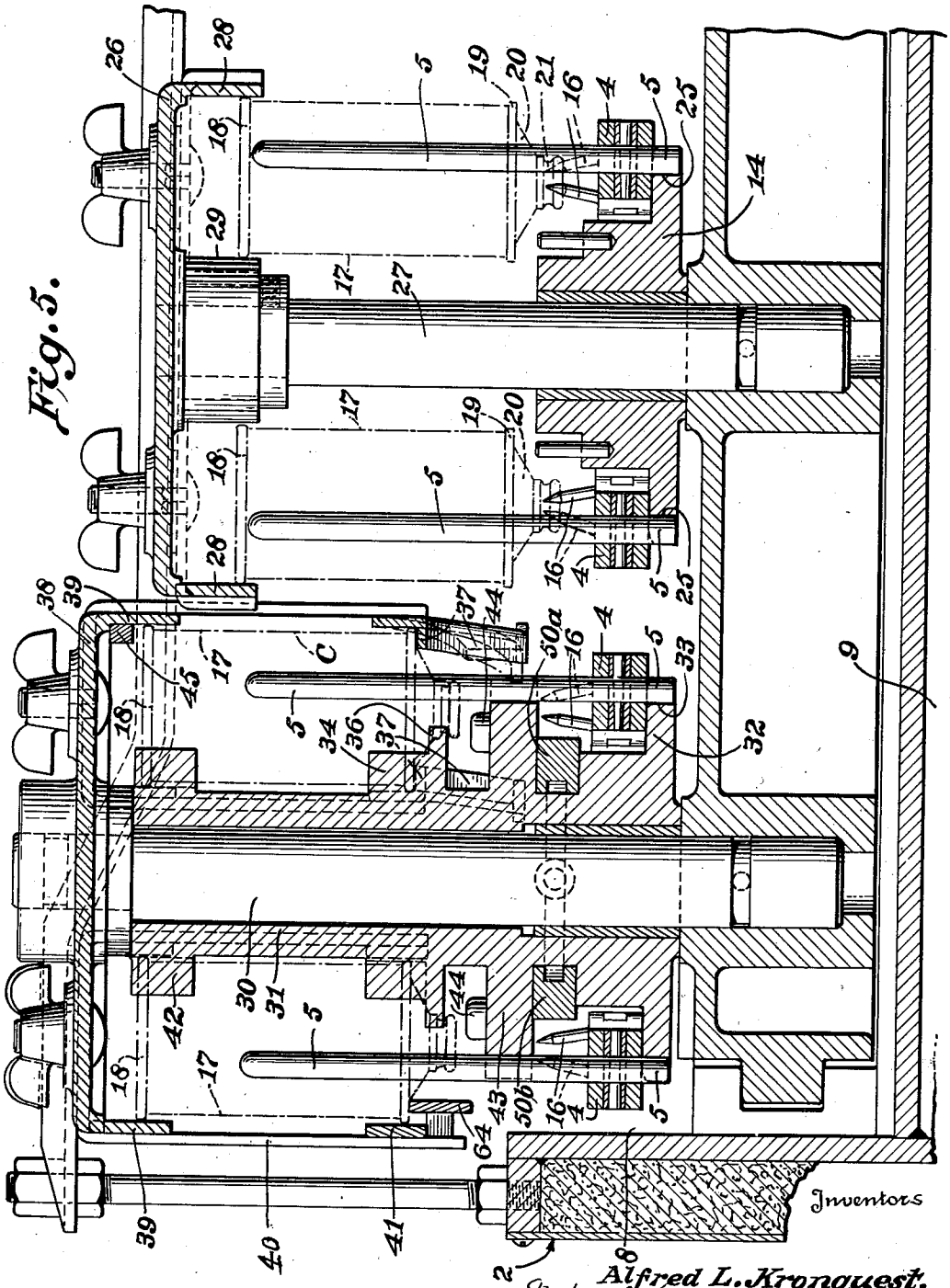
June 15, 1937. A. L. KRONQUEST ET AL 2,084,094

MACHINE FOR COATING CANS

Filed Dec. 31, 1935 4 Sheets-Sheet 4

Fig. 5.



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Patented June 15, 1937 2,084,094

UNITED STATES PATENT OFFICE

2,084,094

MACHINE FOR COATING CANS

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Application December 31, 1935, Serial No. 57,051

8 Claims. (Cl. 91—44)

In an application of Alfred L. Kronquest, Serial No. 56,740, filed December 30, 1935, there is shown and described a machine for coating cans with a thermo-plastic material such as wax, wherein the interior surface of the can is flooded with the hot material while supported in an inverted position, and the excess coating material is permitted to drain from the can. The present invention has to do with an improvement in the coating machine of the aforesaid application, and has for an object the provision of means for de-waxing or stripping the coating material collecting on the outer surface of the lip of the can mouth therefrom, while said coating material is still in flowing condition.

In the drawings which show by way of illustration one embodiment of the invention—

Figure 1 is a plan view showing more or less diagrammatically the coating machine with the improvement applied thereto;

Fig. 2 is a longitudinal sectional view on the line 2—2 of Fig. 1, with parts in elevation;

Fig. 3 is an enlarged plan view of the portion of the machine where the coating material is stripped from the lip of the can mouth;

Fig. 4 is a vertical sectional view on the line 4—4 of Fig. 3;

Fig. 5 is an enlarged sectional view on the line 5—5 of Fig. 1;

Fig. 6 is a view partly in section and partly in plan of the valve manifold for subjecting the traveling nozzles to a vacuum pull;

Fig. 7 is an enlarged sectional view showing a portion of a can, the conveyor and the relation of the guide fingers to the mouth of the can during the draining of the thermo-plastic coating material therefrom;

Fig. 8 is an enlarged plan view of a portion of the conveyor, and

Fig. 9 is a detail in section showing the can raised from the nozzle for discharge from the machine.

In the aforesaid application there is shown a coating machine which includes a turret section and a draining section. The cans to be coated are passed through the turret section in an inverted position and the hot thermo-plastic coating material is discharged from a nozzle on to the interior surface of the can completely flooding the same. The excess coating material drains from the can mouth, leaving a film or coating over the entire surface of the can which is cooled and set. During the draining of the coating from the can mouth, the hot thermo-plastic material flows around on to the outer face of the lip of the can where it sets. This is objectionable, for the reason that when the closure cap is secured to the mouth of the can for closing the same, it is likely to fracture the thermo-plastic coating on the outer face of the lip, and the fractured coating, when the cap is removed, cleaves from the lip of the can. The present invention has particularly to do with a means for removing a greater portion of the thermo-plastic material from the outer face of the lip of the can. This is accomplished by placing the can, before the thermo-plastic material hardens and sets, over a nozzle which is very close to the edge of the lip, and which projects slightly into the mouth of the can. This nozzle is subjected to a vacuum pull which will draw air into the can across the lip. As the air passes across the lip of the can, it will cause the coating placed thereon to flow with the air current, and this will thin the coating on the outer face of the lip so that there is practically no coating left in the region where the closure cap contacts therewith.

Referring more in detail to the drawings, the machine for coating cans includes a turret section 1 and a draining section 2. The turret section 1 is provided with a rotating turret 3, and associated with this rotating turret are a series of coating units. A conveyor 4 consisting of pivotally connected blocks operates to convey the cans to and from the turret for coating. This conveyor is driven by the turret and travels in timing therewith. The blocks are connected by pivot posts 5 which project below the blocks and also above the blocks. The portion of the pivot post projecting above the block contacts with the can and moves it along the guide rails therefor into the turret. This conveyor 4 not only encircles the turret, as shown in Fig. 1, but it passes back and forth in the draining tank 2.

The turret section of the coating machine is provided with a tank 6 (see Fig. 2) for the coating material. A steam chamber 7 serves to keep the thermo-plastic coating material in liquid form. The draining section is provided with a tank 8 and a steam chamber 9 serves to keep the coating material in this draining section in liquid form. The two tanks are connected together, so that the thermo-plastic material as it drains from the cans is maintained in liquid form and again supplied to the tank in the turret section. The coating material is supplied to these tanks from a main reservoir or tank 10 in which is located a pump 11, and the pump supplies the coating to the tank of the turret section through a pipe 12. The cans are delivered into the ma-

chine from a runway 13 and as the cans pass down this runway they are placed in front of the posts 5, and thus, as noted above, the cans are forced along the runway into the turret. After the cans have been coated, they are conveyed by the conveyor 4 into the draining section of the machine. The conveyor passes around one of the disks 14 at the right-hand end of the tank and thence around one of the disks 15 at the left-hand end of the tank.

Mounted on each block of the conveyor are a series of supporting and guiding fingers 16. As shown, there are three of these fingers. The can to be coated consists of a body portion 17 to which a bottom end 18 is double-seamed. A top end 19 is also seamed to the can body and is provided with a crown section 20 terminating in a neck 21, and this neck 21 has an inturned lip 22 (see Figures 4 and 7). When the can comes from the coating machine it is resting on these supporting and guiding fingers 16 and is also in contact with the guiding post in rear of the same. The upper end of the inverted can body passes between guiding rails, one of which is indicated at 23. These guiding rails are carried by brackets 24, 24 which are attached to a cross bar in turn carried by the wall of the draining tank. At the right of Fig. 5, one of the disks 14 around which the conveyor 4 travels is shown in vertical section. This disk is provided with recesses 25 which engage the bottom ends of the posts forming a part of the conveyor. The upper end of the inverted can, at this time, is guided by a cap 26 attached to the upper end of the bearing post 27 on which the disk rotates. The cap 26 has a depending concentric flange 28 and an inner guiding wall 29. The upper end of the inverted can passes between this flange 28 and the wall 29 and will be guided thereby. The supporting and guiding fingers 16 and the post 5 insure the positive movement of the can around the bearing post 27 and the delivering of the same between the guide rails so that it is carried along by the conveyor to the other end of the draining tank where it encircles another disk and is finally brought to the station where the thermo-plastic material on the outer lip of the can mouth is removed.

In Fig. 3 of the drawings, there is shown in plan, a section of the machine where the thermo-plastic material is removed from the can lip. At this station there is a bearing post 30 on which is mounted for rotation, a sleeve 31. Said sleeve is provided with a projecting portion 32 similar to the disk 14, and the outer edge of this projecting portion 32 is provided with recesses 33 adapted to receive the bottom ends of the posts, and this directs the travel of the conveyor around the bearing posts 31, holding each post a predetermined distance from the center of the post, and also positioning the supporting and guiding fingers 16 a predetermined distance from the center of the post.

The sleeve 31 is provided with a projecting portion 34 which is in turn shaped so as to provide a series of pockets 35. At the lower face of these pockets is a supporting ledge 36. Associated with the guiding rails 23 is a supporting cam rail 37 (see Fig. 2). There is a cam rail 37 at each side of the can guideway. As the can is moved along the conveyor supported on the guiding fingers, the lower end of the inverted can will move on to the cam rails 37. These cam rails are inclined upwardly as shown in Fig. 2, and will gradually lift the can off from the supporting fingers so that it is moved along solely by the contact of the post 5 therewith until it is brought into the rotating pockets at the station where the coating is to be removed. The supporting cam rail 37 at the outer side of the path of travel of the can extends slightly beyond a point tangential to the curved path of travel of the can about the bearing post 30. The other supporting cam rail 37 terminates short of the path of travel of the pocket 35. As a result, the conveyor will place the cans in the pockets 35, one after another. The disk 32 is so dimensioned as to cause the posts to travel in a path, the radius of which is slightly greater than the path of travel of the center of the can, and this will bring the guiding fingers directly underneath the path of travel of the can.

Mounted on the upper end of the bearing post 30 is a cap plate 38. Said cap plate is fixed to the bearing post and overlies the path of travel of the can. At the outer edge of the cap plate is a depending flange 39 which serves as a guiding rail for the upper edge of the inverted can. Attached to this depending flange are bars 40 and these bars carry at their lower edge, a guiding rail 41 which contacts with the lower edge portion of the inverted can. There is also a segmental projecting flange 42 at the upper end of the rotating sleeve 31, in which the upper end of the inverted can is nested. In Fig. 5 of the drawings, the can C is shown as having traveled up the cam rails 37 and placed in the pocket of the rotating sleeve 31. It is now raised well above the supporting and guiding fingers 16 on the conveyor 4. It is still supported on the cam rail 37 and at a slight distance above the supporting ledge 36.

The sleeve 31 has an outwardly projecting portion 43. Mounted in this portion 43 is a series of nozzles 44. These nozzles are placed in a line at the center of the pocket 35 so that when the can is seated in the pocket, the mouth of the can will be directly over the nozzle 44. While the cans are supported on the rail 37, the nozzle moves underneath the mouth of the can and into alinement therewith. When the cans pass off from the end of the rail 37, it will move down on to the supporting ledge 36 and will be placed so that the nozzle projects slightly into the mouth of the can, as clearly shown in Fig. 4. The cap plate 38 is provided with a cam rail 45 which overlies the can. The under face inclines downwardly and will insure that a can is moved down on to the supporting ledge when it comes off from the cam rail 37. The nozzles are connected to a vacuum creating means which, as shown in the drawings, includes a tank 46, (see Fig. 1). The tank is connected to an ordinary vacuum line or a vacuum creating mechanism through a pipe 47. In the tank are a series of baffles 48. A pipe 49 leads from the other end of the tank and along the draining tank and is connected to a valve manifold 50 mounted on the sleeve 31 just below the extension 43 (see Fig. 4). Said valve manifold 50, as shown in Fig. 6, consists of two semi-circular portions 50*a* and 50*b* with projecting shanks connected by suitable bolts 51. A dowel pin 51*a* alines the free ends of the sections 50*a* and 50*b*. A plate 52 has a machine fit with the ends of the shank and is secured thereto by bolts 53. The pipe 49 is threaded into this plate. This plate extends downward as shown in Fig. 2, and is connected to a cross beam 54 which prevents the valve manifold from turning. This valve manifold has a port 55 extending radially

hereof and around the shanks of the bolts 51, and this port connects directly with the pipe 49. There is a port or passage 56 encircling the valve manifold at its inner face, and this port or passage 56 is connected with a slotted port 57 in the upper face of the valve manifold. As noted, this valve manifold remains stationary, and the sleeve 31 rotating, will cause ports 58 to move into connection with the slotted port 57 in succession. These ports 58 are connected through a radial port 59 to the nozzle 44. Thus it is that the nozzles 44 in their rotation will make connection with the vacuum creating means while the sleeve is rotating through an arc defined by the length of the arcuate slotted port 57. When the nozzle is put under vacuum, air will be drawn from the can (see Fig. 4). Air will also be drawn into the can so that it may pass out through the nozzle as soon as the atmospheric pressure is above the pressure within the can. The air travels in the path of the arrows in this Fig. 4, and as it sweeps across the outer lip of the can, it will cause the thermo-plastic material which is not yet hardened and set to move with the air current, and this will strip the thermo-plastic material which flows by capillary attraction around on to the outer face of the lip of the can. It will practically remove all of the thermo-plastic material from the outer face of the lip, leaving possibly a very thin film at the extreme inner edge of the lip and across the edge of the metal at the mouth of the can. Any coating material taken up by the air current is carried back into the tank and will be caused by the baffles to be released from suspension in the air current and gather in the bottom of the tank 46. The thermo-plastic material can be drawn back into the main tank through the pipe 60. The vacuum is cut off from the line by means of the valve 61, and then a valve 62 is opened in order to drain the tank, after which said valve is closed and the tank again opened to the vacuum line. After the can has been subjected to the vacuum pull and the vacuum cut off, it is then delivered by the rotating sleeve or turret and the traveling conveyor into the can guideway which includes can supporting rails 63 and 64. The supporting rail 64 extends beyond the tangential point as indicated at 65. This end of the supporting rail is inclined upwardly so that when the can contacts therewith, it will be lifted off from the nozzle so that the nozzle may pass in its curved path of travel while the can moves out into its straight path of travel along the can guideway. After the can has been subjected to this action of the vacuum pull thereon, it is moved along the guide rails and discharged from the machine. While the device for subjecting the can to a vacuum pull is shown as located near the discharge end of the can guideway, it will be understood that it may be located at other points in the travel of the can after it is coated so as to subject the can to the proper vacuum pull at a time before the thermo-plastic coating material has become so set and hardened as to be undisturbed by the air current.

From the above it will be apparent that the machine embodying the present invention is in the nature of a dewaxing machine which operates to remove the surplus and objectionable wax collecting on the outer face of the lip of the can mouth. This machine is in the form of an attachment for the coating machine and the dewaxing mechanism operates upon the wax while it is still in flowing form. It is possible that the machine for de-waxing might be independent of the coating machine, but it is essential, however, that the wax collecting on the outer face of the lip of the can mouth shall be reduced to flowing form by heating, so that the air current passing across the lip will strip it of the wax in the manner which has been described above in detail.

It is obvious that many changes in the details of construction may be made without departing from the spirit of the invention as set forth in the appended claims.

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

1. A machine for removing wax from the outer face of the lip of a wax-coated can comprising a nozzle, means for placing the can in inverted position over said nozzle with the nozzle in the mouth of the can and spaced slightly from the lip thereof, and means for subjecting said nozzle to a vacuum pull whereby air is caused to pass across said lip as it enters the nozzle.

2. A machine for removing wax from the outer face of the lip of a wax-coated can comprising a nozzle, means for placing the can in inverted position over said nozzle with the nozzle in the mouth of the can and spaced slightly from the lip thereof, a vacuum tank, means for maintaining said tank under vacuum, baffles within said tank, a pipe connecting said tank to the nozzle for creating a vacuum thereon and causing the air entering the nozzle to pass across the lip of the can mouth, said baffles serving to separate the wax from the air.

3. A machine for removing wax from the outer face of the lip of a wax-coated can comprising a draining tank, a conveyor movable in a circuitous path in said tank, means for supporting cans in an inverted position on said conveyor whereby the surplus wax is drained from the cans, means operating upon the cans in succession for removing wax from the outer face of the lip of the can including a rotating turret having segmental pockets in which the cans are placed by the conveyor, a nozzle associated with each pocket, means for causing said nozzles to travel in timing with the conveyor, means operating upon the cans in the pockets for placing the mouth of the can over the nozzle associated with the pocket and in spaced relation thereto, and means for subjecting the nozzle to a vacuum pull for a sufficient interval for causing air to pass across the lip of the can mouth as it enters the nozzle and remove the wax therefrom.

4. A machine for removing wax from the outer face of the lip of a wax-coated can comprising a draining tank, a conveyor movable in a circuitous path in said tank, means for supporting cans in an inverted position on said conveyor whereby the surplus wax is drained from the cans, means operating upon the cans in succession for removing wax from the outer face of the lip of the can including a rotating turret having segmental pockets in which the cans are placed by the conveyor, a nozzle associated with each pocket, means for causing said nozzles to travel in timing with the conveyor, means operating upon the cans in the pockets for placing the mouth of the can over the nozzle associated with the pocket and in spaced relation thereto, means for subjecting the nozzle to a vacuum pull for a sufficient interval for causing air to pass across the lip of the can mouth as it enters the nozzle and remove the wax therefrom, said last-named means comprising a

stationary valve having a port therein, and a pipe connecting said valve port to a vacuum creating means, said valve having a slot connected to said port with which the nozzles are connected in succession in their travel.

5. A machine for de-waxing the outer face of the lip of a wax-coated can comprising a bearing post, a rotating sleeve turret mounted thereon, said sleeve turret having pockets adapted to receive in succession, cans and support the same in inverted position, a series of nozzles mounted on said sleeve, one for each pocket, a stationary valve mounted on said sleeve, said valve having a port therein, a pipe leading from said port to a vacuum creating means, and a segmental slot leading from said port to the outer face of the valve, said sleeve having a port associated with each nozzle which is adapted to register with said slot for subjecting the nozzles in succession to a vacuum pull for the interval of time during the rotation of the turret.

6. A machine for de-waxing the outer face of the lip of a wax-coated can comprising a bearing post, a rotating sleeve turret mounted thereon, said sleeve turret having pockets adapted to receive in succession cans and support the same in inverted position, a series of nozzles mounted on said sleeve, one for each pocket, a stationary valve mounted on said sleeve, said valve having a port therein, a pipe leading from said port to a vacuum creating means, and a segmental slot leading from said port to the outer face of the valve, said sleeve having a port associated with each nozzle which is adapted to register with said slot for subjecting the nozzles in succession to a vacuum pull for the interval of time during the rotation of the turret, and a conveyor for delivering the cans in succession to the pockets of the turret and for removing said cans from the pockets.

7. A machine for removing thermoplastic material from the outer face of the lip of the cap-receiving neck while said material is in flowing condition, comprising means for conveying the can in an inverted position for draining the excess material from the interior thereof, and means traveling with the can for directing an air current across the outer face of the lip for stripping the thermoplastic material therefrom.

8. A machine for removing wax from the outer face of the lip of a wax-coated can comprising a conveyor for conveying the cans in an inverted position, traveling nozzles moving in timing with the conveyor, means for applying suction to said nozzles, and means associated with said conveyor and traveling nozzles for so placing the mouth of the can relative to a nozzle that an air current is drawn across the outer face of the lip of the can into said nozzle for removing the wax therefrom while in flowing condition.

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