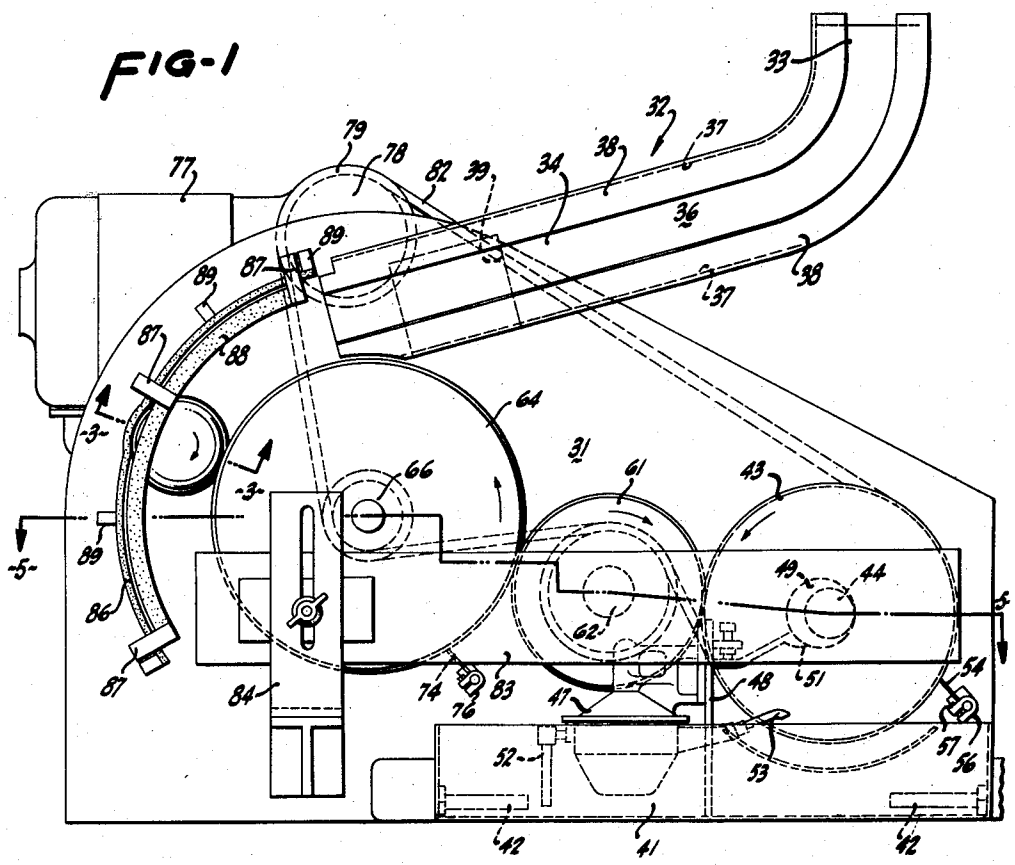
July 12, 1960 E. E. JEREMIAH 2,944,510

MACHINE FOR APPLYING WAX TO CAN ENDS

Filed Dec. 26, 1956 2 Sheets-Sheet 1

FIG-1



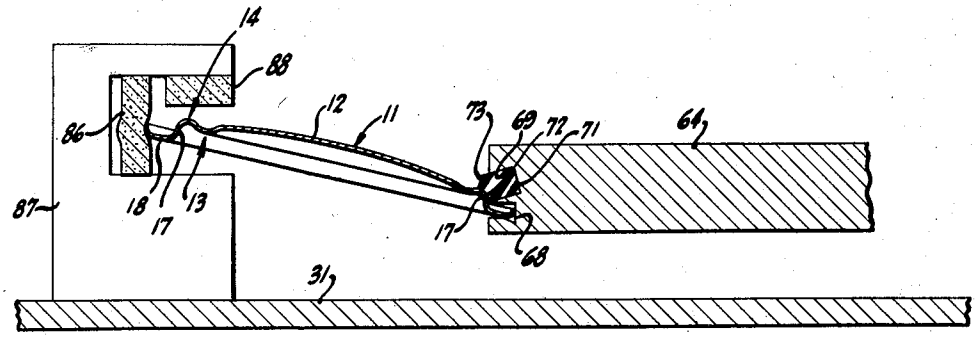


FIG-3

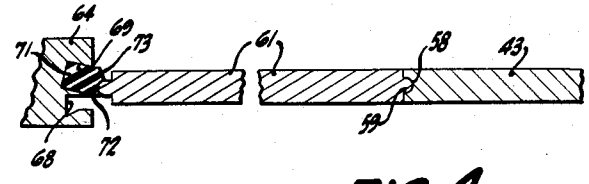


FIG-4

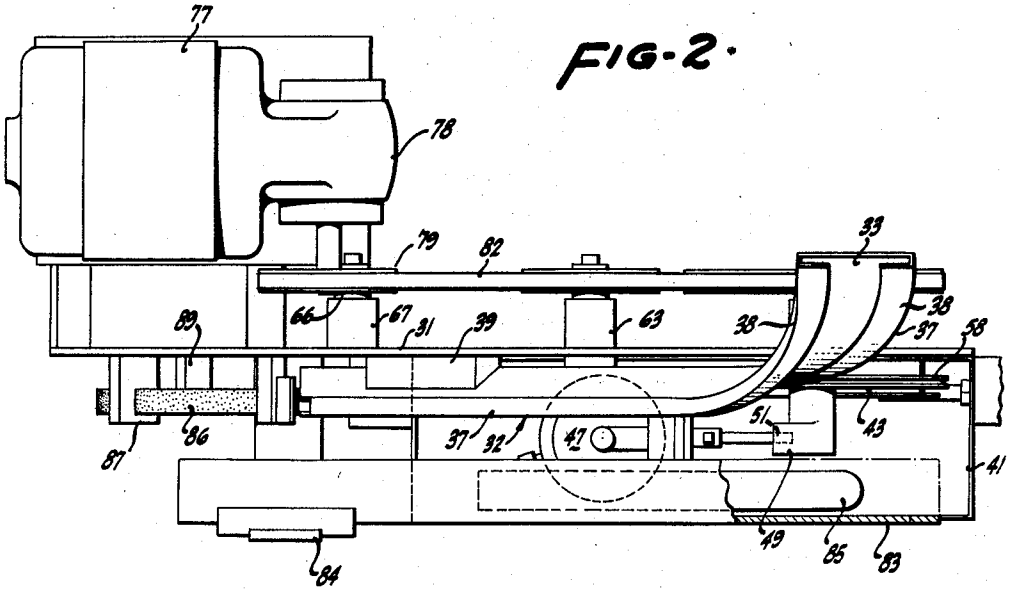
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MACHINE FOR APPLYING WAX TO CAN ENDS

Filed Dec. 26, 1956 2 Sheets-Sheet 2

FIG-2.



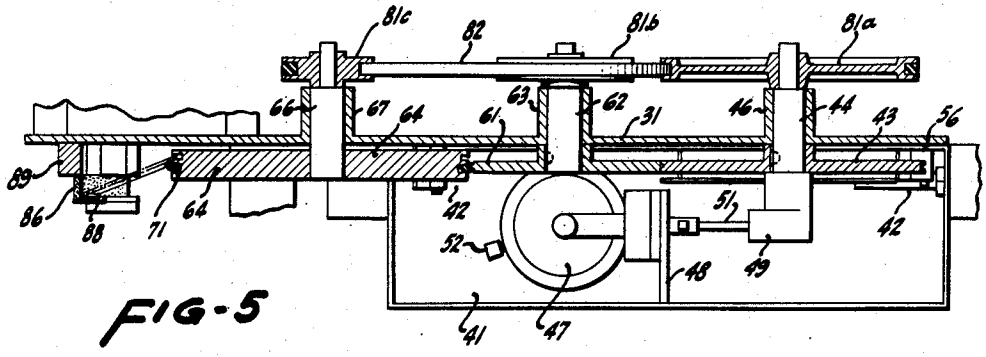


FIG-5

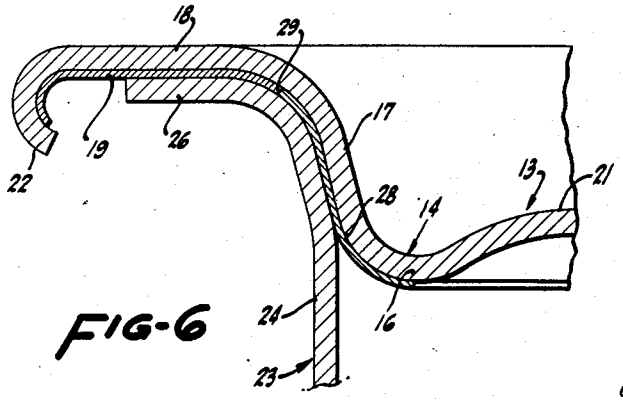


FIG-6

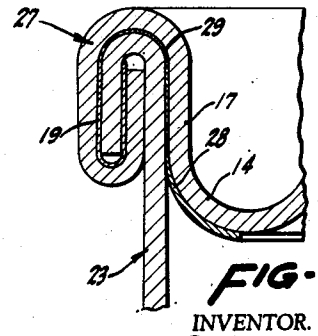


FIG-7

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United States Patent Office 2,944,510 Patented July 12, 1960

2,944,510

MACHINE FOR APPLYING WAX TO CAN ENDS

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Filed Dec. 26, 1956, Ser. No. 630,703

6 Claims. (Cl. 118—233)

This invention relates to a new and improved apparatus for applying wax to can ends and a waxed can end produced in accordance therewith.

More particularly the invention relates to the application of wax to certain areas on a can end of the type used for beverages, such as beer and carbonated drinks.

A can end used for beer, carbonated drinks and the like is commonly made of electrolytic tinplate—i.e., steel-coated on both sides with a relatively thin coating of tin protected by a coating of enamel. As conventionally manufactured, the shape of such a can end comprises a circular central panel surrounded by an annular convex bead (when viewed from the outside) which is in turn surrounded by an annular concave bead. The outer extremity of the concave bead merges with an extended, slightly outwardly diverging flank which terminates in a shallow trough, the outer edge of which is inwardly curved. During the course of manufacture of the end, the bottom of the trough is filled with a lining compound of rubber or rubberlike material which is dried therein by the application of heat. When the end is seamed onto the flanged can body, the extended flank which has been mentioned fits against the inside of the can body adjacent the flanged end thereof. As the double seaming operation is performed, a severe bending of the flanged end of the can body and of the can end and particularly in the regions of the aforementioned trough and flank occurs. The flexing of the metal may cause a rupture of the enamel and/or of the tin coating which, with the passage of time, permits corrosive liquid in the can to come in contact with the steel, with the eventual result that the taste of the beverage is affected and after the passage of a prolonged period of time, the can may leak.

The present invention applies a thin coating of paraffin wax or the like to the aforementioned flank commencing at the inner edge of the rubber compound in the trough and terminating at the crest of the concave bead. The zone to which the wax is applied is quite critical, inasmuch as the metal and its coatings encounter severe abrasion and working.

Accordingly, it is a principal object of the present invention to provide a coating of wax on the aforementioned flank in a controlled zone in order to provide protection additional to the tin plate and enamel coatings on the end. One of the features of the invention is the fact that this wax coating is flowable and hence protects the underlying coatings despite considerable distortion and working of the end.

Another feature of the invention is the fact that the wax acts as a lubricant during the seaming operation and hence prevents rupture or scratching of the underlying coatings.

A particular feature of the invention is the fact that the coating is so applied that its location is carefully controlled and limited to the precise area where the presence of the wax is beneficial. In other devices whereby wax has been applied to can ends, a spray is employed, which inherently splatters wax outside the zone of the

flank heretofore described, with the result that the effectiveness of the rubber compound may be impaired or the wax may be dislodged into the beverage, resulting in deleterious effects upon the clarity and flavor.

Still another feature of the invention is the provision of an apparatus which is simple in construction and operation and which may be carefully controlled to produce the desired coating in the proper location. A particular feature of the invention is the fact that the apparatus may be installed on the discharge end of the compound liner-drier machine and hence the use of a separate machine and separate conveying and handling equipment is eliminated, inasmuch as the ends enter the waxing apparatus immediately after leaving the drier.

A still further object and advantage of the invention is the provision of a roll having inserted in its periphery a rubber insert shaped to engage the flank as aforementioned, with means provided to press the can ends against the aforementioned peripheral insert and the further provision of means for transferring melted wax to the insert in such manner that the wax is rolled onto the can end in the precise thickness and in the precise location desired.

Other objects of the present invention will become apparent upon reading the following specification and referring to the accompanying drawings in which similar characters of reference represent corresponding parts in each of the several views.

In the drawings:

Fig. 1 is a side elevation of the device;

Fig. 2 is a top plan;

Fig. 3 is an enlarged fragmentary transverse sectional view taken substantially along line 3—3 of Fig. 1;

Fig. 4 is an enlarged fragmentary view taken substantially along line 5—5 of Fig. 1;

Fig. 5 is a sectional view take substantially along line 5—5 of Fig. 1;

Fig. 6 is an enlarged fragmentary cross-sectional view through the peripheral portion of a can end coated in accordance with this invention and portions of the adjacent can showing the can end prior to seaming; and

Fig. 7 is a fragmentary sectional view through the peripheral portion of the can end and the adjacent portion of the can body after seaming.

A conventional beverage can end **11** is illustrated herein and comprises a central, slightly concave, circular panel **12** surrounded by an annular convex bead **13** which is in turn surrounded by and merges into an annular concave bead **14**. Continuing from the crest of concave bead **14**, the end is formed with a slightly outwardly diverging flank **17** which terminates in a relatively flat trough **18** elevated considerably beyond the crest **19** of convex bead **13**. The outer edge of trough **18** is formed with an inward curl **21**. The bottom of trough **18** is partially filled with a thin coating of rubber or rubberlike liner compound **22** which has been applied in a compound liner machine and dried therein in a compound drier machine, it being understood that in conventional can manufacturing practice, the liner and drier are frequently combined in a single machine known as a liner-drier.

The can body **23** to which the end is attached comprises a cylindrical body portion **24** adjacent the end of which is an outwardly turned flange **26**. In attaching the end to the body, the end **11** is first placed in position on top of body **23** with the liner compound **22** in trough **18** fitting on top of flange **26** of body **23**. A conventional double-seaming operation, as well understood in the can art, is then performed, causing end **11** and body **23** to be distorted to the double seam **27** shown in Fig. 7. As is apparent, the can end and even the adjacent can body are subject to scratching, abrasion, rupture or other

marring of the enamel, either when the end is placed on the body or when the seaming operation is carried out. The liner compound 22 protects that portion of the end and body with which it comes in contact, but elongated flank 17 of the end and contiguous portion of body 24 ordinarily are not provided with such protection. The present invention applies a thin coating of paraffin wax 28 or the like commencing along a line 29 at the termination of the liner compound and terminating at crest 16 of concave bead 14, which zone is for convenience hereinafter referred to as the "flank" of the can end. In accordance with this invention wax 28 is applied to the flank in precise position.

The apparatus employed in accordance with the present invention is mounted on a base plate 31 which is vertically positioned adjacent the liner-drier (not shown) to receive ends 11 discharged therefrom with trough 18 facing forwardly. For such purpose a chute 32 having a forwardly downwardly curved entrance 33 and an elongated downwardly slanted portion 34 is provided. In cross-section chute 32 has a back 36 having a width slightly greater than the diameter of can end 11 and inwardly turned sides 37 formed in a reverse curve to provide front guides 38 spaced apart to provide access to the can ends in the chute in case of jamming and for observation. Chute 32 is mounted on base plate 31 by means of bracket 39 adjacent the top thereof.

Along the bottom edge of base plate 31 is a trough 41 or reservoir tank which receives wax and the wax is melted and held at proper temperature by means of one or more heating elements 42 controlled by a thermostat (not shown). Above the trough is a pick-up disk 43 mounted for rotation on a horizontal stub shaft 44 journalled in base plate 31 by means of bearing 46, the bottom edge of pick-up disk 43 dipping into trough 41 as it revolves. A pump 47, such as a diaphragm type automobile fuel pump, is installed on a vertical bracket 48 in trough 41 and driven from an eccentric 49 on shaft 44 which engages follower foot 51 connected to pump 47. The intake line 52 of the pump draws wax from adjacent the bottom of reservoir tank 41 and the discharge tube 53 of pump 47 sprays wax against the face of pick-up disk 43. A doctor blade 54 is mounted by means of bracket 56 on base plate 31 in a location above trough 41, the blade 54 being adjustable by means of screw 57, as well understood in this art, to regulate the thickness of wax carried around by pick-up disk 43. As shown particularly in Figs. 3 and 4, the periphery of disk 43 is formed with a concave groove 58 which mates with a convex ridge 59 formed in the periphery of transfer disk 61 mounted on stub shaft 62 which is also journaled in plate 31 by bearing 63. On the side of transfer disk 61 opposite pick-up disk 43 is applicator wheel 64 mounted on stub shaft 66 journaled in plate 31 by bearing 67. Applicator wheel 64 is substantially tangential to the lower end of slanted portion 34 of chute 32. The thickness of applicator wheel 64 is substantially twice that of pick-up disk 43 and transfer disk 61 and the periphery is formed with a rear groove 68 which slants rearwardly inwardly to receive trough 18 of a can end. Slanting forwardly inwardly is a front groove 69 which is filled with an annular rubber insert 71, the outer rearward edge 72 of which is shaped complementary to flank 17 of can end 11 and the outer forward edge 73 of which is beveled. Transfer disk 61 is mounted so that ridge 59 contacts and transfers wax to edge 72 of rubber insert 71 complementary to flank 17. A second doctor blade 74 is mounted on plate 31 by means of bracket 76 to remove from wheel 64 all wax not deposited on the can ends and thus to prevent build-up of wax. For such purpose blade 74 is located slightly ahead of the point of tangency of disk 61 and wheel 64.

An electric motor 77 having a reduction gear 78 is mounted on base plate 31 and provided with a drive pulley 79. A thermostatic control (not shown) may be installed in reservoir 41 or connected into the lead wires of motor 77 to prevent operation of the device except when the temperature of the wax in reservoir 41 is proper. The ends of shafts 44, 62 and 66 behind base plate 31 are provided with suitably dimensioned drive pulleys 81*a*, 81*b*, 81*c*. A belt 82 is reeved around drive pulley 79 and driven pulleys 81*a*, *b*, *c*, thereby causing disks 43, 61 and 64 to revolve in the directions indicated by arrows in Fig. 1 and at substantially identical peripheral speeds. In order to maintain the wax in proper molten condition, an elongated tube type radiant heater 85 is installed behind shield 83 and supported at proper elevation by bracket 84 attached to base plate 31. Heater 83 maintains disks 43, 61 and 64 at proper temperature so that the wax remains substantially at the same temperature as in reservoir 41.

In order to cause engagement of flank 17 of can end 11 with edge 72 of rubber insert 71, an arcuate shaped strip of leather belting 86 is suspended from base plate 31 by means of brackets 87 which are U-shaped in cross-section and to prevent can end 11 from falling forwardly away from base plate 31 a second piece of leather belting 88 is held in place by brackets 87. Intermediate the three brackets 87 are stops 89 which limit outward movement of belting 86.

Accordingly, in operation heaters 42 in trough 41 are adjusted by thermostatic control to maintain the wax at the proper melting temperature and the radiant heater 85 maintains disks 43, 61, 64 at a similar temperature so that the wax does not solidify prior to application to the ends. Motor 77 is started when the wax has heated to proper temperature, driving disks 43, 61, 64 and also causing pump 47 to pump molten wax through outlet 53 against the face of pick-up disk 43. First doctor blade 54 wipes the excess wax from disk 43 and hence only a thin coating is carried around to disk 61. Transfer disk 61 rolls wax onto flank portion 72 of rubber insert 71 on applicator roll 64. As can ends 11 are discharged from the liner-drier, they roll down chute 32 with troughs 18 facing forward and at the end of chute 32 contact the tangentially disposed applicator roll 64 in the tilted position shown in Fig. 3, troughs 18 falling into rear groove 68. Ends 11 are held in position by belting 86 and 88. The first leather belting 86 causes flank 17 of end 11 to come into firm engagement with complementary portion 72 of rubber insert 71 in transfer disk 64, while the second leather belting 88 prevents the end from falling away from disk 64. The ends are discharged at the lower end of belting 88 and are conveyed away in the same manner as ends are conveyed from liner-driers. The second doctor blade 74 wipes the excess wax from transfer disk 64 so that build-up of wax is prevented.

When end 11 is positioned on open, flanged end 26 of can body 23 (see Figs. 5 and 7), wax 28 protects the surfaces of end 11 and body 23 from scratching or other abrasion. When the double seaming operation is carried out (see Fig. 7), the wax 28 continues such protection and also lubricates the flexing of the adjacent parts. Wax 28 forms a protective coating at the most critical portion of seam 27, thereby resisting corrosion by the contents of the can.

Although the foregoing invention has been described in some detail by way of illustration and example for purposes of clarity of understanding, it is understood that certain changes and modifications may be practiced within the spirit of the invention and scope of the appended claims.

I claim:

1. In a machine for applying wax to a predetermined position on the flank of a can end, an applicator wheel, means for rotating said applicator wheel, a reservoir for molten wax, means for transferring molten wax from said reservoir to said applicator wheel, means for guiding can ends into position with their flanks in contact with

said applicator wheel, means for biasing said ends into engagement with said applicator wheel, said applicator wheel being formed with a peripheral groove, and a resilient insert in said groove, said insert engaging the flanks of said can ends to apply wax to said flanks.

2. A machine in accordance with claim 1 wherein said applicator wheel is formed with a second peripheral groove shaped to receive the trough of a can end to locate said can end with said flank in contact with said insert.

3. In a machine for applying wax to a predetermined position on the flank of a can end, an applicator wheel, means for rotating said applicator wheel, a reservoir for molten wax, means for transferring molten wax from said reservoir to said applicator wheel, means for guiding can ends into position with their flanks in contact with said applicator wheel, an annular resilient member carried by said applicator wheel and engaging the flanks of can ends to apply wax to said flanks and a second resilient member shaped in arcuate configuration disposed around a portion of the periphery of said applicator wheel and spaced therefrom a distance substantially equal to the diameter of a can end, said second resilient member engaging one edge of said can ends to hold said can ends in engagement with said applicator wheel.

4. In a machine for applying wax to a predetermined position on the flank of a can end, an applicator wheel, means for rotating said applicator wheel, a reservoir for molten wax, means for guiding can ends into position with their flanks in contact with said applicator wheel, means for biasing said ends into engagement with said applicator wheel, a heating element in said reservoir, a pump having its intake connected into said reservoir, a first disk, a second disk in contact with said first disk and in contact with said applicator wheel, the discharge of said pump being positioned to discharge molten wax pumped from said reservoir onto the surface of said first disk, and means for rotating said disks and applicator wheel.

5. A machine according to claim 4 which further comprises a radiant heating element in proximity to said disks and applicator wheel to maintain said disks and wheel at a temperature above the melting point of the wax.

6. In a machine for applying wax to a predetermined position on the flank of a can end, an applicator wheel, means for rotating said applicator wheel, a reservoir for molten wax, means for transferring molten wax from said reservoir to said applicator wheel, means for guiding can ends into position with their flanks in contact with said applicator wheel, a resilient member shaped in arcuate configuration disposed around a portion of the periphery of said applicator wheel and spaced therefrom a distance substantially equal to the diameter of the can end, said member engaging one edge of said can ends to hold said can ends in engagement with said applicator wheel, a second resilient member disposed in arcuate conformation in proximity to but spaced from said applicator wheel and disposed parallel to the plane of rotation of said applicator wheel, said second member engaging said can ends to align said can ends in proper angular relationship to said applicator wheel with said flanks in contact with said wheel.

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