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METHOD OF SURFACE TREATING GLASS CONTAINERS

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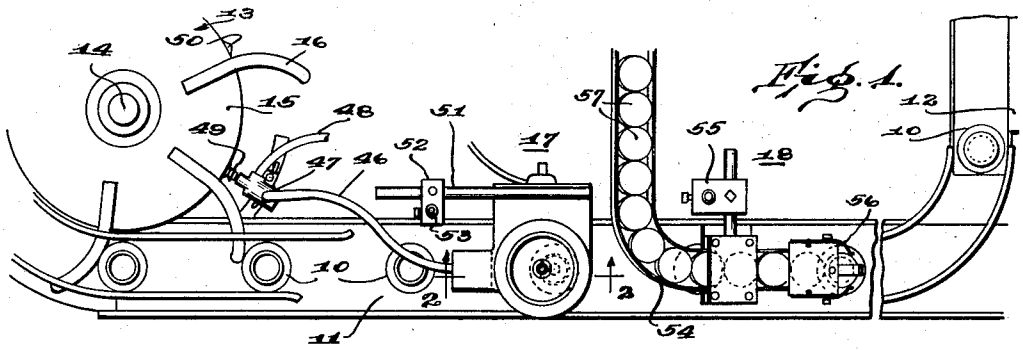


Fig. 1.

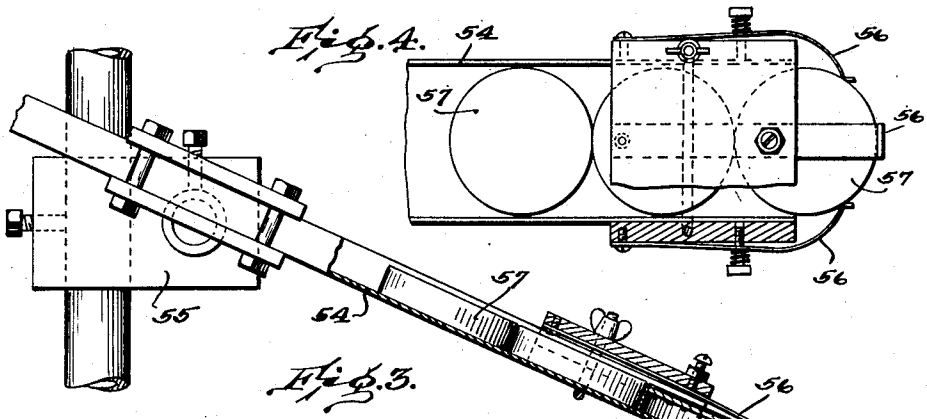


Fig. 4.

Fig. 3.

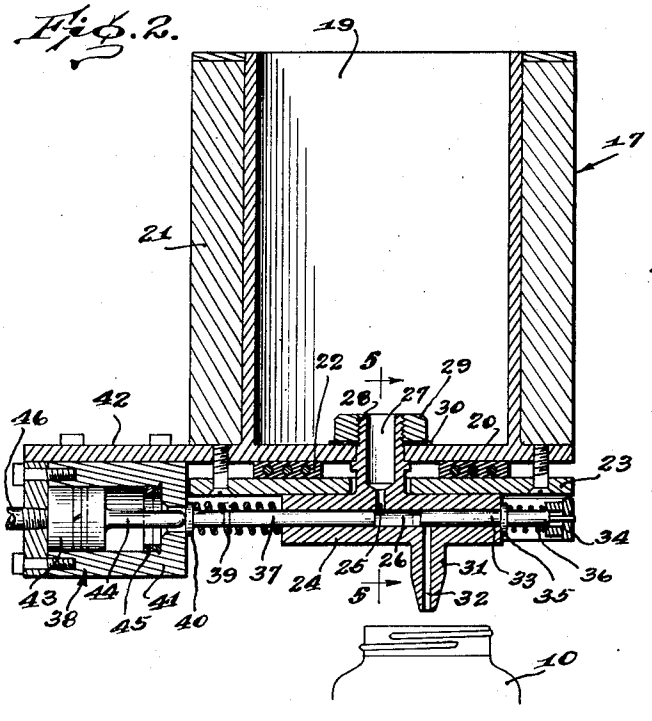


Fig. 2.

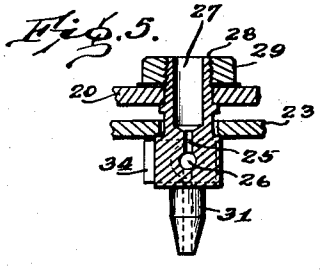


Fig. 5.

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METHOD OF SURFACE TREATING GLASS CONTAINERS

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1 Claim. (Cl. 49—77)

The present invention relates to improvements in methods of and apparatus for surface treating glass containers and is particularly concerned with the provision of means for neutralizing the alkali at and just below the interior surface of glass containers, such for example as bottles and jars. The invention is likewise adaptable for use in neutralizing the surface alkali in glass building blocks which ordinarily consist of two half sections that are formed by a pressing operation and thereafter joined together to create a sealed chamber.

An object of the present invention is the provision of a novel method whereby an acidic gas is confined within the containers or other articles of glassware during a substantial portion of the annealing operation in order to effect a uniformly high degree of treatment of the entire inner surface of the articles. To this end the invention includes means for depositing in the containers or other articles, a quantity of a solid or viscous-solid material, which when fired, creates an acidic gas and immediately closing the opening through which the material was deposited in the articles. Thus, escape of the gases from the articles is retarded sufficiently to insure satisfactory surface treatment of the glass.

Another object of the invention is the provision of novel means for dispensing measured quantities of an acidic gas forming solid or viscous-solid at regular time intervals and depositing them in containers or other hollow articles of glassware which are being transferred from a forming machine to an annealing leer.

It is likewise an object of the present invention to provide novel means positioned between the annealing leer and the aforementioned dispensing means for automatically placing covers or closures upon the articles into which the acidic gas forming material has been deposited.

Other objects will be in part apparent and in part pointed out hereinafter.

In the drawing:

Fig. 1 is a fragmentary top plan view of the entire apparatus involved in the present invention.

Fig. 2 is a vertical sectional view taken substantially along the line 2—2 of Fig. 1.

Fig. 3 is a sectional side elevational view of the closure dispenser.

Fig. 4 is a fragmentary plan view partly in section of the discharge end of the closure dispenser.

Fig. 5 is a transverse sectional view taken substantially along the line 5—5 of Fig. 2.

Briefly, my invention as indicated heretofore, consists in placing in bottles, jars, glass block sections, and like articles of glassware, just prior to annealing thereof, a quantity of a solid or viscous-solid material which when fired, creates an acidic gas and thereafter closing the opening through which the solid or viscous-solid was deposited therein, whereby to prevent any appreciable loss of the gas and consequent reduction in the degree of surface treatment. In practicing my invention the solid or viscous-solid is deposited in the articles as they are carried by the machine conveyor from the forming machine (not shown) to the annealing leer and immediately thereafter, the closures or covers are placed upon the articles, said closures or covers being removed from the articles upon completion of the conventional annealing operation. These covers of course may be used repeatedly. In Fig. 1 jars 10 are being conveyed by the machine conveyor 11 to an annealing leer 12, these containers being uniformly spaced upon the conveyor by means of a star wheel 13, the latter being mounted upon a vertical shaft 14 and including a hub 15 and an annular series of uniformly spaced radial fingers 16 or arms. A dispenser 17 for the viscous-solid at least in part overlies the conveyor 11 in proximity to the star wheel and between the dispenser and leer, there is arranged a cap or closure feeding mechanism 18 which also in part overlies said conveyor. The dispenser for the viscous-solid may be directly controlled and operated by movement of the article spacing star wheel 13 referred to above.

This dispenser 17 may well include a vertical cylinder 19 having an open upper end and a bottom wall 20 closing the lower end thereof. A collar 21 of insulating material surrounds the cylinder 19. An electric heating element 22 is arranged exteriorly of said bottom wall 20 for the purpose of maintaining in a viscous or molten state, a material which when deposited in the articles and fired, creates the acidic gas. A clamp plate 23 secures the heating element 22 in position against the bottom of the cylinder. This material is dispensed in regulable quantities from the container by gravity through a bottom outlet opening which is formed in the aforementioned bottom wall 20.

The means for regulably dispensing the material from this container may well include a horizontal cylinder 24 (Fig. 2) having a radial inlet port 25 connecting the bore 26 thereof with the bottom of a well 27, the latter being formed by a short radial cylinder 28 which projects ver-

tically upward through an opening in the bottom wall 20. This latter cylinder 28 is threaded externally to receive a clamping nut 29 which in turn compresses a sealing gasket 30 in position to prevent leakage of the molten material between said cylinder 28 and the opening in the bottom wall 20 of the container 19. A discharge nozzle 31 is spaced from the port 25 longitudinally of the cylinder 24, said nozzle depending from said cylinder and including a discharge port 32 which communicates with the bore 26 of the main cylinder. Normally, the nozzle is closed by means of a spring pressed valve plunger 33, the outer end of the latter being supported in a bracket 34 between which and a collar 35 on the plunger, is arranged a coil spring 36. This spring at all times tends to hold the collar 35 in engagement with the adjacent end of the main cylinder 24 and coincident therewith, project the inner end of the valve plunger past the inlet end of the port 32 in the aforementioned discharge nozzle 31.

An ejector plunger 37 is positioned in the bore 26 at the other end of the cylinder 24 and normally is spaced from the inner end of the valve plunger 33 and so positioned that the molten or viscous material may flow from the well 27 and through the port 25 into the bore 26 of the main cylinder. The ejector plunger is movable inwardly towards the other plunger 33, by means of a piston type valve actuator 38 which moves said ejector plunger in opposition to the coil spring 39, the latter encircling the plunger exteriorly of the cylinder 24 and being confined between the adjacent end of the latter and a head 40 which is formed at the outer end of said plunger.

The ejector actuator (Fig. 2) comprises a cylinder 41 which is attached to an arm 42 at one side of the bottom 20 of the container 19 and is coaxial with said plungers. A piston 43 is mounted in the cylinder 41 and carries an axial pin 44 which is intended to be projected through one end of said cylinder 41 into engagement with the headed end of the ejector plunger 37. The stroke of this piston 43 is regulably controlled by the number of rings 45 that are placed in the forward end of said cylinder 41. As is clear, the stroke of this piston 43 predetermines the travel of the ejector plunger 37 and thereby regulably controls the quantity of the material that is dispensed with each operation of the apparatus.

The ejector actuator is operated by air under pressure which is delivered thereto through a supply pipe 46, the latter leading to a valve 47, air being supplied to said valve by way of a main pipe 48. The valve 47 may be of conventional form and include a movable stem 49 which projects outwardly into the path of uniformly spaced projections 50 on the aforementioned hub 16 which forms a part of the star wheel 13. Thus, in response to rotation of the star wheel and periodic engagement of the valve with the projections 50, the dispenser is actuated at regular time intervals.

The entire dispensing unit 17 is adjustable in the direction of the length of the machine conveyor 11 in order that the discharge of the molten material from the container may take place coincident with registration of the articles with the discharge nozzle 31. To this end the dispenser includes a horizontal bar 51 which is adjustable horizontally in a support 52, the latter being mounted for vertical adjustment upon a vertical post 53. This latter feature provides means whereby the dispenser may be adjusted to compensate for variations in the height of the articles being treated.

The cap or closure feeding device 18 (Figs. 1 and 3) may be of any conventional, or preferred form and for the purpose of illustration, in this instance, includes an inclined chute 54 mounted upon a bracket 55. The lower or discharge end of the chute includes a plurality of yieldable spring fingers 56 which exert only sufficient tension upon the caps 57 or closures, to prevent independent gravity discharge of the latter and insure removal of the closures one at a time from said chute. The chute is adjustable so that the skirt or flange of the cap or closure next to be discharged, is positioned in the path of the upper end of the containers or other articles, with the result that movement of the latter upon the conveyor effects engagement between the containers and the closures and consequent discharge of the latter from the chute one at a time. The closures come to rest upon the containers or other articles and together with the latter, are carried through the annealing leer 12.

While it is clear from the foregoing that the material, which incidentally may well be sulphur, or the like, is discharged into the articles by the dispenser 17, I wish to add that this material is discharged from the space between the plunger 33 and the ejector plunger 37 (Fig. 2) by movement of the latter farther into the main cylinder 24, momentarily movement cuts off any additional flow of material into the bore 26 and through the measured quantity which has flowed into the bore, operates to move the valve plunger 33 out of registration with the inner end of the nozzle passageway 32 in opposition to the pressure of the spring 36. During this momentary opening of the passageway 32, a predetermined quantity of the material will be ejected under pressure into the article therebelow.

While I have disclosed only means for depositing sulphur or other material as a viscous-solid or in a molten state, it is to be understood that sulphur pellets or like solid may be deposited in the articles and the latter immediately thereafter closed in order to prevent excessive loss of the acidic gas which is created by said solid. In other words this invention is directed to the method and apparatus for placing a material, solid otherwise, in an article, closing the article and then subjecting the material to heat whereby it is fired for the purpose of creating an acidic gas which neutralizes the alkali at and just beneath the interior surface of the glass articles.

Modifications may be resorted to within the spirit and scope of the appended claim.

I claim:

The method of surface treating the interior of a hollow glass article which comprises depositing therein a quantity of sulphur, closing the article and then subjecting it with the sulphur therein to an atmosphere of heat to thereby fire the sulphur and create an acidic gas within the article.

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