April 18, 1939. O. G. BURCH 2,154,490

METHOD OF TREATING HOLLOW GLASS ARTICLES

Filed Dec. 9, 1936

Fig. 1.

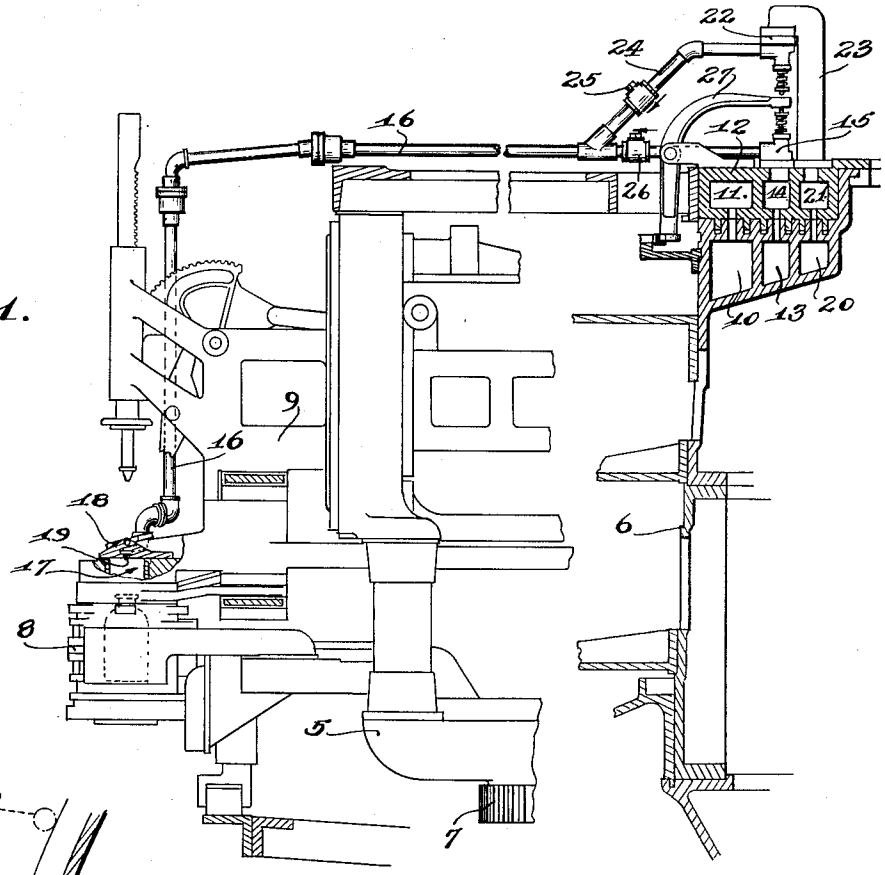


Fig. 2.

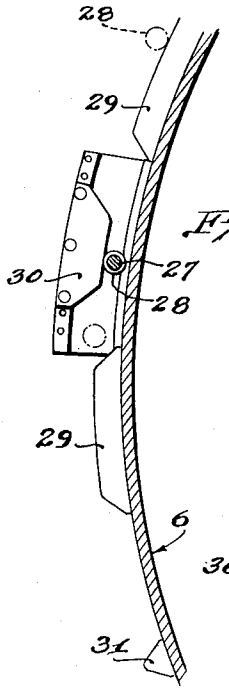
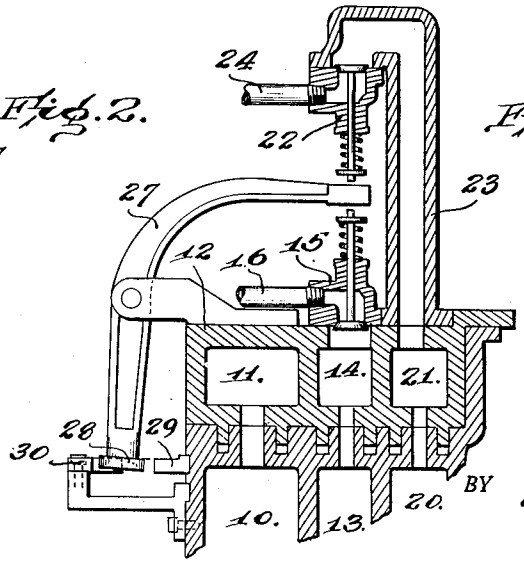


Fig. 3.



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METHOD OF TREATING HOLLOW GLASS ARTICLES

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2 Claims. (Cl. 49—83)

The present invention relates to improvements in the method of treating the interior surfaces of hollow glass articles and more particularly to a method comprising introducing an acidic gas into the article as it is blown into final form.

The character of the glass generally employed in the manufacture of bottles and jars, etc., contains various quantities of alkali. When the articles are filled with an aqueous solution or exposed to humid atmosphere, the alkali at and near the exposed surfaces leaches out. The leaching out of the alkali and consequent corrosion of the glass has a deleterious effect on the contents particularly when the product is a chemical reagent. Further, it causes the glass to become cloudy, thereby affecting its transparency.

Various methods of treating the interior surfaces of containers have been employed to increase the resistance of the glass against weathering, such methods generally being employed after the formation of the article. An object of this invention is the provision of a method whereby a predetermined amount of an acidic gas may be introduced into a partially or completely formed article prior to removal thereof from the forming machine.

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

In the drawing:

Fig. 1 is a sectional elevational view through one head of a bottle forming machine of the type illustrated in La France Patent #1,185,687 dated June 6, 1916, showing my invention embodied therein;

Fig. 2 is a sectional plan view of the cams for controlling the mechanism; and

Fig. 3 is a detail vertical sectional view through the valves shown in Fig. 1.

Referring to Fig. 1 of the drawing, I have illustrated my invention as applied to a standard Owens type bottle machine such as shown in the patent to La France, No. 1,185,687, and which comprises a mold carriage 5 mounted for rotation about a vertical central column 6 by means of a gear 7 through which power is supplied from a source not shown. A series of finishing molds 8 mounted for rotation with the mold carriage 5 are adapted to register with cooperating dipping heads 9 individual thereto. Vacuum for charging the blank forming molds (not shown) is supplied to the heads 9 from a chamber 10 formed within the central column 6. The chamber 10 is in constant communication with a second chamber 11 formed in a member 12 which is secured for rotation with the frames supporting the blowing heads on the mold carriage.

Air under pressure for expanding the blank into final form in the finishing mold 8 is supplied (from a source not shown) to a chamber 13 formed adjacent the chamber 10 in the column 6. A corresponding chamber 14 in the rotating member 12 communicates with a blowing valve 15 arranged thereon and which controls the supply of air to each head 9 through a pipe 16. Air from the pipe 16 is directed into the bottle cavity 17 in the head through a blow slide 18 and passage 19 which form a part of the standard head construction.

A chamber 20 formed adjacent the chambers 10 and 13 is supplied (from a source not shown) with an acidic gas such as, for instance, sulphur dioxide, hydrogen chloride, carbon dioxide, or a mixture of such acidic gases which, when combined with the blowing air during the forming operation will tend to neutralize the excess of alkali brought to or near the surface of the glass during the forming process, thus inhibiting to a considerable degree subsequent hydrolysis of the glass by moisture of the atmosphere or by liquids contained within the bottle. A chamber 21 within the rotating member 12 serves to connect the chamber 20 with a gas control valve 22 which is mounted on an upwardly extending hollow support 23 and in vertical alignment with the valve 15. The valve 22 is connected to the blowing air pipe 16 by a branch pipe 24 in which a check valve 25 is placed. A similar check valve 26 is mounted in the pipe 16 near the control valve 15. The check valves 25 and 26 are open in the direction indicated by the arrows and prevent the possibility of a premature mixture of the gases when either control valve is open.

A bell-crank lever 27 pivoted at the periphery of the member 12 has its upper end disposed between the stems of the valves 15 and 22 for alternately actuating them to supply either blowing air or gas to the mold cavity. The lower end of the lever 27 is provided with a cam roll 28 adapted to engage a blowing air control cam 29 and a gas control cam 30 (Fig. 2). The blowing air control cam 29 is adjustably mounted on the central column 6 to control the length of the final blowing operation. The gas control cam 30 is also adjustably mounted to vary the point at which the application of gas to the container is controlled during the forming process as will be described presently.

The cycle of operation of a machine of the character just described includes delivering a

charge of molten glass to a blank forming mold (not shown), compacting the glass therein to form a completed blank or parison by momentarily opening the blowing valve 15 by means of a puff cam 31 (Fig. 2) and upon completion transferring the blank to a finishing mold. The parison, after a suitable reheating period within the closed finishing mold, is expanded to final form by the opening of the blowing valve 15 by the cam 29. The temperature of the glass at this point is relatively high and may vary from 1400° to 2200° F., which renders the glass substantially plastic. While the glass is in this plastic state and is held against the walls of the mold cavity by internal air pressure, the gas control valve 22 is opened by means of the cam 30 and a predetermined amount of gas under pressure is admitted through pipes 24 and 16 to the mold cavity. The blowing valve 15 is then reopened and the final blow completed, after which time the glass has cooled sufficiently for the article to be removed from the mold.

When the acidic gases reach the interior of the bottle, a coating of a neutral salt is formed on the surface of the glass as a result of reaction of the gases with the alkali present thereon as well as any near the surface, and thereby increases the resistance of the glass surface to the action of aqueous and acidic solutions and to weathering action. After proper annealing the bottles may be washed to remove any traces of neutral salts due to the reaction of the gases with the alkali from the glass.

Various changes in the arrangement of the several parts and manner of application may be resorted to without departing from the spirit of the invention or the scope of the appended claims.

I claim:

1. The method of producing a hollow glass container from a parison in a finishing mold, which consists in expanding the parison to the form of the completed container, and, substantially simultaneously with such expansion but prior to opening of the finishing mold, introducing an acidic gas into the container whereby to neutralize the excess of alkali at and in proximity to the interior surface of the glass.

2. The method of producing a hollow glass container from a parison in a finishing mold, which consists in alternately introducing air under pressure and an acidic gas into the parison while in the finishing mold to thereby expand the parison to the form of the completed container and neutralize the excess of alkali at and in proximity to the interior surface of the glass.

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