Aug. 20, 1940. A. H. SMITH 2,212,379

METHOD AND APPARATUS FOR INTRODUCING GASES INTO CLOSED CONTAINERS

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Fig. 1.

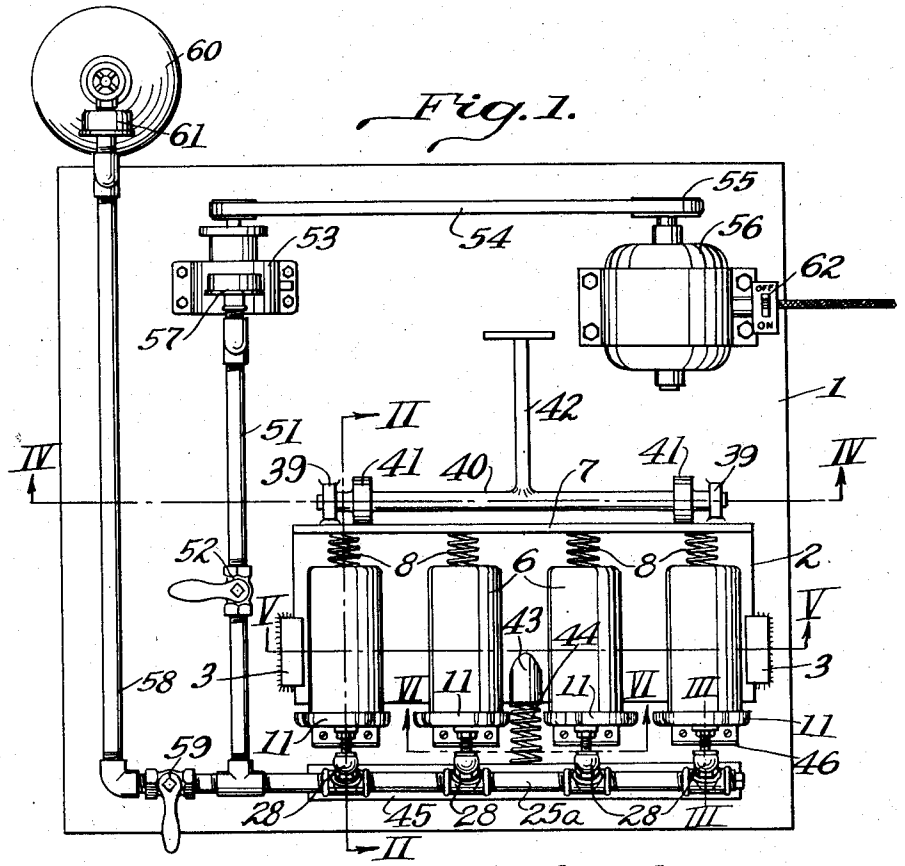


Fig. 2.

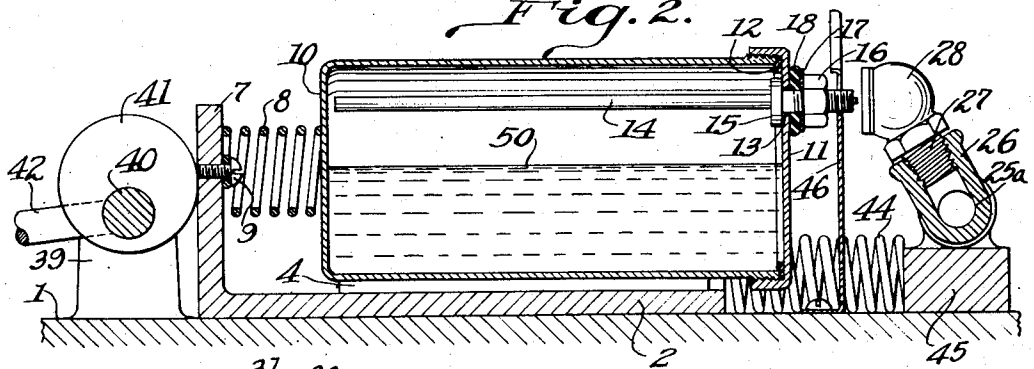
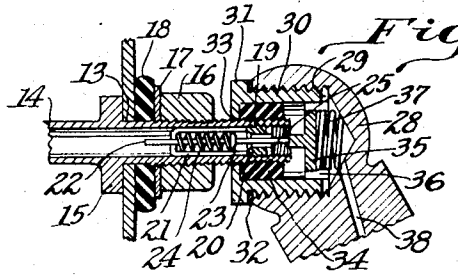


Fig. 3.



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Fig. 4.

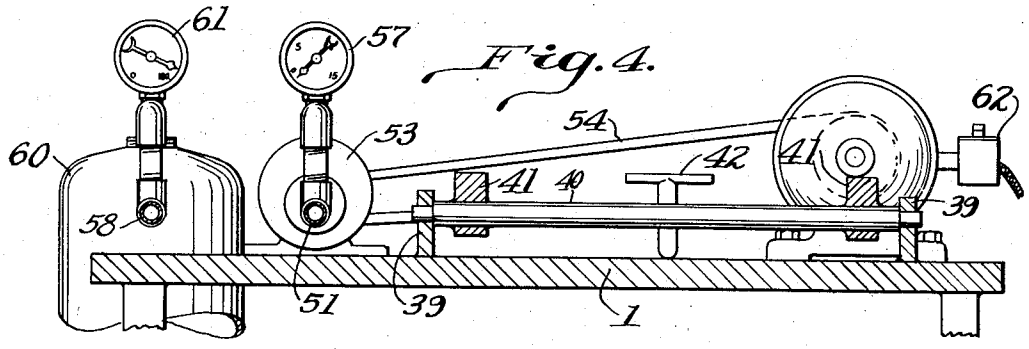


Fig. 5.

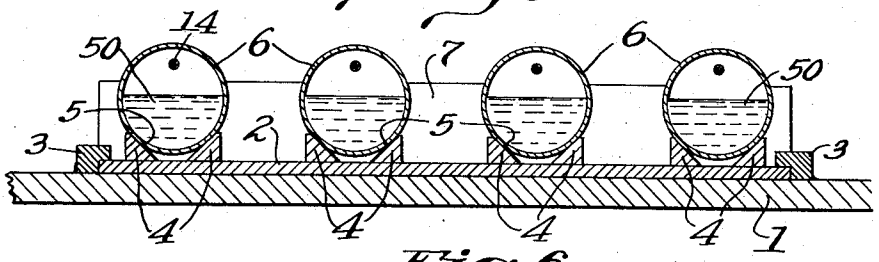
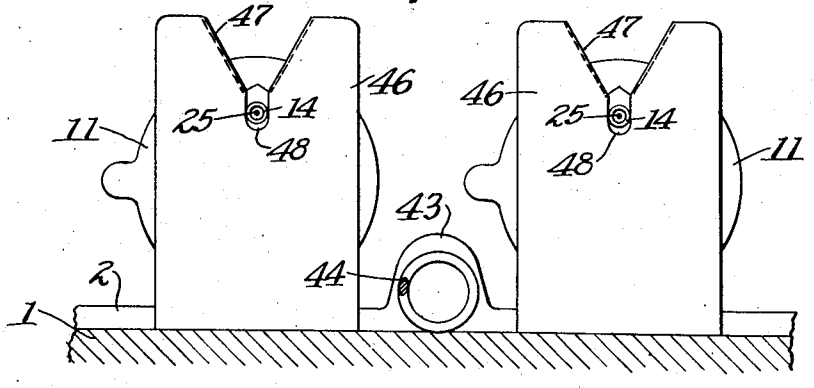


Fig. 6.



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METHOD AND APPARATUS FOR INTRODUCING GASES INTO CLOSED CONTAINERS

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Application January 28, 1938, Serial No. 187,484

8 Claims. (Cl. 226—20)

This invention relates to apparatus for charging closed containers with aeriform fluids under pressure, the primary object of the invention being to provide convenient, readily operated apparatus by which a plurality of such containers may be simultaneously charged with gas in a rapid, easily executed and economical manner.

It is an accepted commercial practice to dispense certain food preparations in closed containers in which charging, expelling or preserving gases under pressure are used. As an instance of this practice, liquid mixtures capable of producing the confection known as whipped cream are introduced into closed metallic containers having removable lids or closures. Following the insertion of such a mixture into a container of the type set forth, it is customary to remove free oxygen from the interior of the containers by means of a partial vacuum and to then introduce an expelling or preserving gas, such as nitrous oxide, into the container so that a pressure will be established internally of the container which, when released, or partially so, will be used to effect the controlled expulsion of the liquid mixture from the container and upon the mixture reaching atmospheric pressures, will cause the expansion of said mixture into the form of whipped cream. The closure or lid of such a container is provided with a tube which extends into the interior of the container and is provided near its outer end with a normally closed spring-pressed valve having an exterior actuating member. Hitherto, it has been customary in the preparation of such containers for the dispensing of whipped cream, to individually place each container in open communication with a conduit leading to a vacuum producing means and in a subsequent separate operation, placing the same in communication with a means for introducing the charging gas into the container. These operations have been slow and laborious and in commercial practice have resulted in lack of uniformity and waste in the gas expelling and charging operations.

It is, therefore, an outstanding object of the present invention to provide simple, efficient and positive apparatus whereby a group of such containers may be conveniently and simultaneously subjected to gas expelling or vacuumizing conditions, and without removal of the containers from their applied positions, and immediately following the gas expelling and vacuumizing operation to introduce into said containers under pressure the final charging gas, the construction and operation of the apparatus being such as to enable these operations to be quickly carried out with uniform results and in an economical and sanitary manner.

For a further understanding of the invention, reference is to be had to the following description and the accompanying drawings, wherein:

Fig. 1 is a top plan view of apparatus for charging gas under pressure to closed containers and embodying the features of the present invention;

Fig. 2 is a vertical sectional view taken through the apparatus on the plane indicated by the line II—II of Fig. 1;

Fig. 3 is an enlarged vertical sectional view taken through the valve mechanism on the plane indicated by the line III—III of Fig. 1;

Fig. 4 is a transverse vertical sectional view on the line IV—IV of Fig. 1;

Fig. 5 is a similar view on the line V—V of Fig. 1;

Fig. 6 is a vertical sectional view on the line VI—VI of Fig. 1.

Referring more particularly to the drawings, the numeral 1 designates the base of the apparatus, which may be in the form of a table top, shelf or counter. Placed horizontally on the upper surface of the base is a plate 2, the latter being slidably received by stationary guides 3 formed in connection with the base. The upper surface of the plate 2 is provided with a plurality of container-receiving rests 4, each of the latter being composed of a pair of elements having inwardly and downwardly reversely inclined surfaces 5, which are shaped to receive and support cylindrical containers 6, with the latter resting on their sides, as disclosed more particularly in Fig. 5. The plate 2 has its rear portion terminated in a vertical upstanding flange 7, which carries a plurality of short forwardly and horizontally extending coil springs 8, the latter having their rear convolutions engaged by headed screws 9 which are threaded into openings formed in the flange 7 in order to effect the support of said springs in a horizontal plane. The forward convolutions of said springs engage with the bottoms 10 of the container 6 when the latter are supported on the rests 4, the normal tendency of said springs being to press the containers forwardly.

The containers, in this instance, are adapted to be charged with a gas under pressure and to this end each container comprises a cylindrical open-topped, metallic shell. Adjacent to its top, each shell is exteriorly threaded for engagement with internal threads of a removable metallic cap or cover 11, a gasket 12 of a compressible ma-

terial being normally positioned between the upper edge of the container shell and the inner surfaces of the cap or cover to seal the container against fluid seepage between inter-engaging surfaces of the shell and the cover.

A specific use for containers of this type resides in their adaptation for the dispensing of whipped cream, in accordance with the method disclosed in the prior application of Charles Getz, Serial No. 42,225, wherein each container is supplied with a liquid mixture in which cream is the predominating ingredient, and wherein the containers are closed and charged with a soluble gas, such as nitrous oxide, under pressure, so that as the cream is discharged from the container, it is aerated and expanded to produce whipped cream. It is obvious, however, that the containers may be employed in many other capacities and therefore the present invention is not limited to the specific uses thereof set forth. In order to prepare the containers for the reception of nitrous oxide or other charging gas, it has been found to be important to remove internal air or oxygen to the greatest practicable degree following the insertion of the liquid cream mix and before charging the containers with nitrous oxide. The present apparatus is used to carry out the dual operations of evacuating air from the containers and then charging the same with the expanding gas under pressure.

In accomplishing these operations, each of the container covers or lids 11 is formed with an opening 13 disposed eccentrically of the axis of the container. Positioned in this opening is the upper end of a tube 14, which extends substantially throughout the full length or height of the container and terminates just short of the bottom 10 thereof, as disclosed in Fig. 2. The upper end of each tube is provided with a collar 15 arranged for engagement with the inner or under surface of the removable cover 11, the tube projecting through the opening 13 and beyond the same for a suitable distance. A portion of the tube which projects beyond the cover is exteriorly threaded for the reception of a clamping nut 16, the latter engaging with a washer 17 which, in turn, engages with a compressible sealing washer 18 so that by the tightening of the nut 16, the collar 15 will be drawn tightly into engagement with the inner or under surface of the cover, and the washer 18 will be compressed to preclude the undue escape of fluid from within the container or the undesired entry of extraneous fluids into the container.

The upper projecting end of each tube 14 is internally threaded as at 19 for the reception of a ported seating member 20, the latter carrying a cage 21 for the slidable support of a valve stem 22, the latter being formed with a valve enlargement 23 adapted for coaction with the valve seat of the member 20. A coil spring 24 surrounds the stem 22 and is positioned between one end of the cage 21 and the valve enlargement 23, the normal tendency of the spring 24 being to maintain said enlargement in seated engagement with the member 20, in order to seal the interior of the container. The stem 22 is extended as at 25 to project beyond the upper or outer end of the tube 14, and this extension provides an actuating element for opening the valve against the resistance of the spring 24.

Stationarily mounted in connection with the base 1 is a longitudinally extending conduit 25*a*. This conduit, in registration with the containers mounted on the supporting plate 2, is provided with upwardly extending branches 26 which are internally threaded for the reception of threaded extensions 27 provided upon a plurality of valve heads 28. Each of these heads, as shown more particularly in Fig. 3, is formed with an internally threaded bore 29, adapted for the reception of an externally threaded valve sleeve 30. At its outer end each of the sleeves 30 includes an annular collar 31, which engages with a gasket ring 32. Each collar 31 includes an axial opening 33 of sufficient diameter to receive the upper and outer threaded end of the tube 14 provided at each of the containers, indicated at 6. To provide close fitting engagement between the head 28 and the upper end of the tube 14, there is arranged within each valve sleeve a rubber ring 34 which is immovably positioned within the sleeve 30 in contact with the inner surfaces of said sleeve and its collar 31. Slidably mounted within each sleeve 30 is a disk valve 35 having the circumferential edges thereof ported as at 36. Normally, the forward face of the valve 35 engages with the ring 34 so that the ports 36 are covered by said ring and the interior of the head 28 thereby closed, this movement of the disk valve being effected by a coil spring 37 disposed between the rear end of the bore 29 and the rear surface of the valve 35, the latter having its rear surface recessed to provide a seat for the spring 37.

By this construction, it will be seen that when relative approach is effected between the control valve of the tube 14 and the control valve in the head 28, so that these parts register as disclosed in Fig. 3, the actuating portion 25 of the valve stem 22 will engage the actuating portion of the valve 35 so that the valve enlargement 23 will be displaced from engagement with the seating member 20 and the valve disk 35 will be moved so that the same will be spaced from the ring 34, so that the interior of the container will be in open communication with the interior of the conduit 25. The extension 27 is provided with a restricted passage 38 which leads from the conduit 25 to the rear portion of the bore 29 in the valve head. It will thus be seen that the outlet of the tube 14 of each container is normally closed by the spring pressed valve 23. Likewise, the outlet of each head 28 is normally closed by the spring pressed valve 35. These valves will not be opened unless the same are brought into relative engagement in the manner illustrated in Fig. 3.

To control the movement of the supporting plate 2 and the containers positioned thereon toward and away from the heads 28, the base 1 is provided with a pair of bearing brackets 39 for the rotatable support of the ends of a rock shaft 40. This shaft is provided with a pair of eccentrics 41 which are adapted, upon the movement of the rock shaft, to engage with the flange 7 of the plate 2 so that said plate, together with the containers grouped thereon, may be bodily advanced toward the heads 28. An actuating handle extension 42 is connected with the rock shaft for convenience in manually operating the same. Due to the pressure of the springs 8 on the eccentrics 41, the latter will be maintained, without requiring holding of the extension 42, in their plate advancing and container charging positions. Also, the plate 2 is formed with a boss 43 against which presses one end of a coil spring 44, the opposite or forward end of the latter being engaged with a block 45 on the base 1. The spring 44 serves to slide the plate

2 rearwardly in a positive manner when the eccentrics 41 are positioned to provide for the separation and withdrawal of the containers 6 from fluid flow engagement with the heads 28. To further insure registration of the outer ends of the tubes 14 with the bores of the heads 28, there is provided a plurality of upstanding sheet metal brackets 46. These brackets, as shown in Fig. 6, have their upper edges formed with V-shaped notches 47 and the lower or restricted portions 48 of these notches are of sufficient width to just receive the outer ends of the tubes 14, preventing lateral shifting of the containers 6 on their rests 4 and insuring accurate registration of said tubes with the charging heads 28.

In the particular apparatus here disclosed with the containers and heads positioned as set forth in Fig. 3, it is preferable to remove free oxygen from the interior of said containers to the highest practicable degree, since such oxygen apparently exerts a deleterious effect on the liquid whipped cream forming mixture, disclosed at 50, within said containers. This vacuumizing or oxygen removing step may be accomplished simultaneously for each of the containers mounted on the plate 2, by connecting the conduit 25 with a branch pipe line 51, the latter having a manually operated control valve 52. The pipe line 51 extends to a vacuum producing pump 53 mounted on the base 1, the pump being driven by means of a belt 54 extending from a pulley 55 carried by the drive shaft of an electric motor 56. The pump 53 or the pipe line 51 is provided with a vacuum gage 57.

Also, the conduit 25 is connected with a second pipe line shown at 58 having arranged therein a manually operated control valve 59, the pipe line 58 extending to a tank 60 containing nitrous oxide under pressure. While nitrous oxide is preferably used in the charging of the whipped cream containers, it is obvious that other charging cases may be used, such as carbon dioxide, nitrogen, or a mixture of such gases. A pressure gage 61 is provided in the pipe line 58 to indicate the pressure of the gas within the pipe line system.

Operation

With the handle extension 42 of the rock shaft arranged in the positions disclosed in Figs. 1 and 2, and with the plate 2 retracted under the influence of the spring 44, the partially filled containers 6 are placed horizontally on the rests 4 so that the closed bottoms 10 of said containers will slightly compress the springs 8 and with the tubes 14 thereof arranged above the level of the liquid mixture indicated at 50.

This positioning of the containers is further facilitated by disposing the outer ends of the tubes 14 in the restricted lower portions of the notches 47 provided in the registering securing brackets 46. Following this positioning of the containers, the rock shaft 40 is then actuated to cause the eccentrics 41 thereof to engage the flange 7 of the supporting plate 2 and to simultaneously advance the containers in a forward direction, compressing somewhat the springs 8. Due to the registration afforded by the brackets 46, the outer ends of the tubes 14 will enter the bores provided in the charging heads 28, causing the normally closed spring pressed valves of the tubes 14 and heads 28 to mutually engage each other and assume open positions. With the valve 59 leading to the tank 60 closed, the valve 52 controlling the vacuum 51 is opened, and the motor 56 energized by the actuation of its governing switch, shown at 62. This effects the operation of the vacuum pump 53 and by observing the gage 57, the operator may control the vacuum created within each of the containers.

When this desired degree of vacuum has been obtained, and without changing the positions of said containers, the valve 52 is closed and the valve 59 opened, so that the charging gas from the tank 60 may be introduced into the gas space provided in each of said containers above the level of the liquids therein. The valve 59 is then closed and the rock shaft actuated to retract the plate 2 and the containers arranged thereon, so that the valved ends of the tubes 14 will be withdrawn from contact with the valves of the charging heads 28. The containers are then removed from the plate 2 and the operations above given are repeated.

What is claimed is:

1. Gas charging apparatus of the character described comprising a base, a container support slidably mounted on said base, V-shaped rests carried by said support for the reception of a plurality of horizontally aligned cylindrical containers, said containers having valved inlets projecting from one end thereof, positioning brackets carried by said base and provided with notches in the upper ends thereof for the reception of the valved inlets of containers positioned on said support, a plurality of valved charging heads stationarily mounted on said base in registration with the valved inlets of the containers, and manually operated means for effecting bodily sliding movement of said support and the containers carried thereby into engagement with said charging heads.

2. Gas charging apparatus comprising a base, a container support slidably mounted on said base, rests formed with said support for the reception of a plurality of cylindrical containers with the latter disposed in horizontal order in an aligned row, said containers having valved inlets projecting from the forward ends thereof, notched bracket means carried by said base for the reception of said valved inlets, an upstanding flange provided on said support, spring means arranged between said flange and the bottom of each of said containers, stationary valved gas charging heads carried by said base in registration with the inlets of said containers, manually operated cam mechanism engageable with the flange of said support and operative to advance said support and the containers carried thereby toward said charging heads, and spring means cooperative with said support and operative upon the release of said cam mechanism to move said support and the containers carried thereby away from said charging heads.

3. Container charging apparatus of the class described, comprising a base, a container support slidably mounted on said base, said support being formed for the reception of a plurality of parallelly arranged closed containers, each of said containers having in one end thereof a normally closed spring-pressed valve, a stationary conduit carried by said base, a plurality of longitudinally spaced charging heads connected with said conduit, a normally closed spring-actuated valve in each of said heads, means for effecting bodily sliding movement of said support and the containers carried thereby to bring the valves of said containers into fluid-tight engagement with said heads and simultaneously unseat the valves of said containers and heads to establish com-

munication between the interiors of said containers and said conduit, valve controlled air exhausting means in communication with said conduit and the interiors of each of said containers, and valve controlled means for introducing a gas under superatmospheric pressures into said conduit and associated containers following the operation of said air exhausting means, said containers being stationarily retained by said support and its actuating means in constant engagement with the charging heads of said conduit during the operation of both the air exhausting and gas charging means.

4. Container charging apparatus of the class described comprising a base, a container support slidably mounted on said base, said support being formed for the reception of a plurality of parallelly closed containers with the latter disposed in horizontal order in an aligned row thereon, each of said containers having in one end thereof a normally closed valve, stationary guides carried by said base for the reception of the valves in the ends of said containers, springs carried by said support and engageable with the ends of said containers opposite to the valved ends thereof, stationary charging heads carried by said base in registration with the valves of the containers arranged on said support, normally closed valves carried by each of said heads and longitudinally registrable with each of the container valves, manually operated means engageable with said support to bodily advance the latter and the containers carried thereby to bring the valves of said containers into engagement with the valves of said charging heads, whereby to effect the opening of said valves and establish communication between said charging heads and the interiors of said containers, and spring means cooperative with said support and operable upon the release of said manually operated means to move said support and the containers carried thereby away from said charging heads.

5. Container charging apparatus of the class described comprising a base, a container support slidably mounted on said base, said support being formed for the reception of a plurality of parallelly arranged closed containers with the latter disposed in horizontal order in an aligned row, each of said containers having in one end thereof a normally closed valve, springs carried by said support and engageable with the ends of said containers opposite to the valved ends thereof, stationary charging heads carried by said base in registration with the valves of the containers arranged on said support, normally closed valves carried by each of said heads and longitudinally registrable with each of the container valves, manually operated means engageable with said support to bodily advance the latter and the containers carried thereby to bring the valves of said containers into engagement with the valves of said charging heads, whereby to effect the opening of said valves and establish communication between said charging heads and the interiors of said containers, and spring means cooperative with said support and operable upon the release of said manually operated means to move said support and the containers carried thereby away from said charging heads.

6. Apparatus for charging closed containers with gas under superatmospheric pressures, comprising a base, a container support slidably mounted on said base, said support being formed for the reception of a plurality of closed containers arranged in parallel order, each of said containers having in one end thereof a normally closed valve, a plurality of spaced gas charging heads mounted on said base, normally closed valves positioned in each of said heads and disposed in longitudinal registration with the valves of containers arranged on said support, means for effecting bodily sliding movement of said support and the containers carried thereby, whereby to bring the valves of said containers into fluid-tight engagement with said heads and to simultaneously unseat the valves of said containers and heads in order to establish communication between the interiors of said containers and the gas charging heads, and yieldable means arranged between the ends of said containers, opposite to the valve carrying ends thereof, and said support to permit of relative movement between the containers and the support when the latter has been moved to bring the valves of said containers and charging heads into relative engagement.

7. Apparatus for charging gas to siphonic containers comprising a base, a container support slidably mounted upon said base, said support being formed for the reception of a siphonic container having a normally closed valve in one end thereof with an exteriorly accessible actuating stem, a stationary gas charging head having a normally closed valve therein, means for effecting relative movement between a container mounted on said support and said charging head, whereby to bring the actuating stem of the valve of the container on said support into direct contact with the valve of said charging head to effect the unseating of said valves and establish communication between the charging head and the interior of the container, valve controlled air exhausting means in communication with said charging head, and separate valve controlled means for delivering a gas under superatmospheric pressures to said charging heads, said container being stationarily retained by said support and its actuating means in constant engagement with the charging head during the operation of both the air exhausting and gas charging means.

8. Container charging apparatus of the class described comprising a base, a container support slidably mounted on said base, said support being formed for the reception of a siphonic container, said container being of the type having in one end thereof a normally closed valve, a stationary guide carried by said base for the reception of the valve in the end of said container, a spring carried by said support and engageable with the end of a container mounted thereon opposite to the valved end of said container, a stationary charging head carried by said base in registration with the valve of a container arranged on said support, a normally closed valve carried by said head and longitudinally registrable with the valve of a container positioned on said support, manually operated means engageable with said support to bodily advance the latter and a container carried thereby to move the valve of the container into direct engagement with the valve of the charging head, whereby to unseat said valves and establish communication between the charging head and the interior of an associated container, and spring means cooperative with said support and operable upon the release of said manually operated means to move said support and the container carried thereby away from said charging head.

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