

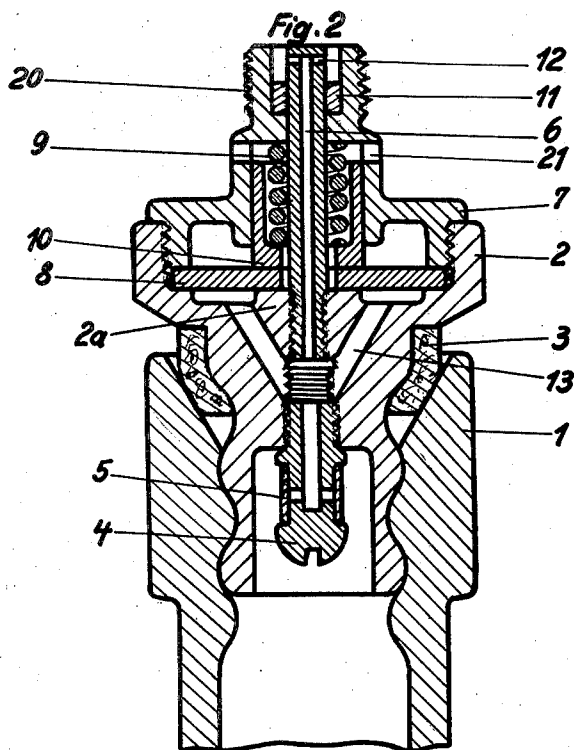
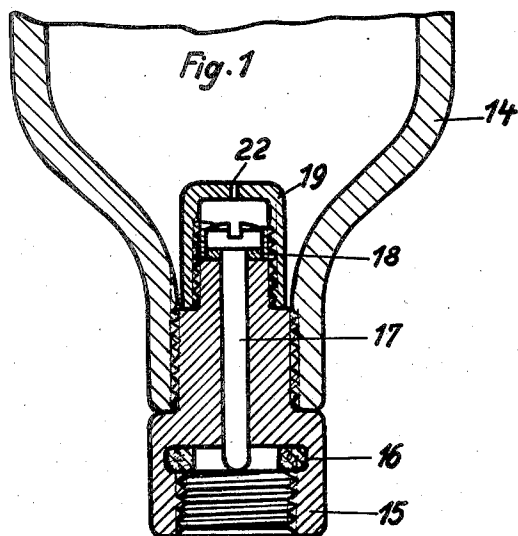
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E. FERNHOLZ

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COUPLING DEVICE FOR CARBONATORS

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Inventor :

Ernst Fernholz

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COUPLING DEVICE FOR CARBONATORS

Ernst Fernholz, Berlin-Tempelhof, Germany

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3 Claims. (Cl. 225-17)

The present invention relates to an installation for producing carbonated beverages which is particularly suited for domestic purposes, being performable simply and conveniently and offering complete protection against accident by the creation of excessive pressure.

The means for carrying out the invention comprise a steel bottle or flask for carbonic acid, a closure for said bottle or flask incorporating a throttle valve and a liquid container whose closure or coupling device contains a relief valve and a non-return valve controlling the outlet of the passage through which gas is admitted from the steel bottle to the liquid container.

The closures of the steel bottle and container can be made to engage with each other. Upon engagement of the two closures the stem of the valve within the closure of the gas bottle is raised and gas can flow freely into the liquid container through the gas inlet which is controlled by a non-return valve.

In order to prevent an excess pressure to be built up within the liquid container, its gas inlet is according to the invention arranged to communicate by means of lateral passages with a spring actuated diaphragm valve which controls passages arranged in the closure and communicating with the atmosphere.

Furthermore the inlet end of the gas bottle valve is according to the invention covered by a cap fitted with a fine orifice by means of which the throttling effect of the valve is increased.

The ordinary spring-actuated relief valves do not offer sufficient guarantee against accidents for household use, as in course of time they fail to work accurately, nor do they permit in case of danger the blowing off of sufficiently large quantities of gas for the avoidance of an undue increase of pressure. These valves have further the disadvantage that prior to their blowing off they become leaky.

Preferably the diaphragm of the relief valve has a comparatively large area so that in case of a very small excess of pressure within the liquid container it operates without a prior leakage having occurred and then permits the escape of gas to the atmosphere in such large quantities that even with the inflow of large quantities of gas the increase of pressure will amount to no more than about $\frac{1}{10}$ of an atmosphere.

Fig. 1 is an axial section through the closure of a carbonic acid container, and

Fig. 2 is an axial section through a closure attached to a liquid container.

As shown, the liquid container consists of a

bottle 1, of glass or other suitable material, which has its neck fitted with a coarse thread opening into a conical seating. Within said neck is arranged the body of a coupling device or closure constructed as follows. A closure body 2 has a coarse thread co-operating with that of the bottle, and also carries a packing ring 3 which engages with the said conical seating when the closure is screwed into the bottle. The body 2 carries, within a recess at its lower end, a non-return valve 4 constituted by a rubber sleeve 5. A hollow rod 6 is screwed into a boss 2a at the upper end of the closure body 2. A cover 7 is screwed into the top of the closure body 2, the edge of a diaphragm 8 being secured between the closure 2 and the cover 7. Within the cover 7 is housed a compression spring 9 which through a cup 10 tends to force the middle of the diaphragm 8 against the boss 2a. The diaphragm 8 and the cup 10 have central apertures so that between the rod 6 and the diaphragm 8 an annular passage is afforded. The rod 6 is at its top end provided with several lateral ducts 12 communicating with the bore of the rod, and the joint between the rod and the valve cover 7 is sealed by means of a rubber ring 11.

A small steel carbonic acid bottle 14 of about 100 grammes capacity is closed by a valve body 15 which is furnished at its lower end with an internal thread and a packing ring 16 of soft rubber. The closure of the bottle 14 is effected by a mushroom valve 17 seating on a packing ring 18. A cap 19 which is screwed to the valve body 15 and serves to cover the valve has a small fixed throttling orifice 22. The cap 19 also serves to prevent the valve 17 from falling into the bottle. The throttling of gas passing through the closure is not only effected by the fine orifice 22 in the cap 19, but also by the stem of the valve 17, which is fitted accurately into the bore of the valve body 15 without other passage for the outflow of the gas.

The apparatus works in the following manner:

The glass bottle 1 is filled with water up to about $\frac{3}{4}$ ths of its capacity, and the closure body 2 is screwed tightly into its neck. The closures of the two bottles are then interengaged by screwing an externally threaded stud 20 on the cover 7 into the internal screw thread of the closure body 15. By this, first the rubber ring 16 is compressed against its seat to seal the joint, and then the rod 6 raises the valve 17, whereupon the carbonic acid can pass into the liquid bottle 1. The apparatus is now turned upside down so that the glass bottle is neck lowermost, whereupon it is vigor-

ously shaken. In a period of about from 20-30 seconds the water becomes saturated with carbonic acid, while a pressure of 5-6 atm. above atmospheric pressure has been created within the bottle 1. Since the spring 9 of the diaphragm valve is adjusted to this pressure, as soon as it is reached the carbonic acid is in communication by way of lateral passages 13 with the chamber beneath the diaphragm 8, raises the diaphragm and thereby gains an outlet to the atmosphere, that is to say, it passes through the slit formed between the diaphragm and the boss 2a, through the annular space around the rod 6 in an upward direction and then through passages 21 into the atmosphere. The increase of pressure due to retardation of the escaping gas amounts to scarcely 1/10th of an atmosphere, so that the bottle 1 is in no danger of bursting.

The coil spring 9 of the diaphragm relief valve is so constructed that the diameters of its turns gradually decrease from the base upward, in order that when the spring is compressed or released the top windings do not catch the edge of the cup 10 housing the spring.

I claim:

1. A connection for directing gas under pressure from a flask into a beverage bottle, and comprising a closure projecting from the neck of said flask and a coupling device carried by the bottle and detachably secured to said closure; said closure having therein a valve controlled passage for the gas; and said coupling device comprising a body member having a socket at one end, a passage extending inwardly from a part of said socket, and a lateral passage extending inwardly from a second part of said socket and communicating at its inner end with the first mentioned passage; a hollow rod secured in said passage and having a channel therein communicating at one end with said valve controlled passage and at the other end with the interior of said bottle and at an intermediate portion with said lateral passage;

a cover arranged to define with said socket a chamber; an outlet passage through said chamber; a diaphragm in said chamber normally positioned to prevent the flow of gas from lateral passage through said outlet passage; yieldable means arranged to maintain said diaphragm in such position or to permit the diaphragm to move therefrom to place the lateral and outlet passages in communication, and an elastic device arranged to permit flow through said channel into said bottle and prevent flow in the opposite direction; the valve actuating end of said hollow stem passing through said cover member.

2. A structure such as defined in claim 1, in which the yieldable means comprises a cup shaped member and a spring arranged to act through said cup shaped member and urge said diaphragm against a seat at the end of said lateral passage.

3. A connection for directing gas under pressure from a flask into a beverage bottle, and comprising a closure projecting from the neck of said flask and a coupling device carried by the bottle, and detachably engaging said closure; the closure comprising a tubular member having a bore communicating with the interior of the flask and terminating in an enlarged threaded socket, a pin slidable in said bore and defining with the walls thereof a restricted passage for the gas, and a cap provided with a throttling orifice and secured to the inner end of said member and defining with said end a chamber; said pin having a head engageable with a seat in said chamber to control the flow of gas through said restricted passage; said coupling device having a threaded stud detachably received in said socket, a stem having a portion located in said stud in position for acting through said pin to hold said head from said seat, and said stem having a bore therein for conducting gas from said restricted passage into said bottle.

ERNST FERNHOLZ.