This invention relates to a novel and useful closure cap construction, and more particularly to a closure cap construction which is specifically adapted to be used as a closure for bottle-type receptacles and the like for preventing unauthorized injection of liquids into the receptacle.

Although the closure cap construction of the instant invention is specifically adapted to comprise a closure cap for bottle receptacles in which alcoholic beverages are contained, it is to be understood that the closure cap construction may be most conveniently used for the purpose of restricting unauthorized injection of liquids into various other types of bottle-type receptacles and the like containing liquids.

In some instances the owner of a tavern or restaurant which serves alcoholic beverages and the like desires to have a means whereby his customers may be assured that they do not receive diluted beverages. Many methods have been used in an attempt to reach this end including the use of apparatus which is capable of registering the number of times a bottle is removed from its position on a storage shelf and also recording its weight each time it is replaced upon the shelf. Although this method makes it extremely inconvenient and time-consuming for a tavern employee or the like to serve a customer a diluted drink in a manner whereby the employee is able to save that portion of the beverage which is not served to the customer, it is still possible for the employee to serve the customer a diluted beverage by diluting each drink individually.

It is therefore the main object of this invention to provide a closure cap construction which may be affixed to the neck of a bottle-type receptacle in a manner whereby its unauthorized removal may be easily detected and which will make it practically impossible for the beverage within the receptacle to be diluted without removing the closure cap construction from the bottle-type receptacle.

A further object of this invention, in accordance with the preceding object is to provide a closure cap construction having an upper valve mechanism and a lower valve mechanism for preventing the flow of liquid into the receptacle to which the closure cap construction is secured while the receptacle is in an upright position.

Still another object of this invention, in accordance with the immediately preceding object, is to provide a closure cap construction having two check valves arranged in series and positioned in such a manner whereby one valve mechanism will completely enclose the other valve mechanism thereby making it next to impossible to manually manipulate the inner valve mechanism.

Yet another object of this invention is to provide a closure cap construction for bottle-type receptacles and the like which may be secured to the opening of the receptacle and which is provided with a threaded neck portion with which either a threaded closure cap construction comprising a part of the invention may be threadedly engaged to provide a suitable covering for the closure cap construction or with which the threaded closure cap originally supplied with the bottle receptacle to which the closure cap construction is secured may be engaged.

It is still a further object of this invention to provide a closure cap construction having a pair of check valve mechanisms which are operable independently of each other but which have a means for interconnecting the inner valve mechanism with the outer valve mechanism so that the outer valve mechanism may engage the inner valve mechanism to close the latter upon the closing of the outer valve mechanism.

A final object to be specifically enumerated herein is to provide a closure cap construction for bottle-type receptacles and the like which will conform to conventional forms of manufacture, be of simple construction and easy to operate so as to provide a device that will be economically feasible, long lasting and simple to use.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a perspective view of a bottle-type of receptacle to which the closure cap construction comprising the present invention is secured;

FIGURE 2 is a perspective view similar to FIGURE 1 but of the upper portion of the bottle-type of receptacle and showing the closure cap construction secured thereto but with the closure cap therefor being removed;

FIGURE 3 is an exploded perspective view of the closure cap construction showing the manner in which it is assembled;

FIGURE 4 is an enlarged vertical sectional view of the upper portion of the bottle-type receptacle shown in FIGURE 1 taken substantially upon the plane indicated by the section line 4--4 of FIGURE 1;

FIGURE 5 is an enlarged vertical sectional view similar to that of FIGURE 4 but showing the bottle-type of receptacle in an inverted position and the valve mechanisms of the closure cap construction in an open position with the closure cap therefor being removed;

FIGURE 6 is a horizontal sectional view taken substantially upon the plane indicated by the section line 6--6 of FIGURE 4;

FIGURE 7 is a horizontal sectional view taken substantially upon the plane indicated by the section line 7--7 of FIGURE 4; and

FIGURE 8 is a horizontal sectional view taken substantially upon the plane indicated by the section line 8--8 of FIGURE 4.

Referring now more specifically to the drawings, the numeral 10 generally designates the closure cap construction of the instant invention which is shown in FIGURE 1 secured to the neck portion of a conventional type of bottle receptacle generally referred to by the reference numeral 12. The receptacle 12 is provided with a diametrically reduced neck portion 14 which has formed thereon a radially extending retaining flange 16 which is of conventional design. The neck 14 is provided with an opening 18 which is in communication with the interior of the receptacle 12.

Referring now more specifically to FIGURES 3 through 5, it will be seen that the closure cap construction 10 includes an upper valve mechanism 19 referred to by the reference numeral 20 and a lower valve mechanism generally referred to by the reference numeral 22. The lower valve mechanism 22 includes a cylindrical valve cage or body generally referred to by the reference numeral 24 which is provided with a radially extending retaining flange 26 on its upper end. A bore 28 is formed through the cage 24 and the upper end of the valve cage 24 is provided with a countere
30. The lower end of the bore 28 is provided with a plurality of radially extending openings 32. Secured to the lower end of the valve cage 24 is a depending journal block 34 which is provided with a centrally disposed bore 36 which is in axial alignment with the bore 28 and counterbore 30. The shoulder 38 between the bore 28 and the counterbore 30 is provided with an upstanding centrally disposed circumferential flange 40 which comprises a seating surface for the underside of the head portion 42 of the valve element for the lower valve mechanism 22 which is generally designated by the reference numeral 44. The valve element 44 is provided with a depending cylindrical valve stem 46 which is slidable disposed through the bore 36. With particular attention directed to FIGURE 4 of the drawings it will be noted that the lower valve mechanism 22 is slidably received within the opening 18 formed in the neck portion 14 of the body 12. A resilient washer 48, which may be conveniently constructed of cork, is interposed between the upper surfaces of the retaining flange 16 and the underside of the retaining flange 26. In this manner, if there were provided means for retaining the lower valve mechanism within the opening 18 it will be noted that unless the valve element 44 was manually manipulated, the entrance of a liquid into the receptacle 12 would be restricted inasmuch as the valve element 44 is urged to a closed position engaged with the flange 26 by gravity whenever the receptacle 12 has its neck portion inclined upwardly.

The upper valve mechanism 20 also includes a cylindrical valve cage or body which is generally referred to by the reference numeral 50. The upper valve cage 50 is provided with a bore 52 which has been disposed therein a perforated restricting partition 54 having a centrally disposed bore 56 formed therein which is in alignment with the large bore 52. The valve cage 50 is provided with a diametrically enlarged base 58 which is adapted to overlie the washer 48 in such a manner whereby the bore 52 will form a continuation of the counterbore 30. Formed in the lower end of the bore 52 is a shallow counterbore 60 which smoothly receives the retaining flange 26 whereby the upper valve cage 50 will be maintained in axial alignment with the lower valve cage 24. The upper valve mechanism 20 is also provided with a valve element which is generally designated by the reference numeral 62. The valve element 62 is provided with a head portion 64 having a suitable resilient washer 66 secured to its underside which is adapted to engage and retain the upper end of the valve cage 50. The valve element 62 is provided with a stem portion 68 which is cylindrical and is slidably disposed in bore 56. The lower end of the stem 68 is threaded as at 70 and has threaded engaged therewith an abutment block 72 whose purpose is to be hereinafter set forth. The outer surfaces of the upper portion of the valve cage 50 are provided with suitable threads 71 with which an internally threaded conventional form of closure cap 73 may be threaded engaged for the purpose of sealing the interior of the closure cap construction 10 from the ambient atmosphere.

To secure the closure cap construction 10 to the upper portion of the receptacle 12 a metallic sleeve 74 is disposed about the base 58, the washer 48 and the retaining flange 16 with the upper and lower ends of the sleeve 74 being crimped over the base 58 and the retaining flange 16 respectively. It is to be understood that a seal or other device may be employed to prevent leakage. The sleeve 74 is crimped securely about the upper portion of the valve cage 50 and the threads 71 thereon may be of a size to enable the conventional type of threaded element of the receptacle 12 to receive the closure cap 73 if the receptacle 12 is provided with such a closure cap.

In operation, the closure cap construction 10 is first secured to the neck 14 of the receptacle 12 as herefore set forth wherein inclination of the receptacle 12 toward a horizontal position if it is full or toward a downwardly inclined position if it is partly filled will enable the fluid contained within the receptacle 12 to enter into bore 28 by means of openings 32 wherein it will urge valve element 44 from engagement with the flange 40 thereby communicating the interior of the receptacle 12 with the interior of the valve cage 50. The liquid entering the valve cage 50 will then urge the valve element 62 toward an open position whereby the liquid may pass from the valve cage 50 through the valve stem 46 in the usual manner. Particular attention is directed to FIGURE 5 of the drawings wherein it may be seen that after the valve element 44 has been moved slightly toward an open position the head 42 thereof will engage the abutment block 72 to further assist in the movement of the valve element 62 toward an open position. As the receptacle 12 is returned to an upright position gravity will urge both the valve element 44 and the valve element 62 in a downward direction until they reach a closed position. It is to be noted that if the valve element 44 resists the downward pull of gravity upon the righting of the receptacle 12 because of friction between its moving parts, the downward movement of the valve element 62 will assist to effect downward movement of the valve element 44.

It is to be noted that the apertured partition 54 will allow the passage of liquid but that it will discourage any attempts to manipulate the lower valve element 44 toward an open position while the receptacle 12 is in an upright position.

Further, it is to be noted that any convenient material may be utilized in the construction of the closure cap construction 10 but that it may be the present at the most conveniently constructed of a plastic material which is not subject to corrosion from coming into contact with various types of liquids which might be served as a beverage.

Further, not only will the closure cap construction 10 restrict persons from diluting the beverage contained within the receptacle 12 but it will also prevent the refilling of the receptacle 12 with a beverage of inferior quality.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operations here described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. In combination with a bottle of the type including a neck provided with a radially outwardly projecting annular flange on its open end, a closure cap construction comprising an upper valve mechanism and a lower valve mechanism, each of said valve mechanisms including an upstanding cylindrical valve cage having a longitudinal bore formed therethrough, a valve element disposed in each of said cages, a perforated partition extending transversely of the cage of said upper valve mechanism and including a centrally disposed sleeve portion defining a small diameter bore concentric with the longitudinal bore of the upper cage, a depending journal block having a small diameter bore formed therethrough carried by the lower end of the journal block, a depending journal block of said lower cage being concentric with said lower cage longitudinal bore, a head portion on each of said valve elements engageable with and comprising a closure for the upper end of the corresponding longitudinal bore, means securing said lower cage to the lower end of said upper cage, said upper and lower valve elements each including a depending rigid valve stem reciprocal in the corresponding small diameter bore, a counterbore formed
in the upper end of the longitudinal bore of the lower cage and defining a radially extending annular shoulder at the inner end of said counterbore, said lower valve element head portion disposed in said counterbore and seatingly engageable with said shoulder to define a lower limit position of said lower valve element in said lower valve cage, the lower end of the valve stem of the upper valve element having a diametrically enlarged abutment block thereon for engagement with the lower end of said sleeve portion to limit upward movement of the upper valve element in said upper cage and the lower end of the valve stem of said upper valve element terminating at a point spaced from the head portion of said lower valve element when both of said valve elements are lowered and engaging said lower valve element when the latter is raised and the upper valve element is partially lowered to urge said lower valve element toward its lower limit position upon further movement of said upper valve element toward its lower limit position, said lower valve cage including a radially outwardly extending flange formed on the upper end thereof and having its lower portion snugly received in the open end of said neck, the head portion of said lower valve element, when in the lower limit position, being enclosed in said lower cage, the head portion of the lower valve element being engageable with the innermost lower end of the upper valve element when the latter is in its upper limit position to define the upper outward limit position of the lower valve element, the lower end of said lower valve cage having a radially outwardly projecting annular retaining flange formed thereon, a resilient washer encircling said lower valve cage and interposed between the lower surface of said last mentioned flange and the upper free end of the neck of said bottle, the upper end of said lower cage being snugly received in a counterbore formed in the lower end of the longitudinal bore of the upper valve cage, the lower surface of said retaining flange being co-planar with the lower surface of the flange on the upper end of the lower valve cage, a retaining sleeve having a diametrically reduced portion on its upper end engaged with the upper surface of said retaining flange and a diametrically enlarged portion on its lower end receiving said neck and having the lower portion thereof crimped over the lower edge of said radially outwardly extending flange on said neck.

2. The combination of claim 1 wherein the outer surfaces of said upper cage are provided with suitable threads adapted for engagement with an internally threaded cap for said bottle.

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