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VALVE SYSTEM FOR CLOSING BOTTLES, FLASKS, OR LIKE RECEPTACLES

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Fig. I

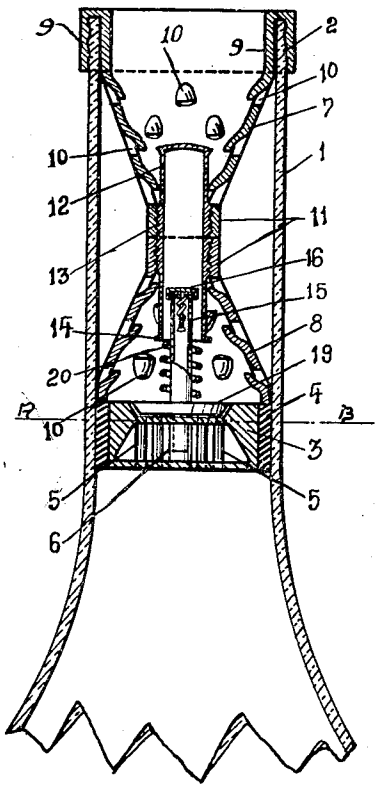



Fig. II

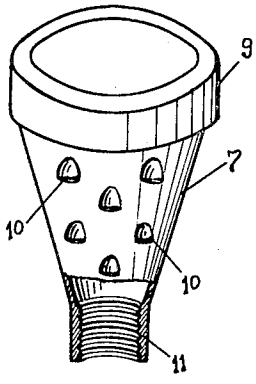



Fig. III

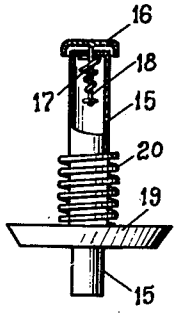



Fig. IV

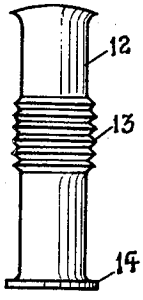
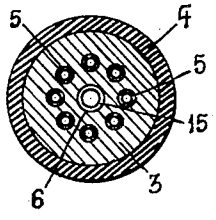



Fig. V




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## VALVE SYSTEM FOR CLOSING BOTTLES, FLASKS, OR LIKE RECEPTACLES

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Application May 12, 1932. Serial No. 610,920

3 Claims. (Cl. 215—19)

My present invention refers to an improved bottle closing means which prevents the bottle, flask or like receptacle once emptied from being filled up again, and particularly provides a new valve which is very satisfactory in this respect and renders filling up the receptacle quite impossible after emptying the receptacle without damaging the valve.

The valve system according to this invention, in comparison with those now employed, is particularly advantageous in so far as it always works perfectly on account of its construction which does not permit the introduction of a wire or like article with the intention of interfering with the operation of the valve, nor does it permit that the entrance of air to be obstructed and render thus impossible the pouring out of the liquid.

Nevertheless, the present device is of relatively simple construction permitting an easy application of the valve and its manufacture at low cost.

My invention, further, comprises a valve system which in use is not restricted to a special class of bottles or flasks, but may be applied to any kind of receptacle provided that the valve fits into the neck thereof and that the latter has an outwardly extending neck as is usual, which permits the upper end of the valve body to be bent and compressed over the rim, so that the valve remains inseparably fixed within the neck of the bottle.

With these and other objects in view, my invention consists in the novel construction, arrangement and formation of parts as will be hereinafter specially described, claimed and illustrated in the accompanying drawing, in which:—

Fig. I is a cross section of the device applied to the neck of a bottle according to my invention;

Fig. II is a perspective and partly sectional detail view of the upper funnel or cone shaped element forming part of the valve;

Fig. III is a perspective and partly sectional view of the valve;

Fig. IV is a perspective and partly sectional detail view of the protector tube also forming part of the valve;

Fig. V is a transversal section through the seat of the valve along the line A—B of Fig. I.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawing by the same reference numerals.

Specially describing the present embodiment of my invention, the numeral 1 designates the neck of a bottle having as usual a somewhat outwardly projecting rim 2. Into the neck of the bottle to a certain distance from the rim there is introduced a ring 3 of solid material in combination with a further outer ring 4 of any suitable elastic material. The combined rings 3, 4 constituting the seat of the valve is of such outer diameter that it may be introduced with difficulty into the bottle neck 1 by compressing the elastic part 4, and even should the neck become wider, it will be evident that the elastic material of the ring tends to expand, thus always securing a tight fitting to the neck wall of the bottle or flask. Said combined ring or seat 3, 4 conveniently will be fixed within the bottle neck 1 at sufficient distance from the rim 2 so as to permit the insertion of the proper valve device, as illustrated in Fig. I.

The lower part of the annular space left within the seat or combined ring 3, 4 is divided vertically into a plurality of tubular cells or compartments 5, which may be of circular, triangular or rectangular or any other shape, provided that the central one 6 has the form of a tube the purpose of which will be described later.

The valve consists of two funnels or cone shaped elements 7 and 8. The upper funnel 7 comprises an elongated cylindrical part 9 adapted to be bent and compressed over the rim 2 of the bottle neck 1 so as to remain firmly secured thereto. Both funnels or cone shaped elements 7 and 8 are provided with a plurality of apertures 10 formed by horizontal notches, the upper edges of which together with the adjacents parts of the walls are somewhat turned inwardly or outwardly, respectively, or the arrangement is such, as shown, that the upper notch edges of the upper funnel 7 and the lower edges of the notches of the lower funnel 8 both are bent inwardly, so that the proper apertures 10 remain hidden under the bent edges as illustrated in Fig. I. With such a construction it is quite impossible to pass a wire or the like through the apertures 10 of the two funnels or cone shaped elements 7 and 8 with the intention of interfering with the operation of the valve. The smaller ends of the cone shaped elements 7 and 8 comprise elongated cylindrical parts 11 provided with screw-threads by which they are adapted to be mounted on a protector tube 12, the central part of which is formed with a corresponding screw-thread 13, said tube 12 thus being firmly held in position by means of the two funnels or cone shaped elements 7 and 8.

Within the protector tube 12, the upper end of which is closed, and the lower open end having an outwardly projecting rim 14 is disposed

a smaller tube 15 having a removable lid or cover 16 of a predetermined weight sufficient to cause the same when inclining the bottle or flask, to open the tube 15 in spite of the resistance of a spring 17 provided on a small pin 18 and fixed in its upper end to said tube 15. It is evident that when reestablishing the vertical position of the receptacle, said spring 17 tends to exactly replace the lid or cover 16 on the tube 15.

The lower end of the tube 15 which remains open is passed through the valve 19 so as to extend beyond the latter into the centre 6 of the seat 3, 4, which thus serves as guide for the tube 15 and the valve 19.

From the aforesaid, it will be evident that when inclining the bottle and thus removing the lid or cover 16, the air is allowed to pass through the apertures 10 of the cone shaped elements 7 and 8 into the protector tube 12 from its lower end and then through the smaller tube 15 into the receptacle.

The shape and size of the valve 19 coincide with the opening formed by the seat or combined rings 3, 4, and its weight is so calculated that when the bottle or flask is sufficiently inclined, it may force the valve out off the opening of the seat 3, 4 and introduce the tube 15 into the protector tube 12 to such an extent as permitted by a spring 20 surrounding the tube 15 extending between the valve 19 and the rim 14 of the tube 12.

The operation of the valve is as follows:

When inclining the bottle, flask or like receptacle to about 135° and more from its vertical position, the lid or cover 16 on account of its weight, which is greater than the resistance of the spring 17, will open the tube 15, so that the air may freely enter as previously described into the receptacle. At the same time, the valve 19, also on account of its weight, will leave the seat 3, 4 permitting the liquid to pass through part or all of the tubular cells 5 and to be poured out through the apertures of the funnels or cone shaped elements 7 and 8.

It will be evident that when inclining the bottle or flask from the vertical position to the horizontal only, the liquid will not be poured out, as both elements, the lid 16 and the piston 19, on account of the fact that they are not yet moved by their proper weight, still are retained by the springs 17 and 20, respectively. In the same way, when beginning to reestablish the vertical position from an inclination of 135° and reaching the horizontal line, at which moment the gravity of the lid 16 and the piston 19 is compensated, the springs 17 and 20 will immediately force said elements to close the tube 15 and the aperture of the seat 3, 4, respectively. Thus even in horizontal position it is practically impossible to fill up the receptacle provided with a valve according to my invention.

With reference to the assembling of the present device, it may be repeated that the seat or combined ring 3, 4 is introduced into the bottle neck 1 at a sufficient distance from the rim 2 so as to enable the insertion of the proper valve device to such extent that the valve 19 exactly fits into the aperture formed by the seat or combined ring 3, 4. The upper end of the elongated cylindrical part 9 is bent and compressed over the outwardly projecting rim 2 of the neck 1, so that it remains firmly secured thereto. The space left within the elongated part 9 of the upper funnel 7 may serve to receive a cork or stopper (not shown), in order to prevent when out of use the entrance of dust or the like. As the whole valve system forms a unit, there are no further manipulations necessary for the assembling of the device, and it is evident that provided the size of the valve coincides with that of the bottle or flask, the same may be applied to any like receptacle without being specially manufactured for this purpose.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is:—

1. In a valve system for closing bottles, flasks or like receptacles, the combination with a valve seat or ring of solid material within a further ring of any suitable elastic material, a plurality of tubular cells or compartments within the lower part of said seat or combined ring fixed within the bottle neck, a valve fitting into the seat above the cells, a small tube passed through said valve into the central cell or compartment of coinciding shape and extending with its upper end into a protector tube, a removable lid or cover of predetermined weight closing the upper end of said small tube, a spring surrounding the latter between the valve and the protector tube, the upper end of which is closed, while the lower end comprises an outwardly projecting rim, two funnels or cone shaped elements rigidly mounted with their smaller ends on said protector tube and provided with a plurality of hidden apertures and one of said funnels being provided with an elongated cylindrical part to be bent and compressed over the rim of the neck and to receive a cork or stopper as a supplementary closing means for the bottle, flask or like receptacle.

2. In a valve system for closing battles, flasks or like receptacles, the combination with a valve seat or ring of solid material within a further ring of any suitable elastic material, a plurality of tubular cells or compartments within the lower part of said seat or combined ring fixed within the bottle neck, a valve of predetermined weight, a small tube passed through said valve and extending with its upper end into a protector tube, said valve being adapted to spontaneously open the seat on account of its weight, when sufficiently inclining the bottle, and to return to its closing position under the action of a spring provided on said small tube between the valve and the protector tube, the upper end of said small tube being closed by a removable lid or cover of predetermined weight to overcome the resistance of a spring when inclining the bottle in order to open said small tube for the entrance of air, said spring being mounted on a pin provided in said lid and connected with the upper rim of the small tube, and being adapted to exactly replace the lid on the tube when reestablishing the vertical position of the bottle, said protector tube having mounted in its center part two funnels or cone shaped elements, the walls of which are provided with a plurality of hidden apertures and one of said funnels having an elongated cylindrical part to be bent and compressed over the rim of the neck and to receive a cork or stopper as a supplementary closing means for the bottle, flask or like receptacle.

3. In a valve system for closing bottles, flasks or like receptacles, the combination with a valve seat or combined ring fixed within the neck of a bottle, a plurality of tubular cells or compartments of a convenient shape, a valve fitting into the seat above said cells, a small tube passed through said valve into the central cell serving as guide for

said tube in combination with the valve in its reciprocating movement of opening and closing the seat, a protector tube for said small tube, held in position by its connection with two funnels of cone shaped elements, the walls of which are provided with a plurality of hidden apertures formed by horizontal notches turning the upper edges thereof in the upper funnel and the lower edges thereof in the lower funnel together with the adjacent parts of the walls inwardly, said upper funnel or cone shaped element having an elongated cylindrical part destined to be bent and compressed over the rim of the bottle neck, so that it remains inseparably fixed thereto, said elongated part being adapted to receive a cork or stopper as a supplementary closing means for the bottle, flask or like receptacle.

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