

Dec. 27, 1960

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2,965,907

SANITARY SUCTION CUSPIDOR

Filed April 24, 1959

FIG. 1.

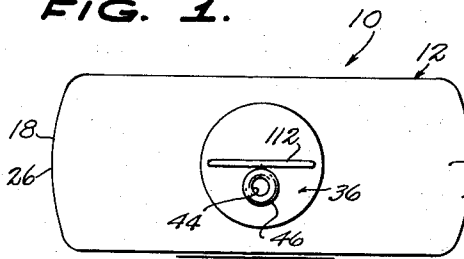


FIG. 2.

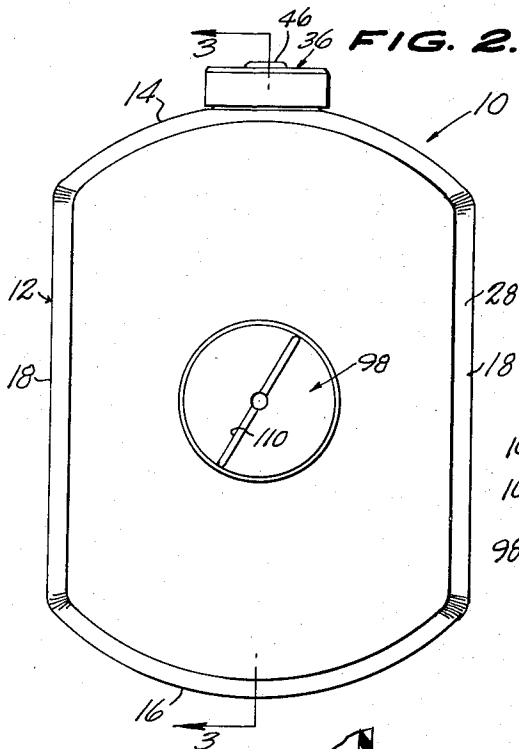


FIG. 4.

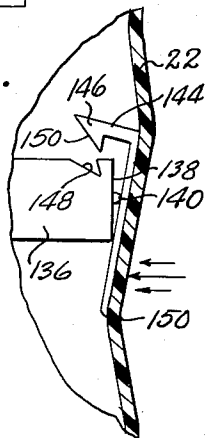
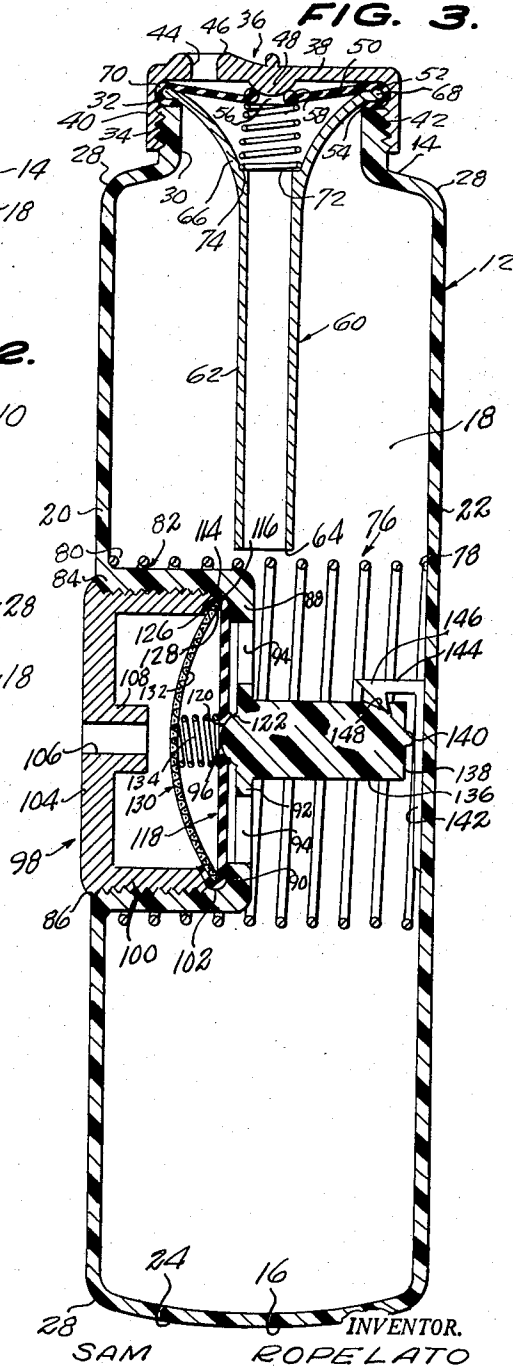


FIG. 3.



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2,965,907

SANITARY SUCTION CUSPIDOR

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Filed Apr. 24, 1959, Ser. No. 808,649

10 Claims. (Cl. 4-259)

This invention relates to a sanitary suction cuspidor.

The primary object of the invention is to provide an efficient and convenient device of this kind, which can be in a relatively small, compact, and portable form, as for carrying in a pocket or purse, and which provides suction removal of sputum from the mouth of the user, and sanitation of sputum deposited in the device, as by means of germicidal and deodorant material placed in the device, and positive sealing of the contents of the device against leakage.

Another object of the invention is to provide a relatively simple and easily cleaned device of the character indicated above in which spring means is provided to expand a sputum container in such a way as to produce a partial vacuum within the container which acts to suck sputum into the container through check valve means normally closing a sputum receiving opening, outside air being admitted into the container in concert with the spring expansion thereof through a normally closed check valve assembly which is screened to filter incoming outside air.

Other important objects and advantageous features of the invention will be apparent from the following description and the accompanying drawings, wherein, for purposes of illustration only, a specific form of the invention is set forth in detail.

In the drawings:

Figure 1 is a top plan view of a device of the invention;

Figure 2 is a side elevation thereof;

Figure 3 is an enlarged vertical transverse section taken on the line 3-3 of Figure 2; and

Figure 4 is a further enlarged fragmentary vertical transverse section showing the manner of disengagement of the latch hook from the latch stem.

Referring in detail to the drawings, wherein like numerals designate like parts throughout the several views, the illustrated device, generally designated 10, comprises a preferably vertically elongated, closed container 12, of generally rectangular horizontal cross section, and made of suitable relatively rigid but resilient material, either metal or molded plastic material. Alternatively, all of the container 10 can be of rigid material, with the exception of its opposed top and bottom, which are made flexible so as to be capable of being distorted or flexed toward and away from each other for producing the bellows action which sucks air and sputum into the container.

The illustrated form of container 10 has convex arcuate first and second end walls 14 and 16, respectively, which are preferably substantially rigid, similar straight and preferably parallel side walls 18 extending to and between the ends of the end walls, and normally flat and normally parallel top and bottom walls 20 and 22, respectively. The top and bottom walls 20 and 22 are flexible to be moved toward and away from each other and are preferably resilient so as to have inherent tend-

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encies to return to their flat parallel normal relation, after being flexed. For convenience and comfort in carrying and handling the container 10, the second end wall 16 is transversely rounded, as indicated at 24, as are the side walls 18, as indicated at 26, and as are the corners at the meetings of the walls, as indicated at 28. The second end wall 16 and the side walls 18, besides being rounded for the purpose stated, are preferably concavo-convex in cross sectional curvature, so as to endow it with some bendability, where needed, to accompany and facilitate the distortion of the top and bottom walls 20, 22.

Formed on and projecting outwardly from the center of said first end wall 14 is an open annular neck 30 of relatively large diameter as compared to the cross section of the container 10, and having an outer end 32, around which are formed external screw threads 34. A removable pan-shaped cap 36 has a web or top 38 and an annular flange 40 which has an internal screw thread 42 which is spaced from the web 38. The cap 36 is normally threaded on the neck 30, and has in its web 38 an eccentric sputum entrance opening 44 which is surrounded, on the upper or outer side of the web by an outstanding and rounded annular mouth 46. Formed centrally on the inward side of the web 38 is a hemispherical valve element 48.

A resilient circular diaphragm 50, which is larger in diameter than the interior of the cap 36, is removably engaged in the cap and has a rolled peripheral edge portion 52 which bears against the interior of the cap flange 40, between the screw thread 42 and the web 38, and which terminates in a radially inwardly extending annular free edge portion 54. The diaphragm 50 is formed with a single central opening 56 on and around which is an enlarged cylindrical cross section bead 58 which is on the side of the diaphragm facing the cap web 38, and which supplies the valve seat for the valve element 48.

A sputum conduit 60 comprises a relatively small diameter straight tube 62 having an open inner end 64, which reaches substantially to a centered and midlength point of the interior of the container 10, and an upper end which is flared into a funnel portion 66. The funnel portion 66 terminates at its wider outer end in a lateral annular flange 68 extending therearound, which is larger in diameter than the neck 30, and only slightly smaller in diameter than the cap flange 40. The funnel flange 68 enters the annular concavity 70 between the body of the diaphragm and its rolled edge portion 52, and the cap 36 is threaded on the neck 30 to a degree to compress together the free edge portion 54, the rolled edge portion 52, and the funnel flange 68, between the cap web 38 and the outer end 32 of the neck 30. This seals the cap 36 on the neck 30 and puts the diaphragm valve seat 58 forcibly against and around the valve element 48, with the diaphragm 50 flexed away from the cap web 38, and thereby under tension.

Where the use of a relatively thin diaphragm 50 is desirable, and/or to obtain more positive and reliable seating of the valve seat 58 on the cap valve element 48, a helical expanding spring 72 is provided and is compressed between the shoulder 74 at the meeting of the funnel portion 66 and the tube 62 of the conduit 60 and the facing side of the diaphragm 50 around its opening 56.

For expanding the container 10 to produce a partial vacuum therein, a relatively large diameter helical expanding spring 76 is provided in the container 10, which has a lower end 78 which bears against the container bottom wall 22, preferably at a central midlength location thereon, and a free upper end 80 which bears against a similar

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area of the container top wall 20. The upper end 80 of the spring 76 closely surrounds or is circumposed on a hollow cylindrical air valve housing 82 which extends downwardly from the container top wall 20 and at the open inner end 64 of the conduit 60.

The air valve housing 82 has an upper end 84 which is suitably fixed to or formed on the edge of a relatively large circular access opening 86 provided in the top wall 20. On its lower end the housing 82 is provided with an internal annular flange 88 having an upper side 90, and with a smaller cross section lower end wall 92, which is downwardly offset with respect to the upper side 90 of the flange 88. The end wall 92 is imperforate except for a suitable number of air holes 94 therethrough. On the upper side of the wall 92 is an upstanding hemispherical central valve element 96.

Removably threaded into the housing 82 from its upper end is a ported closure cap 98 which has a side wall 100 having a beveled lower end 102, and a web 104 on its outer end. The web 104 is imperforate except for a central air-escape port 106 which is surrounded by and communicates with the bore of a tubular boss 108 which is formed on and extends downwardly from the web 104, and which is axially spaced from the valve element 96. The cap 98 and the cap 36 are severally provided on their webs with outstanding transverse ribs 110 and 112, respectively, or other such suitable means to facilitate their being screwed into and out of place.

When the cap 98 is screwed home, its beveled lower end 102 is spaced from the upper side 90 of the internal cap flange 88, and positioned in the resultant groove 114 is the rolled edge portion 116 of another flexible and resilient diaphragm 118, having a central opening 120 and an annular bead seat 122, facing and for normal closure engagement with the valve element 96. Seated in the concavity of the rolled edge portion 124 of the diaphragm 118 and the free edge portion 126 thereof, is the peripheral edge 128 of a rigid, concavo-convex air screen 130, whose concave side 132 faces the diaphragm 118. The diaphragm 118, having atmospheric or outside air pressure against its upper side, coming through the port 106, is undistorted and unflexed in its closed position. Where, however, a relatively thin diaphragm 118 is used, or more positive closing thereof is desired, an expanding helical spring 134 is provided, and is compressed between the center of the concave side 132 of the screen 130 and the diaphragm 118 around its opening 120.

For holding the top and bottom walls of the container 10 in normal unexpanded parallel relation, as shown in Figure 3, releasable latch means is provided which comprises a stem 136, of relatively large diameter, which is fixed on or formed at its upper end on the center of the end wall 92 of the housing 82 and projects downwardly toward the container bottom wall 22. The stem 136 has a lower end 138 which is close to and spaced from the bottom wall 22, and is provided with a relatively small diameter rounded latch engaging boss 140. Suitably fixed along the upper side of the bottom wall 22 and extending to opposite sides of the stem 136 is a latch bar 142 having on one end a rigid right-angular, upstanding latch tongue 144 which reaches along a side of the stem 136 and has a tapered, downwardly angled pawl 146, directed toward, and normally engaged in a V-shaped detent notch 148 in the adjacent side of the stem 136 near its lower end 138.

In order to disengage the latch pawl 146 from the detent notch 148, it is necessary to apply upward pressure, while holding the top wall 20 stationary, to the bottom wall 22 at a point at the end of the latch bar 142 opposite the tongue 144, as indicated at 150, in Figure 4, so as to flex the wall 22 and the latch bar 142 upwardly, at an angle to tilt the latch pawl 146 out of the detent notch 148. This releasing of the latch means frees the spring 76 to push the container top and bottom walls away from each other. This produces a partial vacuum within the container 10 which acts to pull the diaphragm 50 down-

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wardly, and unseat the valve seat 58, and to suck air and sputum present in the opening 44 of the cap 30 into the container, through the diaphragm opening 56 and the conduit 60. Germicidal material (not shown) placed in the container 10 acts to sanitize and deodorize an accumulation of sputum therein, and such accumulation can be removed and the container easily and thoroughly cleaned, by removing the caps and the diaphragms.

The outside air drawn into the container 10 on release of the latch means and expansion of the top and bottom walls by the spring 76, must be vented from the container 10, in order to collapse the container to its normal form, against the tension of the spring 76 and re-engage the latch means. This venting is accomplished by the pressure of the air compressed in the container 10 by the collapsing action, against the diaphragm 118, through the holes 94, and against the resistance of the spring 134, whereby the diaphragm seat 122 is disengaged from the valve element 96, so that the trapped air passes through the screen 130 and to the exterior of the container through the cap port 106. The mesh of the screen 130 is fine enough to preclude the passage of sputum therethrough in volume, and germicidal material can be put in the space between the cap 98 and the screen 130 to further arrest, filter, and sanitize any sputum components which may pass through the screen 130.

As the top and bottom container walls are manually compressed or flexed toward each other to restore the normal form of the container and to set the device for another sputum intake operation, the angled cam surface 150 of the latch pawl 146 cams over the lower end 138 of the stem 136 until the pawl reaches and re-engages in the detent notch 148.

Although there has been shown and described herein a preferred form of the invention, it is to be understood that the invention is not necessarily confined thereto, and that any change or changes in the structure of and in the relative arrangements of components thereof are contemplated as being within the scope of the invention as defined by the claims appended hereto.

What is claimed is:

1. A sanitary suction cuspidor comprising a closed container having first and second end walls, side walls, and top and bottom walls, said top and bottom walls being flexible to be expandable away from each other, check valve controlled sputum entrance means on said first end wall, check valve controlled air venting means on said top wall, means within the container between and engaging said top and bottom walls for expanding the top and bottom walls away from each other to produce a vacuum within the container acting to open said sputum entrance means and draw sputum into the container and releasable latch means on the top and bottom walls and engageable with each other only in a normal and unexpanded condition of the top and bottom walls.

2. A sanitary suction cuspidor comprising a closed container having first and second end walls, side walls, and top and bottom walls, said top and bottom walls being flexible to be expandable away from each other, check valve controlled sputum entrance means on said first end wall, check valve controlled air venting means on said top wall, and means within the container between and engaging said top and bottom walls for expanding the top and bottom walls away from each other to produce a vacuum within the container acting to open said sputum entrance means and draw sputum into the container, and latch means within the container comprising latch components mounted on the top and bottom walls and engageable with each other only in a normal and unexpanded condition of the top and bottom walls, and means on a latch component carrying wall for releasing the latch means.

3. A sanitary suction cuspidor comprising a closed container having first and second end walls, side walls, and top and bottom walls, said top and bottom walls be-

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ing flexible to be expandable away from each other, check valve controlled sputum entrance means on said first end wall, check valve controlled air venting means on said top wall, and means within the container between and engaging said top and bottom walls for expanding the top and bottom walls away from each other to produce a vacuum within the container acting to open said sputum entrance means and draw sputum into the container, and latch means within the container comprising latch components mounted on the top and bottom walls and engageable with each other only in a normal and unexpanded condition of the top and bottom walls, and means on a latch component carrying wall for releasing the latch means, said expanding means comprising an expanding spring compressed between the top and bottom walls of the container.

4. A sanitary suction cuspidor comprising a closed container having first and second end walls, side walls, and top and bottom walls, said top and bottom walls being flexible to be expandable away from each other, check valve controlled sputum entrance means on said first end wall, check valve controlled air venting means on said top wall, and means within the container between and engaging said top and bottom walls for expanding the top and bottom walls away from each other to produce a vacuum within the container acting to open said sputum entrance means and draw sputum into the container, and latch means within the container comprising latch components mounted on the top and bottom walls and engageable with each other only in a normal and unexpanded condition of the top and bottom walls, and means on a latch component carrying wall for releasing the latch means, said expanding means comprising an expanding spring compressed between the top and bottom walls of the container, said releasing means comprising a flexible portion of the top or bottom wall on which one latch component is mounted to be moved out of engagement with the other latch component by flexure relative to said one latch component.

5. A sanitary suction cuspidor comprising a closed container having first and second end walls, side walls, and top and bottom walls, said top and bottom walls being flexible to be expandable away from each other, check valve controlled sputum entrance means on said first end wall, check valve controlled air venting means on said top wall, and means within the container between and engaging said top and bottom walls for expanding the top and bottom walls away from each other to produce a vacuum within the container acting to open said sputum entrance means and draw sputum into the container, said sputum entrance means comprising a tubular neck or opening through said one end wall, a cap having a web and an annular flange threaded on said neck, said web having a sputum entrance opening therethrough, a valve element on the inner side of said web, said neck having an outer end, a first flexible and resilient diaphragm having a free edge portion compressed between the cap web and the outer end of the neck, said diaphragm being imperforate except for a central opening provided therethrough opening to the interior of the cap and the interior of the container, said diaphragm having a seat on its outer side around its opening and normally in closure engagement with said valve element.

6. A sanitary suction cuspidor comprising a closed container having first and second end walls, side walls, and top and bottom walls, said top and bottom walls being flexible to be expandable away from each other, check valve controlled sputum entrance means on said first end wall, check valve controlled air venting means on said top wall, and means within the container between and engaging said top and bottom walls for expanding the top and bottom walls away from each other to produce a vacuum within the container acting to open said sputum entrance means and draw sputum into the container, said sputum entrance means comprising a tubular neck

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or opening through said one end wall, a cap having a web and an annular flange threaded on said neck, said web having a sputum entrance opening therethrough, a valve element on the inner side of said web, said neck having an outer end, a first flexible and resilient diaphragm having a free edge portion compressed between the cap web and the outer end of the neck, said diaphragm being imperforate except for a central opening provided therethrough opening to the interior of the cap and the interior of the container, said diaphragm having a seat on its outer side around its opening and normally in closure engagement with said valve element, and a sputum conduit extending into the container from within said neck, said conduit comprising a tube having an open inner end located centrally within the container and having a flared funnel portion on its outer end, said funnel portion having a larger end having a lateral annular flange thereon, said lateral flange being engaged between portions of said free edge portion of the diaphragm and being compressed therebetween.

7. A sanitary suction cuspidor comprising a closed container having first and second end walls, side walls, and top and bottom walls, said top and bottom walls being flexible to be expandable away from each other, check valve controlled sputum entrance means on said first end wall, check valve controlled air venting means on said top wall, and means within the container between and engaging said top and bottom walls for expanding the top and bottom walls away from each other to produce a vacuum within the container acting to open said sputum entrance means and draw sputum into the container, said sputum entrance means comprising a tubular neck or opening through said one end wall, a cap having a web and an annular flange threaded on said neck, said web having a sputum entrance opening therethrough, a valve element on the inner side of said web, said neck having an outer end, a first flexible and resilient diaphragm having a free edge portion compressed between the cap web and the outer end of the neck, said diaphragm being imperforate except for a central opening provided therethrough opening to the interior of the cap and the interior of the container, said diaphragm having a seat on its outer side around its opening and normally in closure engagement with said valve element, and a sputum conduit extending into the container from within said neck, said conduit comprising a tube having an open inner end located centrally within the container and having a flared funnel portion on its outer end, said funnel portion having a larger end having a lateral annular flange thereon, said lateral flange being engaged between portions of said free edge portion of the diaphragm and being compressed therebetween, and an expanding diaphragm closing spring positioned within said funnel portion of the sputum conduit, said funnel portion having a shoulder thereon and said closing spring being compressed between said shoulder and said first diaphragm.

8. A sanitary suction cuspidor comprising a closed container having first and second end walls, side walls, and top and bottom walls, said top and bottom walls being flexible to be expandable away from each other, check valve controlled sputum entrance means on said first end wall, check valve controlled air venting means on said top wall, and means within the container between and engaging said top and bottom walls for expanding the top and bottom walls away from each other to produce a vacuum within the container acting to open said sputum entrance means and draw sputum into the container, said air venting means comprising a tubular housing within the container, said top wall having an opening intermediate its ends, said housing having an open upper end registered with said opening and fixed to the top wall therearound, said housing having a lower end closed by a lower end wall having a centered valve element on its upper side, said lower end wall having air escape holes around said valve element, a flexible and resilient dia-

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phragm extending across said housing above said lower end wall and having a central opening therethrough, an annular valve seat on said diaphragm around said central opening normally in closure engagement with the valve element, a screen extending across said housing above said diaphragm, and a vented cap securably engaged in the upper end of said housing through the top wall opening and holding said screen and said diaphragm in place.

9. A sanitary suction cuspidor comprising a closed container having first and second end walls, side walls, and top and bottom walls, said top and bottom walls being flexible to be expandable away from each other, check valve controlled sputum entrance means on said first end wall, check valve controlled air venting means on said top wall, and means within the container between and engaging said top and bottom walls for expanding the top and bottom walls away from each other to produce a vacuum within the container acting to open said sputum entrance means and draw sputum into the container, said air venting means comprising a tubular housing within the container, said top wall having an opening intermediate its ends, said housing having an open upper end registered with said opening and fixed to the top wall therearound, said housing having a lower end closed by a lower end wall having a centered valve element on its upper side, said lower end wall having air escape holes around said valve element, a flexible and resilient diaphragm extending across said housing above said lower end wall and having a central opening there-through, an annular valve seat on said diaphragm around said central opening normally in closure engagement with the valve element, a screen extending across said housing above said diaphragm, and a vented cap securably engaged in the upper end of said housing through the

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top wall opening and holding said screen and said diaphragm in place, and a diaphragm closing spring compressed between the venting means diaphragm and such diaphragm.

10. A sanitary suction cuspidor comprising a closed container having first and second end walls, side walls, and top and bottom walls, said top and bottom walls being flexible to be expandable away from each other, check valve controlled sputum entrance means on said first end wall, check valve controlled air venting means on said top wall, and means within the container between and engaging said top and bottom walls for expanding the top and bottom walls away from each other to produce a vacuum within the container acting to open said sputum entrance means and draw sputum into the container, and latch means within the container comprising latch components mounted on the top and bottom walls and engageable with each other only in a normal and unexpanded condition of the top and bottom walls, and means on a latch component carrying wall for releasing the latch means, one of said components being a stem having a notch in one side and the other component with a latch bar fixed on the said carrying wall having a latch pawl engageable and disengageable with said stem and its notch.

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