March 2, 1971 K. B. CARLSON ET AL 3,566,418

SEPARATOR FLAP ASSEMBLY

Filed May 27, 1968

Fig. 1.

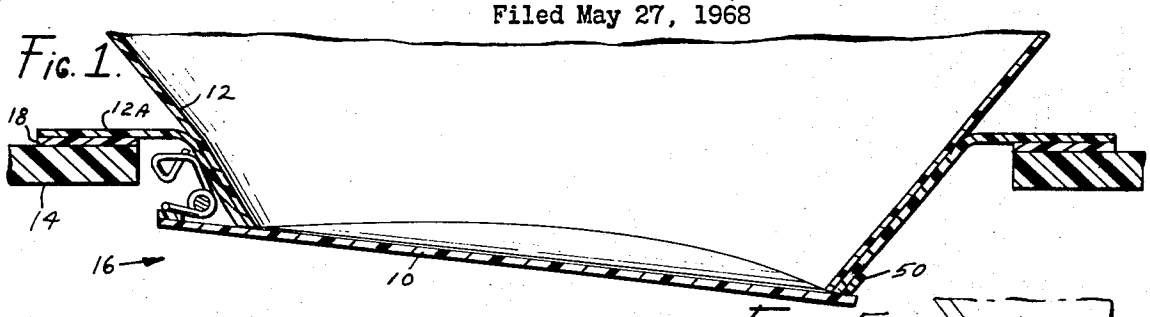


Fig. 2.

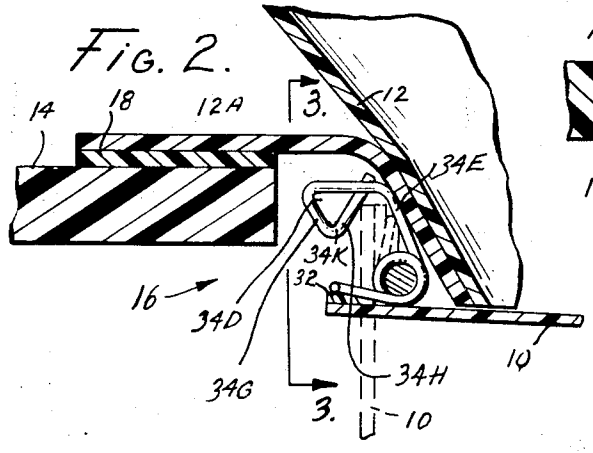


Fig. 5.

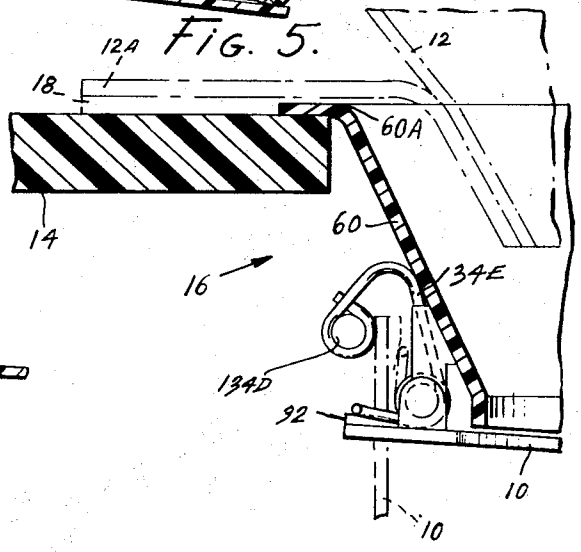
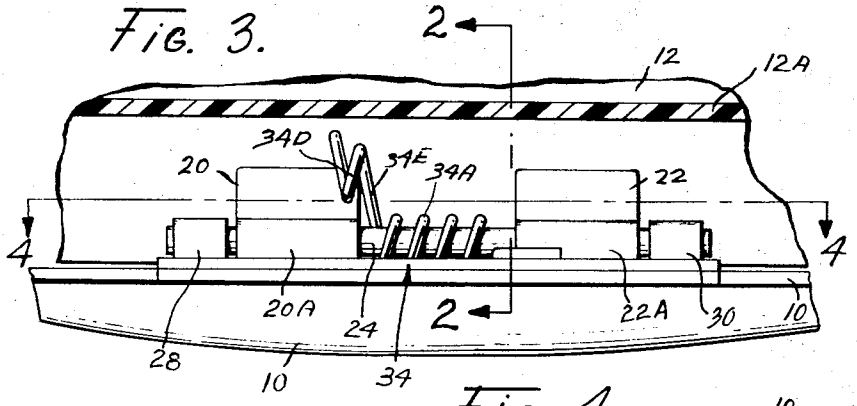


Fig. 3.



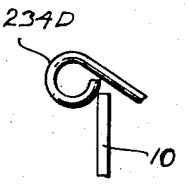
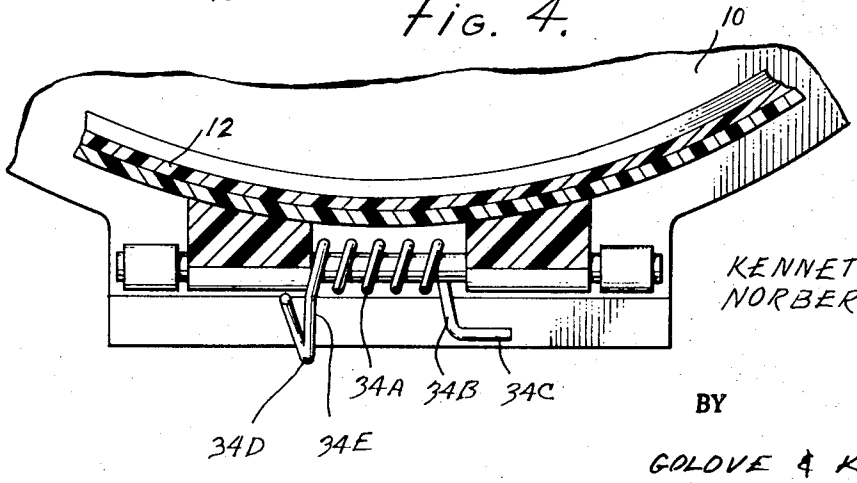


Fig. 6.

Fig. 4.



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3,566,418

SEPARATOR FLAP ASSEMBLY

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Int. Cl. E03d 11/10
U.S. Cl. 4—84 8 Claims

ABSTRACT OF THE DISCLOSURE

A toilet assembly involves a flushing bowl and a separator flap pivotally mounted and spring-urged near the lower end of such bowl to normally block the view into a lower, bottom tank. The flap is displaceable by flushing liquid to an open position during normal flushing operations and the spring then returns the flap automatically to closed position. For cleaning and other purposes the flap may be moved to an extreme open position, wherein it is automatically maintained in a latched condition by a specially constructed spring which, in addition, performs the other functions mentioned above.

The present invention relates to an improved toilet construction which is particularly useful in, for example, aircraft, trailers or other vehicles wherein it is desired to provide some baffle or flap between the flushing bowl and a lower bottom tank for the purposes of preventing direct view into the tank, preventing splash, or functioning as a sound transmission baffle on those toilets wherein multiple bowls share a common tank. Preferably, the baffle or flap should give the appearance of an open configured separation, when viewed from above.

It is therefore a general object of the present invention to provide a novel separator or baffle-flap which is simple in construction and which allows the baffle-flap to be maintained in a fully open position for purposes of, for example, cleaning of and access to the bottom tank and in some cases also for providing a slosh baffle.

Another specific object of the present invention is to provide an arrangement of this character using a specially constructed spring which provides for a simplicity in construction with a small number of parts that are easily assembled for these multiple purposes.

The features of the present invention which are believed to be novel are set forth with particularity in the appended claims. This invention itself, both as to its organization and manner of operation, together with further objects and advantages thereof, may be best understood by reference to the following description taken in connection with the accompanying drawings in which:

FIG. 1 is a view in cross-section of an assembly embodying features of the present invention;

FIG. 2 shows in enlarged form a portion of the structure shown in FIG. 1 and is generally a view taken in the direction indicated by the arrows 2—2 in FIG. 3;

FIG. 3 is a view taken as indicated by the arrows 3—3 in FIG. 2;

FIG. 4 is a view taken as indicated by the arrows 4—4 in FIG. 3;

FIG. 5 is a view like FIG. 2 but of a modified construction;

FIG. 6 is yet an alternative embodiment of a latching member.

In the drawings, a preferred embodiment is illustrated which includes a movable separator or flap **10** having a general circular configuration with a drain slope. The flap **10** may be made of various materials including, for example, metal, plastic or rubber and is pivotally mounted with respect to the lower discharge end of a conventional flush bowl **12** which is fastened to the top cover member **14** of a conventional aircraft toilet tank **16**. The flap **10** is provided with a generally concave contour so that when polished, the illusion of an open-type separator or baffle is created.

The flush bowl **12** has secured thereto a conventional annular flange member **12A** and the assembly **12, 12A** is secured to the tank cover member **14** with an annular sealing gasket **18** therebetween.

Secured to the lower portion of bowl **12** as seen in FIGS. 3 and 4 are a pair of spaced bracket members **20, 22** each formed with a circular portion **20A, 22A** respectively through which a circular shaft **24** extends. However, this construction, while employed in the preferred embodiment, is a matter of design choice and other arrangements can be provided for hingingly mounting the flap **10** with respect to the bowl **12** and the tank **16**.

As shown, this shaft **24** extends also through a pair of circular bracket members **28, 30** which are secured to flap **10** and which are also secured to shaft **24**. A generally flat tapered strip **32** may also be secured to flap **10** so as to provide a bearing surface for one end of a specially wound prestressed coil spring **34** disposed between circular bracket portions **20A, 22A** and also to provide a wear-resistant edge for engagement with the spring loop portion **34D** as described later.

Spring **34** has a central helical portion **34A** extending around shaft **24** and an end portion (which engages strip **32**) of generally L-shaped configuration comprising a radially extending portion **34B** and an axially extending portion **34C**. The other end of spring **34** is of particular special construction and includes a loop portion **34D** on an intermediate radially extending portion **34E** which spaces the loop portion **34D** away from the helical portion **34A** in both the radial and longitudinal directions and which bears against the bowl flange portion **12A**.

The loop **34D** as in FIG. **2** may be of generally triangular configuration with two legs **34G, 34H** thereof forming cam surfaces and meeting to define an apex portion **34K** which is engageable with the strip **32** on flap **10** when and as the flap **10** is moved from its closed full line position in FIG. 2 to its dotted line position. Instead of being triangular configuration as shown in FIG. 2, the loop **34D** in alternative embodiments may be of generally circular configuration as in the modified loop construction **134D** in FIG. 5 or loop **234D** in FIG. 6.

In operation of the arrangement shown in FIGS. 1–4 the flap **10** is normally held in its closed condition shown in full lines by the prestressed coil spring **34** having one of its ends bearing on plate **32** on flap **10** and the other one of its intermediate end portions **34E** bearing on the bowl assembly **12, 12A**. To prevent rattle and provide stability, a bumper **50** of rubber or other material may be mounted on the lower edge of the assembly **12**.

During normal flushing operations, the contouring of the flap **10** promotes drainage and the weight of matter to be stored in the tank **16**, which may be a flushing liquid on flap **10** is sufficient to overcome the action of spring **34**, whereupon the flap **10** moves to an open position to allow passage of such flushing liquid. After the flushing operation, the spring **34** returns the flap **10** to its closed condition shown in FIG. 1.

It will be appreciated that the flap **10** is contoured and shaped so as to allow some drainage even in its held closed condition or to normally provide a good odor seal and water trap. Further, the contouring and shaping is accomplished with the additional aim of providing to an observer immediately above the flap **10**, the illusion that the flap is part of an "open" system.

In those instances where it is desired to maintain the flap in a fully opened and latched condition as, for

example, for purposes of cleaning or in stationary or static installations, or under circumstances where it is desired to use the flap as a vertically extending slosh baffle, the flap **10** is moved manually against the action spring **34** so that the plate and flap assembly **32, 10** move past the apex portion **34K** of the resiliently mounted loop **34D**. In such movement the plate **32** engages the leg **34G** and moves the loop **34D** upwardly out of the path of movement of plate **32** and then the loop **34D** returns to its normal position shown in full lines in FIG. 2 to retain the flap **10** in its open or dotted line position shown in FIG. 2. To again close the flap **10**, manual force is required to move the assembly **32, 10** past the apex **34K** in which case the triangular leg portion **34H** serves as a cam surface. A lesser force may be used to close the flap than to open it, particularly since during closing the intermediate portion **34E** of the spring **34** is free to become disengaged from its normal engagement with the bowl assembly **12, 12A**.

In the modification shown in FIG. 5, instead of the flap **10** being directly mounted on the bowl assembly **12, 12A** as in FIG. 2 the same may be directly mounted at a lower position in the tank **16** on an added tubular support **60** which is retained by its annular flanged portion **60A** on tank cover member **14**.

In this case the intermediate spring portion **34E** bears against support **60** and the movable end portion of spring **34** is now in the form of a circular loop **134D** engageable with the flap assembly **32, 10** in the manner previously described whereby such assembly may be moved to and from its closed dotted line position shown in FIG. 5 by applying sufficient manual force to the assembly **10, 32** to cause the spring loop **134D** to move out of the path of movement of the assembly **10, 32**.

An alternative spring loop **234D** is illustrated in FIG. 6 and can be substituted for the triangular loop **34D** of FIG. 2. Yet other embodiments will be apparent to the skilled designer.

We claim:

1. For use in combination with a tank having a cover member and a support mounted on the cover member and extending inwardly into the tank;

(a) a flap member, pivotably mounted with respect to the cover member at or near the inward end of the support for closing the access to the tank;

(b) pivoting means including a pivot pin and alignment apertures on said flap and the support connecting said flap member to the cover member; and

(c) prestressed biasing means mounted between said flap member and the cover member for maintaining said flap member in a normally closed position, said biasing means including a prestressed coil spring

encircling said pin, said spring having a generally cylindrical portion encircling said pin and having one of its ends extending generally radially outwardly and bearing against said flap member, the other end of said spring having a loop portion formed therein which is spaced from said cylindrical portion by an intermediate radially extending portion, said intermediate portion bearing against the support, said loop portion being in the path of movement of an edge portion of the flap when and as it is moved to its fully open position and being cammed upwardly out of said path by said edge in continued movement toward said fully opened position, said loop portion being resiliently supported by said intermediate portion such that it automatically returns to its downward position to releasably maintain said flap in a latched fully open position.

2. Apparatus as in claim **1**, wherein said flap member has a dished, concave shape extending inwardly into the tank to provide the visual impression, when viewed from above, of an open-type separator.

3. A construction as set forth in claim **1**, in which said support is a toilet flush bowl.

4. A construction as set forth in claim **2**, in which said support is an auxiliary support extending down below a toilet flush bowl, said auxilliary support and toilet flush bowl being mounted on the tank cover member.

5. A construction as set forth in claim **1**, in which said flap is of plastic material and has a metal portion mounted thereon for engagement with said loop portion.

6. A construction as set forth in claim **1**, in which said loop portion has an apex portion contacted by said flap.

7. A construction as set forth in claim **1**, in which said loop portion has a circular portion contacted by said flap.

8. A construction as set forth in claim **1**, wherein a resilient bumper portion is interposed between said flap and an edge of the support, in the closed position of said flap.

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U.S. Cl. X.R.

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