Jan. 11, 1966 G. C. CURRIE 3,228,040

ADDITIVE FEEDING MEANS

Filed May 15, 1961

Fig. 1

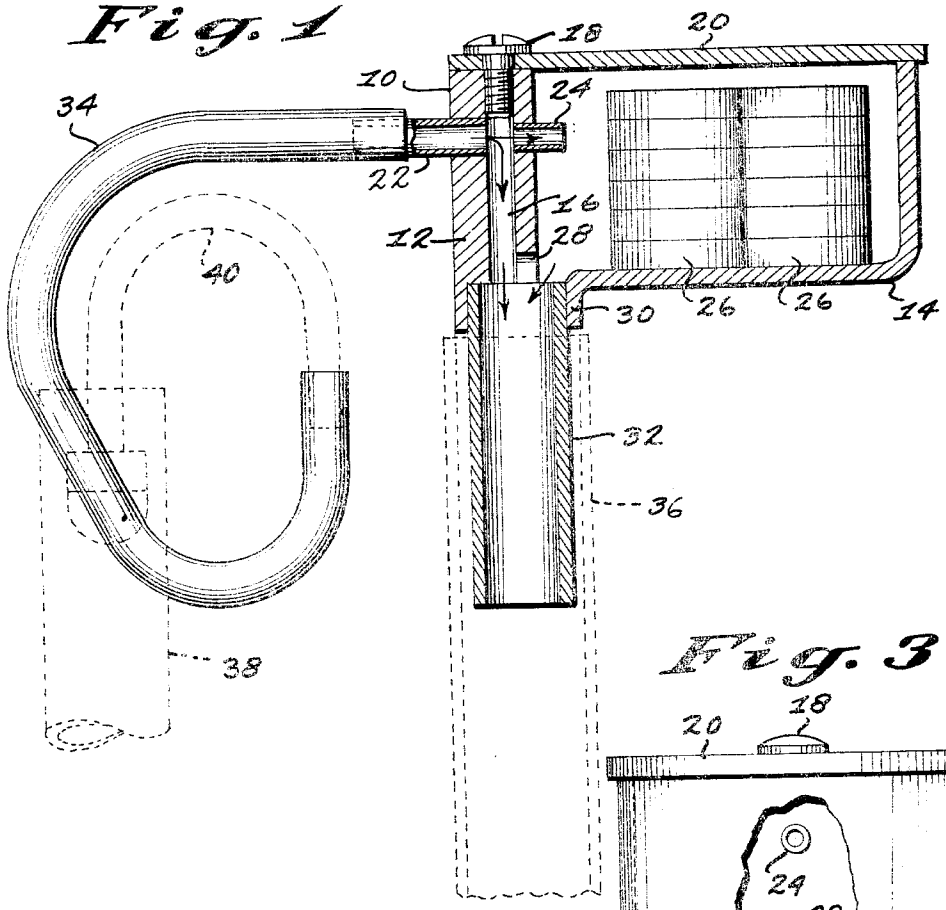


Fig. 3

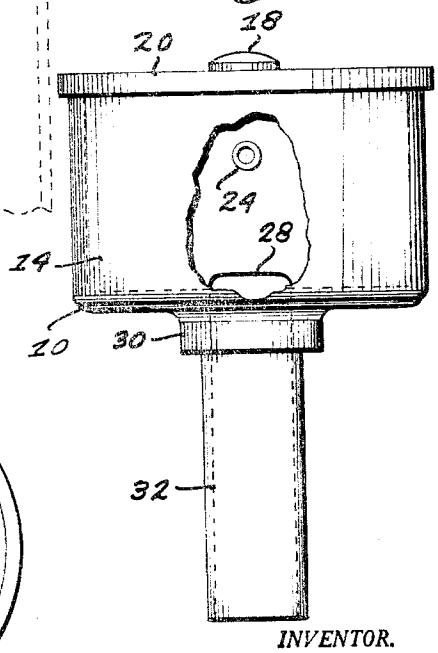
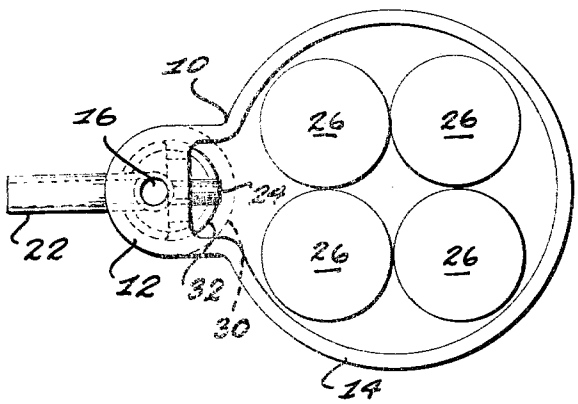


Fig. 2



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ADDITIVE FEEDING MEANS

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This invention relates generally to additive feeding means of the type operating to add a modifying supplement to a main stream of liquid in proportion to the flow of the main stream, and more particularly to means of this sort that is uniquely adapted for additive feeding to an intermittently flowing main stream.

A familiar example of intermittent main stream flow is found in the operation of a toilet flushing mechanism which commonly incorporates an overflow standpipe and an associated refill tube for delivering refill water through the stand pipe to the toilet bowl upon each occasion of flushing, and the additive feeding means of the present invention may be employed to excellent advantage for regularly adding a solute supplement to the refill water upon each operation of the flushing mechanism so as to maintain the toilet bowl clean and continuously deodorized; all as described in further detail below in connection with the accompanying drawings, in which:

FIG. 1 is an illustration, mainly in vertical section, indicating the installed arrangement of an additive feeding means embodying the present invention;

FIG. 2 is a top plan view of the device shown in FIG. 1, without the connection for delivery of refill water thereto, and with the cover for the body member thereof removed; and

FIG. 3 is a side elevation of the FIG. 1 device as seen from the right in FIG. 1.

The illustrated embodiment of the present invention, as seen best in FIG. 1, comprises a body member **10** formed with a conduit portion at **12** and a storage chamber portion at **14**.

The conduit portion **12** is characterized in particular by a downwardly opening passageway **16**, that may have the top end thereof closed conveniently by a pivot screw **18** provided for securing a cover **20** in place over the storage chamber portion **14**. In addition, the conduit portion is arranged with a delivery conduit **22** communicating from the exterior of the body member **10** with the upper end of the passageway **16**, and with a diversion conduit **24** branching adjacently from the passageway **16** to the storage chamber portion **14**. Both the delivery conduit **22** and the diversion conduit **24** are preferably formed by tubular fittings inserted in the conduit portion **12** to extend therefrom, respectively, at the exterior of the body member **10** and the interior of the storage chamber portion **14**, for a purpose that will appear presently.

The storage chamber portion **14** is shaped appropriately for containing a solid state supply of the material from which the desired solute supplement is to be formed for additive feeding; a representative stacked arrangement of circular cakes of such material being indicated at **26** in FIGS. 1 and 2. Alternatively, the solute forming material might be in pellet or flake or powder or any other solid state form, as might be most conveniently supplied to and handled in the storage chamber portion **14** in particular instances.

It has already been noted above that the storage chamber portion **14** is provided with a cover **20** that is positioned by a pivot screw **18**, which allows sidewise displacement of the cover **20** for opening while tending to maintain it at a closed covering position by suitable tightening. Additionally, the storage chamber portion **14** is formed with a drainage opening adjacent the lower end of the passageway **16** that opens downwardly

from the conduit portion **12**. As shown in the drawings, this drainage opening is formed in the illustrated embodiment both by notching the adjacent wall of the conduit portion **12**, as indicated at **28**, and by shaping the lower face of the body member **10** beneath the conduit portion **12** with a depending circular flange **30** that is proportioned in diameter so that a segment of its cross section also extends into the area of the storage chamber portion **14**.

At the depending circular flange **30**, a discharge tube fitting **32** is seated to receive downward flow from the conduit portion passageway **16** and drainage from the storage chamber portion **14** as well; and the discharge tube **32** also serves the purpose of locating the body member **10** in operative position as will be noted further just below. Finally, the illustrated additive feeding means of the present invention is equipped with a suitable delivery connection means **34**, such as a length of flexible tubing that may be installed on the delivery conduit fitting **22** which is extended exteriorly of the body member **10**, as previously mentioned, for this purpose.

As thus constituted, the illustrated additive feeding means is particularly adapted for operative installation in association with a toilet flushing mechanism, as already noted above. The arrangement of such an installation is indicated in FIG. 1, in which the upper end portion of a toilet tank overflow standpipe is represented in dotted lines at **36**, while the flushing water supply pipe is similarly represented at **38** with a conventional gooseneck refill tube extending therefrom at **40**. The refill tube **40** is often associated with the float controlled ballcock valve (not shown) that is usually installed at the top of the supply pipe **38** for regulating the flow of water to replenish the tank supply at each flushing operation, and the refill tube **40** is normally arranged to discharge in the upper end of the standpipe **36** to deliver thereto a sufficient quantity of water to insure refilling of the toilet bowl after each flushing operation.

When the additive feeding means of the present invention is used, however, the refill tube **40** is displaced from the upper end of the standpipe **36**, and the discharge tube **32** of the additive feeding means is inserted thereat instead, while the flexible tubing **34** installed on the delivery conduit fitting **22** is likewise installed on the displaced refill tube **40**, so that the additive feeding means is then interposed between the refill tube **40** and the standpipe **36**.

Thereupon, each flushing operation results in directing the refill water through the delivery conduit **22** to the downwardly opening passageway **16** of the feeding means, and such delivery in turn results in bleeding a portion of this refill water through the branching diversion conduit **24** for extracting contact with the solute forming material **26** in the storage chamber **14**, from which this extracting portion of the refill water, together with the solute borne thereby, will drain to the discharge tube **32** at which it is returned to the main stream of refill water flowing downwardly from the passageway **16**, so that a thus extracted solute supplement is added to the refill water regularly for delivery to the toilet bowl after each flushing.

In order to direct the diverted extracting portion of the refill water effectively into contact with the solute forming material **26**, the diversion conduit fitting **24** is preferably extended suitably into the storage chamber **14**, as previously mentioned; and the relative orifice size of the diversion conduit **24**, as compared with the size of the passageway **16**, may be readily proportioned for obtaining the extracting flow of diverted refill water through the chamber **14** in any desired or required quantity.

As to the solute forming material **26** that is used, a wide field of selection is available. The material selected must, of course, be water soluble for the presently de-

scribed purpose; and, as the aim in this instance is to provide for automatically cleansing and deodorizing a toilet bowl as an incident of its flushing, the material should be selected for its effectiveness in these respects. Otherwise, a wide variety of detergents, soaps, germicides, bactericides, and aromatic scents and the like may be used as a matter of choice.

The present invention has been described in detail above for purposes of illustration only, and is not intended to be limited by this description or otherwise except as defined in the appended claims.

I claim:

1. Means for additive feeding of a water soluble solute supplement to the toilet bowl refill water supplied by a toilet flushing mechanism of the type incorporating an overflow standpipe and an associated refill tube for delivering refill water to said standpipe upon each occasion of flushing, said additive feeding means comprising a body member having a conduit portion and a storage chamber portion, the conduit portion of said body member being formed with a downwardly opening passageway having a delivery conduit communicating from the exterior of said body member with the upper end of said passageway and a diversion conduit branching adjacently from said passageway to said storage chamber portion, and the storage chamber portion of said body member being formed to contain a solid state supply of material to form said solute supplement and having a drainage opening adjacent the lower end of said passageway, a discharge tube fitted in said body member to extend downwardly therefrom and to receive both the flow from the lower end of said passageway and the drainage from said storage

chamber opening, said discharge tube being proportioned for insertion at the upper end of said overflow standpipe to support said additive feeding means thereat in place of said refill tube, and means for connecting said refill tube with said delivery conduit, whereby an extracting portion of said refill water is diverted from said passageway through said storage chamber portion for draining return to add said solute supplement to the refill water flow upon each operation of said flushing mechanism.

2. Means for additive feeding as defined in claim **1** and further characterized in that said diversion conduit is proportioned in relation to said passageway for obtaining a flow of the extracting portion of said refill water through said storage chamber portion in a desired quantity.

3. Means for additive feeding as defined in claim **1** and further characterized in that the material for forming said solute supplement comprises a cleansing and deodorizing composition.

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