

R. B. STROUT ET AL

# FREEZE PROTECTION DEVICE FOR TOILET BOWL TRAPS

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## FREEZE PROTECTION DEVICE FOR TOILET BOWL TRAPS

Russell Brown Strout and John William Harrison,  
Winchester, Mass., assignors to Lowry Develop-  
ment Corporation, Winchester, Mass., a corpora-  
tion of Massachusetts

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4 Claims. (Cl. 4—1)

This invention relates to winter protection for toilet bowls and more particularly to a portable re-usable device that may be quickly installed in toilet bowls which are destined to exposure to freezing temperatures and may be readily removed therefrom without awaiting thawing.

A disagreeable task of summer cottage owners in northern latitudes is the preparation of the plumbing facilities for vacant unheated winter survival without damage from bursting pressures exerted during freezing of any included water. Particularly in these days of skiing, it is a common occurrence for such cottages to be unheated all week but repeatedly opened on successive week-ends throughout the winter season. Complicated or time-consuming protection procedures then become a real nuisance.

While most water lines can be drained by opening conveniently located drain plugs, toilet bowl traps are not so provided. If they are hand-pumped out to dryness, they defeat their purpose of preventing inflow of sewer or septic tank gases into the building. Addition of liquids having low freezing points to the water in the traps is costly, particularly when it has to be done twenty or thirty times a winter with successive week-end opening and closings of the cottage, and this procedure is not always secure for longer periods because of the volatility of most of the low temperature freezing liquids such as alcohol. Nor are they desirable additions in quantity to septic tanks.

Objects of the invention thus include the provision of an inexpensive means for protecting toilet bowl facilities despite freezing temperatures and without possibility of gas leakage, which is quickly made operable, quickly removed without thawing and repeatedly re-usable and without resulting in undesirable addition to septic tanks.

To accomplish these objects, a removable plug is utilized which may be inserted into the bowl and trap to displace most of the water normally present in an unfrozen toilet bowl and trap, but the plug is of such nature that if ice subsequently forms around it by reason of the presence of undisplaced remaining water, it will be compressed by the expansive force accompanying freezing of the water and relieve the rigid walls of bursting pressure. The presence of the ice insures that, with the plug, a gas block will be maintained. In addition the device is of such nature that it will contract in cross-section when elongated so, if frozen to the surrounding walls, when the device is pulled outwardly it will contract and free it from the intervening layer of ice not by sheer as much as by delamination, and progressively inwardly of the trap.

A device of the invention and its mode of installation in a toilet bowl is illustrated in the accompanying drawings wherein:

FIG. 1 is a cross-sectional view of a typical toilet bowl having a device of this invention in freeze protection position in the underlying trap;

FIG. 2 is a perspective view of the device of this invention prior to insertion in the toilet bowl;

FIG. 3 is a plan view of the device shown in FIG. 2; and

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FIG. 4 is an enlarged fragmentary view showing a modification of the structure of the device shown in FIG. 2.

FIG. 1 illustrates a typical toilet bowl in cross-section having walls forming a bowl 20, into which flush water flows through inlet 22. The bowl communicates with an outlet 24 through an interposed curved drain or trap provided by the oppositely facing lips 26 and 28, the latter forming in effect a dam to trap water at a normal level indicated in the drawings by the dotted line 30, above the bottom of lip 26 thus providing a water seal against escape of gases accumulating beyond the trap, back into the bowl.

It is this pool of trapped water which can cause damage to the installation if allowed to freeze and, in any event, requires substantial time to thaw if it is frozen solid.

A plug of this invention is shown prior to use in FIG. 2. It includes a molded block of elastically stretchable and compressible foam which has on its proximal end a head 40 of exterior bowl-shape contour merging into an elongated distal portion 42. Preferably the material is a foam of the closed cell type having an external thin smooth skin resulting from the molding operation and can be conveniently made from silicone rubber foam or other rubber or plastic foam. The material contracts in cross-section when stretched, similar to a rubber elastic band, particularly in its elongated portion.

The head is provided with a suitable handle 44 which may be a rigid dowel or a flexible strap or lacing whose ends are anchored in the head and which extends across a recess 46.

The plug is shown installed in the toilet bowl in FIG. 1. After the source of water supply has been turned off and the tank normally connected to the inlet 22 to the bowl has been drained by continual flushing of the toilet to remove all water except that remaining in the trap, the plug is inserted in the bowl pushing most of the water in the trap pool over lip 28 and down the drain outlet. Some water remains at the interface between the plug and the surrounding walls. However, when such water freezes, any expansion is accommodated by an equivalent compression of the plug. Whether present as water or as ice, this surrounding medium with the plug bars escape of gases.

If it is desired to place the frozen bowl back into operation before thawing the ice, for example before the cottage heating system becomes effective, the plug may be readily released by grabbing the handle and pulling, freeing it from any ice in the bowl surrounding the head and then progressively any ice surrounding the elongate portion as it contracts due to elongation. The greater the pull the more the contraction of the plug and the greater the separation force. The major requirement is that the material have more coherence than its adherence to the ice layer surrounding it. For this reason, the plug may be reinforced with fibers or other materials so long as they do not interfere with contraction upon stretching. Thus the plug can be wrapped in a coarse bias woven knit, braided net or with spirally wound yarns, as shown in FIG. 4 at 50, which can be overcoated with a finishing smooth extensible coating 52, both of which have exaggerated thickness in FIG. 4. When the plug is stretched, such a fabric will not initially resist contraction because of its bias configuration with respect to the pulling direction.

External plug coatings, such as of silicone, Teflon or other non-wettable materials which reduce the specific adhesion of ice are also useful. Oftentimes considerable amounts of such silicone anyway remain on the skins of molded foam articles when such silicones or other non-wettable materials are used in molds as parting agents.

It is also contemplated that one or more small grooves may be molded in along a side surface of the device in order to permit water in the bowl above the head to drain down into the trap.

As can be understood, the device supplies a real need from a standpoint of expense, convenience and reliability.

What is claimed is:

1. In combination with a conventional toilet bowl having a curved drain leading to an outlet pipe, said drain providing a water trap for said bowl, a freeze protection device comprising an elastically compressible plug of stretchable material having an externally bowl-shaped proximal head portion seated against the lower surface of said bowl and merging into an elongated distal portion filling, in conjunction with surrounding water, said waste trap to block said trap against free escape of outlet pipe gases, a handle on said head portion, said material yieldingly accommodating freezing expansion of any water surrounding said plug at the interface between said plug and said bowl and trap, and any ice formation sticking said plug thereto being separable progressively from the proximal to the distal end thereof as plug extracting forces are exerted through said handle on the proximal end causing said plug to progressively contract in cross-section as it is pulled from said bowl and trap.

2. A device for protecting toilet bowls and associated traps from freeze damage comprising an elastically compressible and stretchable plug member having a proximal

head portion of exterior bowl-shape contour, said head portion merging into an elongated distal portion of smaller cross-section adapted to be inserted into the curved drain forming a water trap beneath a toilet bowl, said plug contracting in cross-section when stretched, whereby said plug will compressibly absorb any expansion forces as ice forms in said bowl or trap around said plug, and an unplugging force applied to said plug will progressively contract said plug as it is elongated to separate said plug from any ice layer formed at the interface between said plug and the surrounding bowl and trap surfaces.

3. A device as claimed in claim 2, wherein the plug is a unitary molded closed cell plastic foam.

4. A device as claimed in claim 2, having a reinforcement of bias oriented yarns embedded beneath the surface of at least its distal portion.

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LAVERNE D. GEIGER, *Primary Examiner*.

H. K. ARTIS, *Assistant Examiner*.