

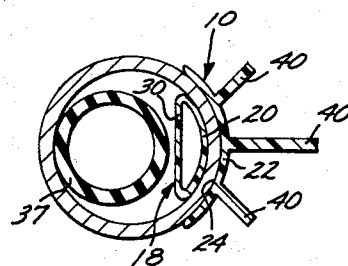
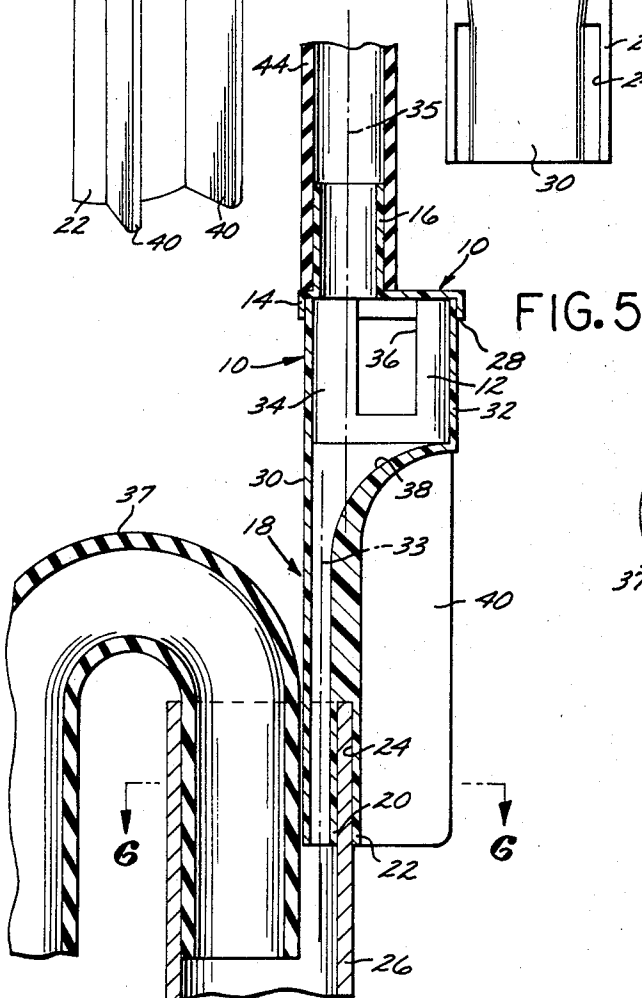
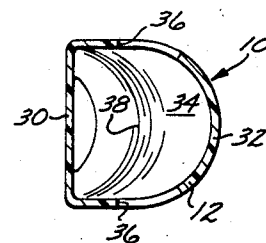
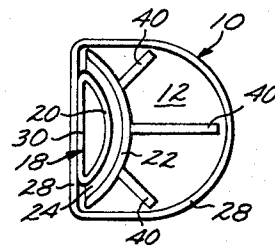
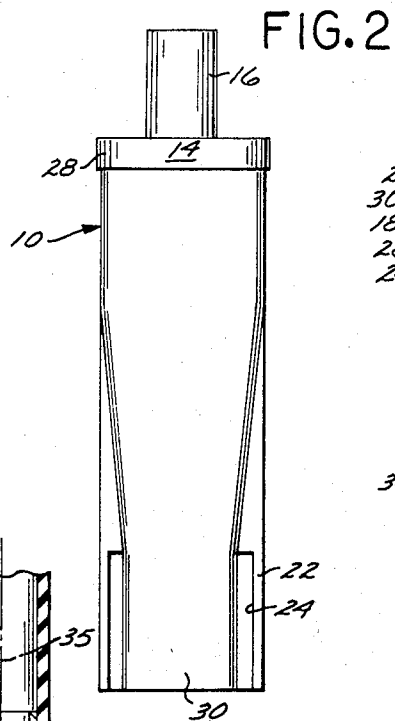
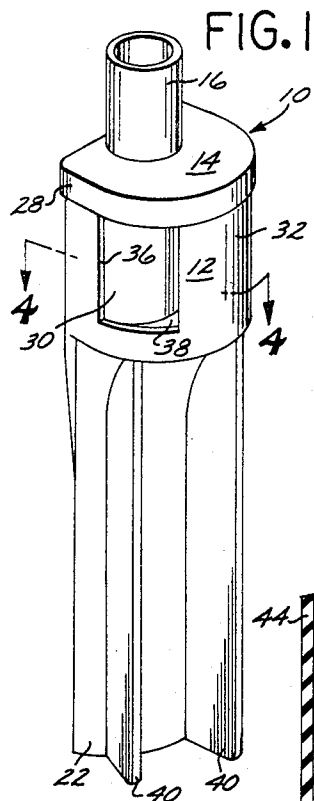
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3,411,524

VACUUM BREAKER

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3,411,524

VACUUM BREAKER

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The present invention relates to a vacuum breaker, and more particularly to a vacuum breaker which is adapted to be mounted upon the upper end of a usual drain standpipe.

It is common practice in the construction of residential structures to provide a vertically oriented discharge conduit or standpipe adjacent the laundry tray or washing machine area. With this arrangement the housewife can insert the end of the washing machine drain line in the standpipe to provide the necessary drainage of the machine. Occasionally, the homeowner also has a water softener or similar appliance which must also be periodically drained.

The usual one and one-half inch standpipe is ample to receive the conventional size washing machine discharge conduit, but is not quite large enough to take another line of the same size from the water softener. Consequently, in order to use the existing standpipe, and thereby avoid the expense of new plumbing, there has heretofore been provided specially designed vacuum breaker attachments which fit upon or otherwise adapt the existing standpipe to receive more than the one drain line. Such special fittings are relatively expensive, and often require installation by a plumber.

Accordingly, it is an object of the present invention to provide a vacuum breaker which is adapted to be quickly mounted upon the usual drain standpipe to fit within the space in the standpipe alongside a washing machine drain line or the like.

It is another object of the invention to provide a vacuum breaker of the aforementioned character which is made of relatively inexpensive plastic, and which includes walls defining an arcuate space adapted to receive a portion of the circular rim of the standpipe, one of the walls being deflectable to permit a wedging fit. No special threads are required on the standpipe, and no special attachments, fittings, or clips are needed to mount the vacuum breaker in position. The homeowner need only wedge the vacuum breaker upon the upper rim of the standpipe to secure it in position.

A further object of the invention is the provision of a vacuum breaker of the aforementioned character in which the deflectable wall thereof includes integral, elongated ribs for strength thereby permitting usage of inexpensive, thin wall construction.

Another object of the invention is to provide such a vacuum breaker having air gap openings for the breaking of any vacuum which might otherwise develop, and which further includes a gradually sloping ramp to direct the water radially inwardly of the centerline of the inlet passage.

Other objects and features of the invention will become apparent from consideration of the following description taken in connection with the accompanying drawings, in which:

FIG. 1 is a perspective view of a vacuum breaker according to the present invention;

FIG. 2 is a rear elevational view of the vacuum breaker of FIG. 1;

FIG. 3 is a bottom plan view of the vacuum breaker;

FIG. 4 is a cross-sectional view taken along the line 4-4 of FIG. 1;

FIG. 5 is a vertical cross-sectional view of the vacuum breaker mounted in position upon the usual standpipe,

alongside a conventional washing machine drain line; and FIG. 6 is a cross-sectional view taken along the line 6-6 of FIG. 5.

Referring now to the drawings, there is illustrated a vacuum breaker 10 which comprises, generally, a semi-cylindrical casing 12 having a complemental cap 14 surmounted by an integral stub pipe or conduit 16; a discharge portion 18 connected to the casing 12 and having a lower extremity characterized by an arcuate wall 20; and an elongated, arcuate skirt 22 connected to the casing 12 and spaced from the arcuate wall 20 to form a space 24, as best viewed in FIG. 3, whereby the vacuum breaker can fit upon a portion of the upper rim of a usual and conventional drain standpipe 26.

The vacuum breaker 10 is preferably made of high impact styrene or similar plastic. The cap is molded separately and includes a peripheral flange or lip 28 which overlies the upper rim of the casing 12. A suitable adhesive or solvent is applied to the casing and to the lip 28 to secure the cap 14 in position.

As best viewed in FIG. 4, the rear of the casing 12 is defined by a vertically oriented, flat wall 30 which extends downwardly the full length of the vacuum breaker 10 to also form the rear wall of the discharge portion 18. As will be seen, this wall could also be made concave if tooling costs permit.

The arcuate front of the casing 12 is formed by a forward or outer wall 32 which, together with the rear wall 30, defines an internal chamber 34 located directly beneath the conduit 16.

The casing wall 32 which defines the chamber 34 includes a pair of rectangular apertures or openings 36 to vent the chamber 34 to atmosphere and thereby break any vacuum which might otherwise form in the chamber. The transverse cross-section of the chamber 34 is made considerably larger than the cross-section of the conduit 16 to provide a fairly large chamber 34 for adequate venting. This, however, locates the centerline of the chamber outwardly of the centerline 35 of the conduit 16, and also outwardly of the edge or rim of the standpipe 26.

It is important to note that the main object of this invention is to provide a vacuum breaker 10 adapted to fit within a very small part of the standpipe 26. For example, in FIGS. 5 and 6 the standpipe 26 is illustrated with a usual washing machine hose 37 mounted in position for drainage. Only a very limited space is left in the standpipe to accommodate the discharge portion 18 of the vacuum breaker 10. It is for this reason that the discharge portion 18 is of segment shape. Of course, the rear wall 30 could be made concave to fit within the crescent shaped space available adjacent the hose 37, but a flat wall 30 is preferred for tooling simplicity.

In any event, there is not sufficient space available to merely extend the conduit 16 into the standpipe and it becomes necessary to provide a structure in which the circular cross-section of the conduit 16 can be modified to fit within the available space. In the vacuum breaker 10 this is done by locating the conduit 16 outwardly and redirecting the inflowing water from the conduit centerline 35 to a more inwardly located centerline 33 of the segment shaped discharge portion 18.

As best viewed in FIG. 5, water direction is accomplished by the floor or base of the chamber 34, which also forms a part of the discharge portion 18, as will be seen. The floor is faired or curved inwardly and downwardly to form a ramp or transition section 38 which is characterized by a gradually decreasing cross-section in a downward direction. The transition section 38 directs the water from the chamber 34 into the discharge portion 18 with minimum velocity loss in a concentrated stream of segment shape along the inwardly disposed centerline 33.

The segment shaped cross-section of the discharge portion 18 is formed by the rear wall 30 and by the arcuate wall 20. The wall 20 extends upwardly and then curves outwardly to form the floor of the casing 12. The outer face of the lower portion of the wall 20 is adapted to nest against the inner face of the rim of the standpipe 26 in close relation; as best viewed in FIG. 6.

The arcuate skirt 22, which is defined by molding the arcuate slot or space 24 in the wall 20, is adapted to engage the outer face of the standpipe 26 to mount the vacuum breaker 10 in position upon the standpipe. The slot or arcuate space 24 between the wall 20 and the skirt 22 also narrows or converges in an upward direction so that the vacuum breaker 10 can be wedged and thereby securely mounted upon the rim of the standpipe 26. Such wedging tends to deflect the skirt 22 outwardly.

Three vertically elongated, radially disposed fins or ribs 40 are integrally molded to the casing 12 and to the skirt 22 to strengthen the skirt during its deflection. The skirt 22, and the other components of the vacuum breaker 10 are preferably made of low cost, thin wall molded construction.

In use, the water softener or appliance hose, as indicated at 44 in FIG. 4, is slipped onto the conduit 16 in fluid tight relation. The vacuum breaker 10 is then forcibly mounted upon the standpipe 26 by wedging the upper rim of the standpipe within the space 24, as best viewed in FIGS. 5 and 6. The compact manner in which the discharge portion 18 fits within the standpipe 26 leaves ample room for the washing machine hose 37. The openings 36 provide the desired vacuum breaking action during discharge of water from the hose 44 into vacuum breaker 10, and the transition section 38 redirects the water from the center line 35 of the conduit 16 to the centerline 33 of the discharge portion 18.

By utilizing the relatively thin wall, plastic structure, the vacuum breaker 10 is light, easily handled, relatively inexpensive to manufacture, and characterized by a skirt 22 sufficiently strong to permit wedging of the unit onto the usual standpipe 26. No special fittings, attachment clips, or plumbing are therefore necessary to enable use of the existing standpipe 26 for drainage of more than one appliance, such as a washing machine and a water softener.

Various modifications and changes may be made with regard to the foregoing detailed description without departing from the spirit of the invention or the scope of the following claims.

We claim:

1. A vacuum breaker for connection in the discharge line of an appliance, water softener or the like, and mountable upon the upper end of a drain standpipe, said vacuum breaker comprising:

a casing including a chamber having air gap openings, said casing being adapted for connection to the discharge line of an appliance to receive liquid in said chamber;

a discharge portion depending from said casing for receiving liquid from said chamber, said casing and said discharge portion including a transition section therebetween having a curving surface for directing liquid flow inwardly, said discharge portion further having a wall adapted to fit against the inner surface of a standpipe in compact relation therewith; and

an elongated skirt located adjacent said wall and defining a space therebetween for receiving the upper end of the standpipe.

2. A vacuum breaker according to claim 1 wherein said casing includes an inlet for receiving said liquid along a substantially vertically oriented first centerline, wherein said discharge portion is vertically oriented and located to discharge liquid along a second centerline displaced inwardly of said first centerline, and wherein said transition section directs said liquid from said first centerline toward said second centerline.

3. A vacuum breaker according to claim 1 wherein said discharge portion is segment shaped.

4. A vacuum breaker according to claim 1 wherein said space between said wall and said skirt is arcuate and narrows upwardly whereby said vacuum breaker can be wedged onto said standpipe for secure mounting.

5. A vacuum breaker according to claim 4 and including elongated ribs attached to said wall for strengthening said wall during said wedge mounting of the vacuum breaker.

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