

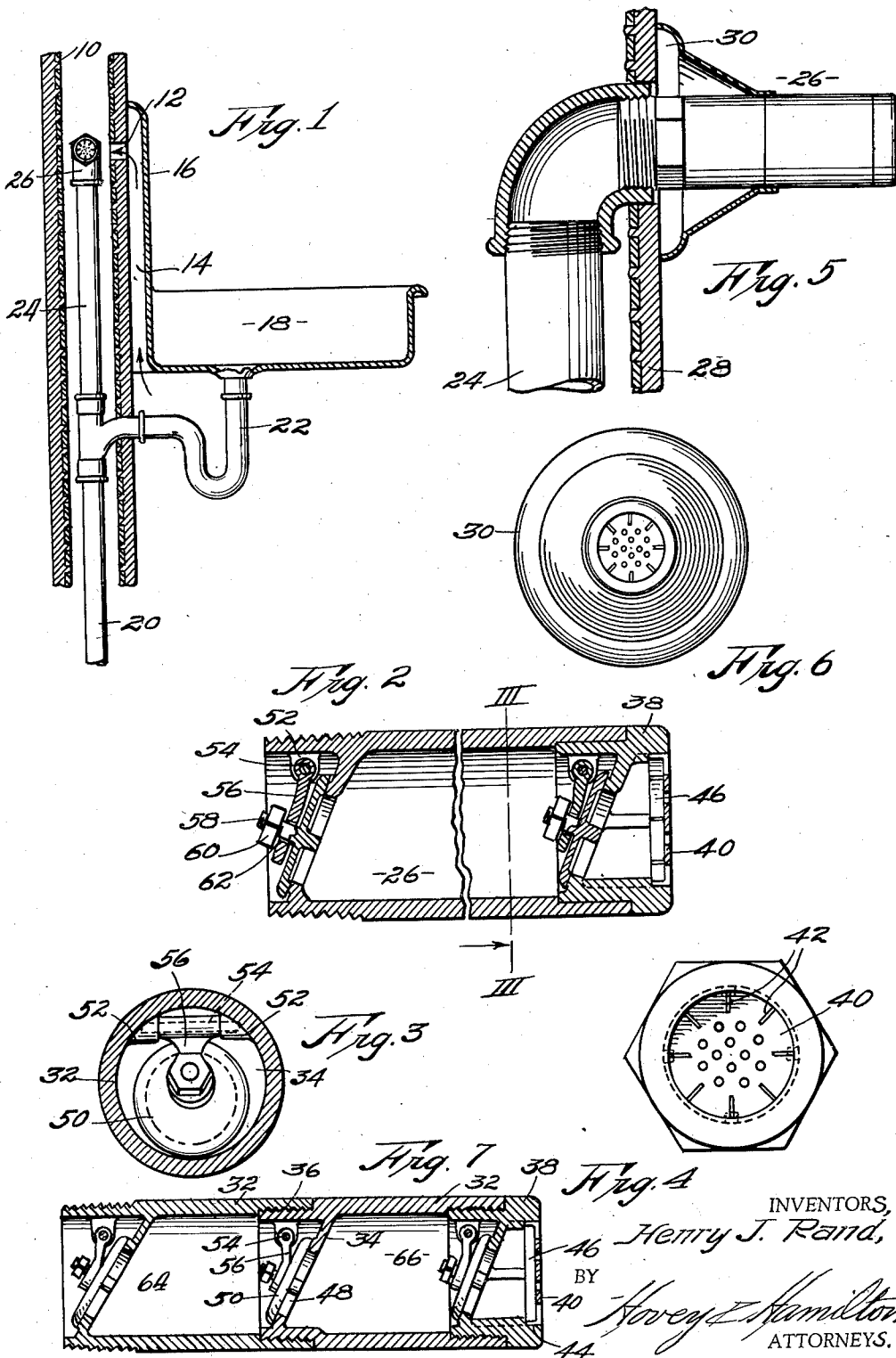
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MULTIPLE CHECK VALVE

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MULTIPLE CHECK VALVE

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7 Claims. (Cl. 4-211)

This invention relates to plumbing systems for buildings wherein is incorporated an air intake vent, and the primary object of the invention is to provide a check valve that will permit taking air from exteriorly of the building, whereby to supply the system when vacuums or suction are created therein for periodically using the plumbing system for the removal of waste from within the building.

One of the important aims of the instant invention is the contemplation of a multiple check valve usable as aforementioned and constructed to permit the introduction of air from within the building to the plumbing system, and yet to preclude the escape of objectionable, obnoxious gases from the plumbing system into the building.

Another object of this invention is to provide a combination of parts within a plumbing system that will allow the effective use of the check valve forming the major part of this invention with specially formed building walls and plumbing fixtures, all of which are assembled in a manner to allow disposing an intake air vent within the building to overcome hereinafter mentioned objections with respect to exterior vents.

A yet further object of the invention is the provision of a valve of the character mentioned, wherein is formed a plurality of chambers, said chambers being of different size of capacity and divided from each other by movable valve heads, normally held closed by the action of gravity, which heads will require forces of different intensities to withdraw them from their closed position.

Under ordinary conditions, and as a result of established practice, vents for plumbing systems are located outside of the building. During certain season of the year the projected end of a vent pipe will very often become completely clogged with frost so that when the plumbing system is evacuated by the passage of a volume of waste therethrough, the vent pipe will be unable to allow the introduction of sufficient volume of air to replace that drawn from the system when the waste material flows therefrom through the main sewer pipe of the building.

It, therefore, becomes desirable to provide within the building, a vent which will be protected against such clogging and which will take air into the system from within the building. This desirability is qualified by the objection that with check valves heretofore employed, obnoxious gases have escaped from the plumbing system into the building and likewise, germs find their way from the system into the building, both of

which must positively be thoroughly overcome before a plumbing system having an interior vent and check valve rises to a point where it will be approved by health authorities or will be satisfactory to the building occupant.

The aforementioned broad objects of this invention and the minor objects thereof which will appear during the course of the following specification, when fulfilled by suitable structure, will be capable of teaching the construction and installation of a multiple check valve that will overcome the objections to interior vents, as just set forth.

The preferred form of this invention is illustrated in the accompanying drawing, wherein:

Figure 1 is a sectional view through a catch basin and a portion of a hollow building wall, illustrating a fragment of a plumbing system and the vent thereof that is equipped with a valve embodying this invention.

Fig. 2 is an enlarged, fragmentary, longitudinal, central section through the valve.

Fig. 3 is a cross section taken on line III-III of Fig. 2.

Fig. 4 is an end elevation of the valve.

Fig. 5 is an enlarged, fragmentary, sectional view showing the valve in position.

Fig. 6 is an end elevation of the valve illustrated in Fig. 5, and,

Fig. 7 is a longitudinal, central section through the multiple section valve illustrating the angular relation between apertured partitions therein.

Fig. 1 illustrates one manner of bringing together parts of a plumbing system so that the valve contemplated might be positioned within a hollow wall 10 having an opening 12 formed through one side thereof which communicates with the space 14 formed behind a splash apron 16 that forms a part of catch basin 18 that, in turn, is connected with a part of the plumbing system 20 by branch 22. Vent pipe 24 extends upwardly within the space formed by wall 10 to a point adjacent opening 12 where the multiple check valve 26 is secured in place. When so positioned, this check valve will draw air from within the building along a path indicated by the arrows in Fig. 1, and the aforementioned objects will thereby be fully met.

Fig. 5 illustrates another manner in which this check valve might be incorporated in a plumbing system. In this instance wall 28 supports check valve 26 and member 30 creates a finished appearance at the point where valve 26 passes through wall 28 and joins a part of the plumbing system by way of vent pipe 24.

With respect to the specific structure of valve 26 per se, it is important that the same be made up of a plurality of sections 32, each cylindrical and divided by a transverse partition 34 which intersects the longitudinal axis of the section 32 at an angle, as illustrates in Figs. 2 and 7. Sections 32 are in screw-threaded relation as shown at 36, and one of these sections 38 is modified so that it will support perforated screen 40, having radially extending slots 42, whereby diametrical contraction might take place when screen 40 is pressed to position within the confines of annular shoulder 44, formed by section 38.

As illustrated in Figs. 6 and 7, screen 40 has an inturned, annular flange 46 for the purpose of securely gripping shoulder 44. Each partition 34 has an aperture 48 formed therethrough that is covered, when the valve is closed, by a swingable valve head 50 that rests upon partition 34 which serves as a seat for head 50. The manner in which valve head 50 is swingably mounted within its section 32 of case 26 is clearly shown in Figs. 2, 3 and 7, and the mounting might be effected through the use of opposed bosses 52 formed integrally with the body of section 32, through which is passed a pivot pin 54 that swingably supports link 56 between bosses 52. The free end of link 56 engages projection 58 formed on head 50 and nut 60 precludes displacement of these parts.

As shown in Fig. 2, line 56 has an opening 62 therethrough to receive member 58 that is substantially larger in diameter than the member itself, and nut 60 does not move tightly against link 56, all for the purpose of creating a looseness of fit so that seating of valve head 50 might be effective and not retarded by binding parts.

Manifestly, these valve heads 50 are maintained in the closed or seated position by the action of gravity, and to positively seal the valve against the escape of gases from the plumbing system or the escape of germs therefrom into the building, there is provided a plurality of valve structures as just described, all of which must be opened before fresh air is drawn into the plumbing system.

Each of the plurality of partitions and valve heads 34 and 50 respectively is disposed at an angle different from that of the other similar parts of the valve and the angularity of the valve head and partition closest to the point of connection with vent pipe 24 should be greater in order that more force is required to draw the same to the open position. When this is accomplished, the air from within chamber 64 will evacuate into the plumbing system in an effort to overcome the vacuum that has been created therein by the passage therethrough of a quantity of waste. Obviously, the vacuum or suction set up will be sufficient to draw the next succeeding valve open and evacuate chamber 66 and again this same action will be repeated so that the last valve will be opened and air at atmospheric pressure will be drawn into the system by passing through all of the apertured partitions 34. Obviously, as the angle is decreased from true vertical it will be easier for the valve heads 50 to be drawn open and this angle approaches the vertical as the screened end of valve 26 is approached.

When sufficient air has been drawn into the system to overcome the vacuum therein, gravity will draw heads 50 closed and a multiple seal will be established to fulfill the primary requirement of

such a valve and to meet the broader concepts of this invention.

This valve and its parts might be constructed of metal or other suitable substance and the connection between sections of the case might be effected through other mediums than those illustrated. The relation between the angled valves, the size of the chamber formed therebetween, and the suction created within the plumbing system is of great importance and a valve made to embody the features of this invention will fulfill the duty of establishing proper combination in order that a perfect seal against escaping of objectionable gases and other contamination will always be established when sufficient suction within vent pipe 24 is not present to hold all of the plurality of heads 50 in an open position.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In a plumbing system having an interior air intake vent, a multiple check valve allowing air to enter the system and to preclude the escape of gases from the system comprising a case; a plurality of spaced-apart valve seats formed in series within the case; and a swingable valve head for each seat respectively, said heads being maintained against their seats by the action of gravity.

2. In a plumbing system having an interior air intake vent, a multiple check valve allowing air to enter the system and to preclude the escape of gases from the system comprising a case; a plurality of spaced-apart valve seats formed within the case; and a swingable valve head for each seat respectively, said valve seats being disposed at different angles and the heads being maintained against their respective seats by the action of gravity, all the heads and associated parts swingable therewith being substantially the same weight whereby the force required to lift one of said valve heads is different than that required to lift any of the others.

3. In a plumbing system having an interior air intake vent, a multiple check valve allowing air to enter the system and to preclude the escape of gases from the system comprising a case; a plurality of spaced-apart valve seats formed within the case; and a swingable valve head for each seat respectively, said valve seats and valve heads being disposed at different angles to form chambers of different capacities within the valve case.

4. In a plumbing system having an interior air intake vent, a multiple check valve allowing air to enter the system and to preclude the escape of gases from the system comprising a case; a plurality of spaced-apart valve seats formed within the case; and a swingable valve head for each seat respectively, said case comprising a plurality of sections in screw-threaded engagement each having a valve seat and a valve head therein, the said seats and heads of the valve being at different angles with the heads maintained in closed position by the action of gravity.

5. In a plumbing system for buildings, an interior intake vent, and a catch basin connected for drainage by said system and having a splash apron spaced from the wall of the building, a multiple check valve allowing air to enter the system and to preclude the escape of gases from the system, positioned to draw air from within the building at a point behind the said splash apron.

6. In a plumbing system for buildings, an interior intake vent and a catch basin connected for drainage by said system and having a splash apron spaced from the hollow wall of the build-

ing wherein is formed an opening interconnect-
ing the space within the hollow wall and the space
behind said splash apron, a check valve allowing
air to enter the system and to preclude the escape
5 of gases from the system, positioned within the
hollow wall at a point adjacent the opening
formed in the said wall whereby to draw air from
the interior of the building by way of said open-
ing and space behind the said splash apron.
10 7. A valve of the character described compris-
ing a case having a plurality of longitudinally
aligned hollow, cylindrical sections; a transverse
partition within each of said sections having an
aperture formed therethrough; and a swingably
mounted valve head within each section movable
to and from a position to close the aperture
through the associated partition, said partitions
intersecting the longitudinal axis of the case at an
angle thereto and the valve heads being held
against the partitions by the action of gravity,
the partitions and valve heads being spaced apart
and disposed at different angles to the longitudi-
nal axis of the case whereby to form a plurality of
chambers of different size therein.

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