

Sept. 20, 1971

J. F. LINEBACK

3,605,132

AUTOMATIC PLUMBING VENT VALVE

Filed July 22, 1969

2 Sheets-Sheet 1

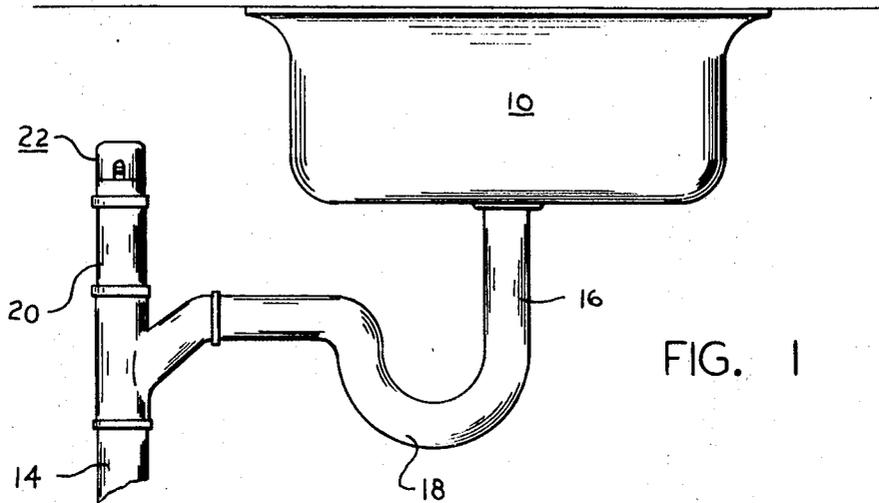


FIG. 1

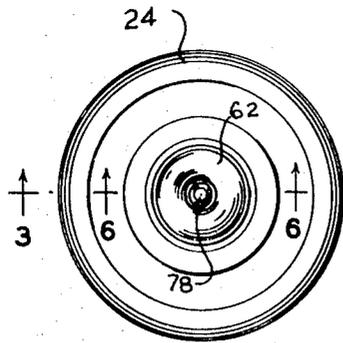


FIG. 2

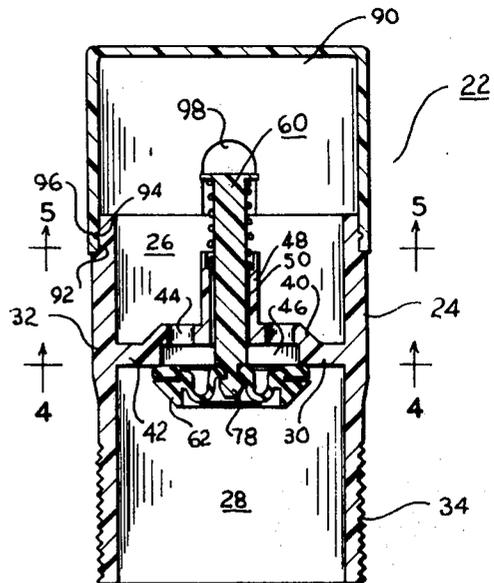


FIG. 3

INVENTOR.

JOHN F. LINEBACK
BY

Hobbs & Green

ATTORNEYS

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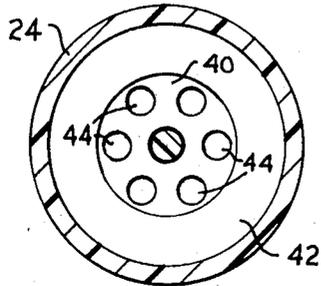


FIG. 4

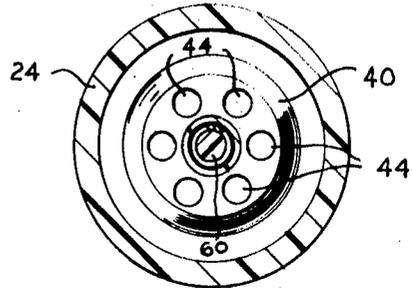


FIG. 5

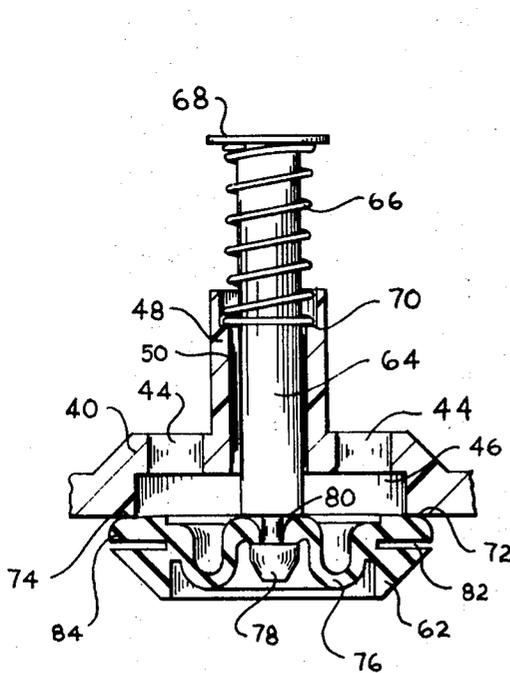


FIG. 6

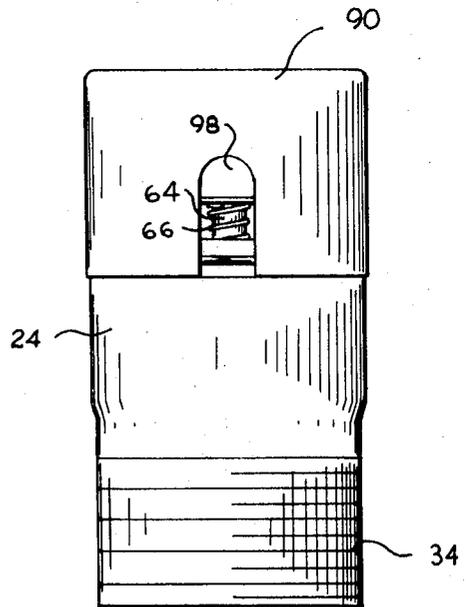


FIG. 7

INVENTOR.

JOHN F. LINEBACK
BY

Hobbs & Green

ATTORNEYS

1

3,605,132
AUTOMATIC PLUMBING VENT VALVE

John F. Lineback, 801 Emerson,
South Bend, Ind. 46615

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5 Claims

ABSTRACT OF THE DISCLOSURE

An automatic plumbing reventing valve having a body constructed of plastic material and defining an inlet and outlet chamber with a partition therebetween. The partition includes a transversely extending valve seat and holes therethrough in the confines of the valve seat. A valve element having a generally disc-shaped configuration seats on the partition and is lightly urged to its seat by a spring member operating on a stem extending through the partition. The valve is for secondary plumbing vent risers and is normally only used in conjunction with a system having a main vent.

In the conventional installation of home plumbing, the drain for sinks and lavatories includes a U-shaped trap usually disposed directly beneath the sink or lavatory and connected to a vertical drain pipe in the wall. In order to prevent the water in the trap from being siphoned therefrom when the final water leaves the sink or lavatory, a vent pipe is normally connected to the wall pipe and extended upwardly through the wall and attic and through the roof of the house. The conventional vent remains open at all times and is vented to the atmosphere, to permit escape of any sewer gases which may flow upwardly through the drain and vent pipes. This vent pipe is often long and must be sealed at the roof and hence is relatively expensive to install and maintain. Further, a number of these vent pipes extending through the roof are often required in homes having a number of sinks or lavatories spaced from one another on a single floor level, the alternative being an intricate and expensive interconnecting vent system with a single roof outlet. It is therefore one of the principal objects of the present invention to provide a valved vent system which eliminates the need for long vent pipes and roof outlet connections and which can be readily installed in and limited to the wall or other limited or un-used space.

Another object of the invention is to provide a valve for use in a vent system for sink and lavatory drains, which permits the vent pipe to be relatively easily installed completely within the house structure, and which readily and effectively permits air to enter the drain pipe to avoid siphoning the water from the trap without permitting the escape of sewer gases into the living or wall space or into the attic of the house.

Still another object is to provide a valve of the afore-said type which can be easily made to open and close in response to the flow of water through the drain pipe and to close positively when water is not flowing from the sink or lavatory to the drain pipe, and which is operable by only a small amount of subatmospheric pressure created in the drain by the flow of water therein, and is adapted to close instantly and effectively when the water is no longer flowing through the drain.

A further object of the invention is to provide a relatively simple, trouble-free vent valve in which the valve element is designed to compensate for wear of the valve parts and is so controlled and arranged with respect to the other valve parts that it is self cleaning, and which can be easily fabricated and installed and inspected.

2

Additional objects and advantages of the invention will become apparent from the following description and accompanying drawings, wherein:

FIG. 1 is a schematic view of a plumbing installation having incorporated therein the present vent valve;

FIG. 2 is a bottom view of the present vent valve;

FIG. 3 is a vertical cross sectional view of the present valve, the section being taken on line 3-3 of FIG. 2;

FIG. 4 is a horizontal cross sectional view, the section being taken on line 4-4 of FIG. 3;

FIG. 5 is a horizontal cross sectional view, the section being taken on line 5-5 of FIG. 3;

FIG. 6 is an enlarged cross-sectional view of the valve operating mechanism; and

FIG. 7 is a side elevational view of the assembled vent valve.

Referring more specifically to the drawings and to FIG. 1 in particular, numeral 10 designates a lavatory, sink or the like, 14 a drain pipe for lavatory 10 connected to the lavatory by a pipe 16 having a trap 18 therein, and 20 a vent pipe connected to drain pipe 14 and having mounted on its upper end the present vent valve 22. The vent valve is normally mounted in the dead air space in a wall and normally is not elevated any substantial distance above the lavatory, sink or other water outlet. The installation shown in FIG. 1 is merely for the purpose of illustrating the manner in which the present valve is used, the valve being equally applicable to other types of installations and to other types of venting systems.

In the embodiment of the invention illustrated in the drawings, valve 22 consists of a body 24 having an inlet chamber 26 and an outlet chamber 28, the two chambers being separated by partition 30. The body is preferably constructed of a plastic material such as nylon and is preferably formed as a one piece structure with partition 30 being joined integrally to the side wall 32 of the cylindrical body. The lower portion of the body is provided with threads 34 for installing the valve in the system by attaching the body to pipe section 20, for example. The partition 30 is essentially disc-shaped with an upwardly projecting portion 40 formed integrally with the peripheral portion 42 and containing a plurality of holes 44 communicating with a recess 46 on the under side of partition 30. The holes 44 are equally spaced around a central sleeve 48 which contains a center opening 50 extending the full length thereof.

The valve element generally indicated by numeral 60 is mounted on partition 30 and consists generally of a disc-shaped member 62 connected to a stem 64 which projects upwardly through central opening 50 and outwardly above the sleeve. Mounted on the upper end of the stem is a coil spring 66 which reacts between a disc-shaped end member 68 on the upper end of stem 64 and a recessed shoulder 70 in the upper end of sleeve 48. Thus the valve member 62 is urged upwardly against a valve seat 72 surrounding recessed portion 46 of partition 30. The valve seat is an annular flat surface 72 in a plane transverse to the longitudinal axis of the body. The marginal portion of the upper side of valve member 62 is likewise flat, and this flat upper surface 74 forms a relatively broad contact area which effectively seals off the rising gases in the drain and yet permits the valve to readily unseat in response to low reduction in pressure in the drain system. The valve member 62, which is of resilient rubber and has a flexible center portion 76, is secured to stem 64 by a projection 78 on the lower end thereof, the stem containing a recessed portion 80 for receiving the inner edge of member 62 surrounding a center opening. The valve member is assembled on projection 78 by merely pressing flexible portion 76 longitudinally over the tapered end of the projection and seating the flexible inner edge of portion 76 in recess 80. The valve member is assembled after the

3

spring 66 has been assembled on the stem and inserted in central hole 50 of sleeve 48. Valve member 62 contains an annular slot 82 which renders the peripheral portion 84 more flexible so that it will seat effectively throughout the flat valve seat 72 and yield sufficiently to form an effective seal, notwithstanding irregularities or foreign material which may be present, in or on the valve seat 72. In view of the integral valve body and partition containing the plurality of holes 44 and center member 48, the valve can be made economically, and readily assembled, installed, and serviced.

In order to protect the operating mechanism, the valve preferably includes a cap 90 which seats over the upper end of the body and engages a reduced diameter portion 92. The reduced diameter portion 92 includes an annular rib 94 which seats in an annular groove 96 on the internal surface of the cap. The cap is provided with a plurality of openings 98 for the admission of air into the valve and then into the drain system as water is drained from lavatory 10.

In the operation of the present valve installed in the manner illustrated in FIG. 1, when the water is drained from the lavatory 10, a low vacuum is created in pipes 14 and 20. The valve element 60 immediately responds by opening to the differential in pressure created thereby across valve member 62, the valve member moving downwardly away from its seat 72 in opposition to spring 66, thereby permitting air to flow through openings 98 and holes 44, and past valve member 62, thence into the drain system. As soon as the differential has been relieved between the two chambers 26 and 28, the spring 66 immediately returns valve member 62 to its seated position, with the flat sealing surface 74 firmly engaging valve seat 72 throughout the annular portion thereof. The valve element remains closed as long as the lavatory is not being used, thus preventing sewer gases from entering the space in which the valve is located. The immediate response of the valve to the decrease in pressure prevents the vacuum from removing the water in trap 18, and thus prevents the sewer gases from flowing upwardly through the trap into and above the lavatory.

While only one embodiment of the present valve structure has been described in detail herein, various changes and modifications may be made without departing from the scope of the invention.

I claim:

1. An automatic vent valve for a vent pipe of a plumbing system operable under low vacuum conditions comprising a cylindrical valve body having a fluid passage and a partition separating the passage into an inlet chamber and an outlet chamber, said partition having a substantially transversely extending annular valve seat and a plurality of holes within the confines of said annular valve

4

seat connecting said inlet and outlet chambers, said partition having a central opening, and a valve element including a flexible disc-shaped valve member of rubber-like elastomeric material disposed in said outlet chamber and having a flexible sealing surface adjacent its peripheral margin in a substantially transverse plane for engaging said valve seat, a stem removably connected to said valve member and extending through the central opening in said partition, said stem having a groove and said valve member having a center section with an annular resilient portion seating in said groove for releasably retaining said valve member on said stem and being flexibly connected to said sealing surface for yieldably urging said sealing surface onto its seat, and a spring on said stem seating said valve member and being responsive to low vacuum conditions in said vent pipe to permit said valve member to open in response thereto.

2. An automatic plumbing vent valve as defined in claim 1 in which said spring is a coil spring disposed around said stem and reacts against an enlarged end of said stem.

3. An automatic plumbing vent valve as defined in claim 1 in which a sleeve projects into the inlet chamber and is disposed around said central opening, and in which said spring is a coil spring mounted on said stem and reacting against said sleeve and against an enlarged end of said stem.

4. An automatic plumbing vent valve as defined in claim 1 in which said cylindrical valve body is constructed of a plastic material.

5. An automatic plumbing vent valve as defined in claim 1 in which a cap containing an opening covers the inlet chamber.

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LAVERNE D. GEIGER, Primary Examiner

H. K. ARTIS, Assistant Examiner

U.S. Cl. X.R.

251—368

Dedication

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VENT VALVE. Patent dated Sept. 20, 1971. Dedication filed Nov.
12, 1976, by the assignee, *Lyons Industries, Inc.*
Hereby dedicates to the Public the entire term of said patent.
[*Official Gazette May 3, 1977.*]