

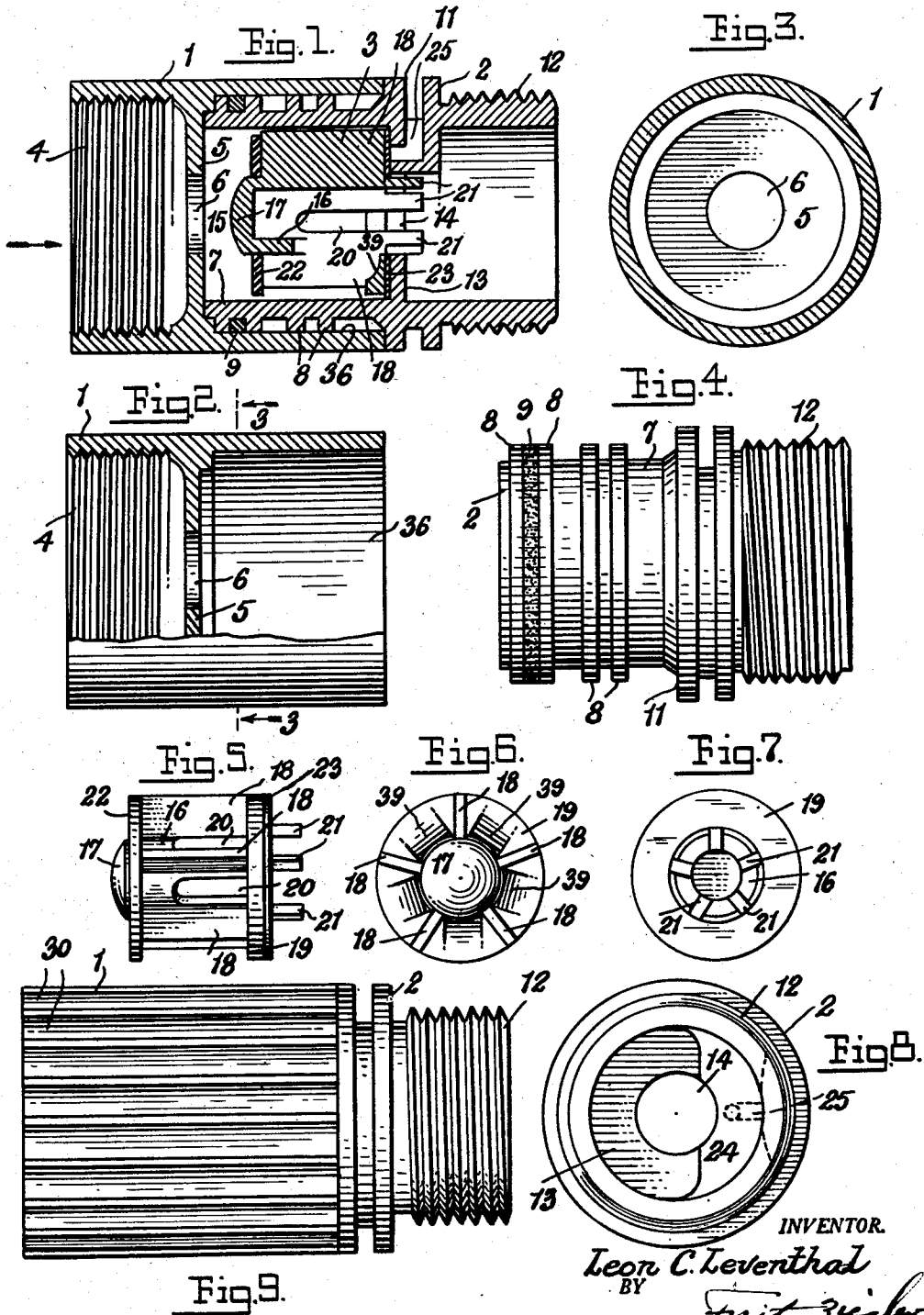
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VACUUM BREAKER FOR WATER SUPPLY SYSTEMS

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VACUUM BREAKER FOR WATER SUPPLY SYSTEMS

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2 Claims. (Cl. 137—218)

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This invention relates to vacuum breakers of the character adopted for use in water-supply lines by means of which a return flow of water into the line will be prevented in the event of cessation of normal water pressure and water flow in the line.

An object of the invention is to provide a device of this character by means of which the return flow will be effectively prevented; which will be of simple construction with the parts thereof composed of plastic materials, if desired, and which can be easily installed without the use of tools.

Another object of the invention is to provide a device of this kind which can be inexpensively made; which will be unlikely to clog or get out of order and which will operate positively and smoothly when required.

These and other objects are attained by the invention, a more particular description of which will be hereinafter set forth and pointed out in detail in the claims appended hereto.

In the accompanying drawing, wherein an illustrative embodiment of the invention is disclosed, Fig. 1 is a longitudinal sectional view of the vacuum breaker constructed in accordance with the invention;

Fig. 2 is a longitudinal sectional view of the outer shell or sleeve;

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2, looking in the direction of the arrows;

Fig. 4 is a side elevational view of the inner sleeve;

Fig. 5 is a side elevational view of the valve member;

Fig. 6 is an end view of the valve member, looking at the left end as viewed in Fig. 5, with the washer at that end omitted to more clearly disclose the finned portion of the valve;

Fig. 7 is an end view of the valve, looking at the same from the right of Fig. 5;

Fig. 8 is an end view of the inner sleeve, looking at the same from the right of Fig. 4; and

Fig. 9 is a side elevational view of the complete vacuum breaker.

Referring to the drawing, it will be noted that the device is composed of three main elements, namely, an outer shell or sleeve 1, an inner sleeve 2 and a valve member 3. These parts may all be composed of metal or all of any suitable plastic or other materials usable for the purpose to be described. The outer shell or sleeve 1 is in the form of a tubular cylinder, provided near one end with internal screw threads 4 by means of

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which it may be attached to a faucet, water tap or other water outlet, this end of the device being the inlet end of the vacuum breaker. Within the sleeve or shell 1 is a wall or partition 5 provided with a central aperture 6 through which the water will flow in the direction of the arrow in Fig. 1 to reach and pass the valve 3 in a manner to be described.

Beyond the partition or wall 5 within the shell 1 is provided a smooth-bore portion 36, within which is fitted the shank portion 7 of the inner sleeve 2. Said shank portion 7 is formed with a plurality of spaced circumferential ribs 8, between one pair of which is arranged a packing or gasket 9. The inner sleeve 2 is maintained in place within the outer sleeve or shell 1 by being adhesively secured therein, when the parts 1 and 2 are of plastic material, or otherwise permanently fitted therein, the joinder of the parts 1 and 2 taking place after the valve 3 has been fitted in position. When the inner shell is fitted in place, as seen in Fig. 1, the flange 11 on the inner shell comes into abutment against one end of the outer sleeve 1 and the inner end of the inner sleeve 2 abuts against the wall or partition 5.

The inner sleeve 2 is externally threaded adjacent one end as shown at 12 to enable it to be attached to a hose-coupling or other connection. Provided in the interior of the inner sleeve 2 is a transverse wall or partition 13, formed with a central opening 14. The valve 3 is located in a chamber 15 formed between the wall 5 of the outer shell 1 and the wall 13 of the inner sleeve 2, the valve being axially slidably movable within said chamber 15 to an extent permitted by said walls.

The valve 3 is more clearly seen in Figs. 5 to 7 inclusive, and the same may be composed of metal or plastic. It includes a central tubular portion or core 16, terminating at one end in a rounded head portion 17. Formed integrally with the central tubular portion 16 is a plurality of equally-spaced, radially-extending fins 18, connected at one end to a disk or flange 19 which may be formed integrally with the fins and core portion 16 of the valve. Elongated slots 20 are provided in the tubular portion or core 16 between the fins 18. Extending from the disk 19 is a plurality of pins or projections 21 which fit in the central opening 14 of the wall 13 and serve to hold the valve centrally positioned within the chamber 15 and guide the valve in its sliding movement.

A washer 22, which may be of rubber or other

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suitable material, is fitted around the core 16 adjacent to the rounded end 17 thereof and another washer 23, which may be of leather or other suitable material, is located at the opposite end of the valve and against one face of the disk portion 19 thereof. Located within the inner sleeve 2, adjacent to the wall 13 thereof, is a baffle 24, and arranged between said baffle and the wall 13 is a vent opening 25, normally closed by the washer 23 while the vacuum breaker is in its normal or open position, as seen in Fig. 1, and open when back pressure or return flow occurs.

From the foregoing, the operation of the device will be readily understood. The internally threaded end 4 of the outer shell or sleeve 1 is attached to a faucet, tap or other source of water supply and the normal water flow through the device occurs in the direction of the arrow shown in Fig. 1. The water entering through the end 4, will flow through the aperture 6 to enter the chamber 15. It will then flow around the edge of the washer 22 to enter between the fins 18 and flow through the slots 20 in the tubular central portion or core 16 of the valve. The water will thereupon flow through the central opening 14 in the wall 13 being guided thereto by inclined or curved guide surface 39 on the disk 19 between the fins 18 thereon, to reach the hose or other conduit that may be then attached to the external threads 12 of the inner sleeve.

As long as the water is normally flowing from its supply source through the vacuum breaker, or in the direction of the arrow in Fig. 1, the valve will remain in its open position, or that shown in Fig. 1, so that a free flow of the water through the device is assured. Should the water cease to flow, through failure of pressure or otherwise, and a vacuum be then developed in the line to an extent sufficient to cause suction to retract water back into the supply line from within the hose attached to the device, such water on its return flow, in a direction from right to left in Fig. 1, will exert pressure within the tubular or core portion 16 of the valve as well as against the washer 22, to an extent sufficient to move the valve to the left to close said valve. This back pressure thus forcing the valve to the left will bring the washer 22 into seating contact with the wall 5 around the aperture 5, while the rounded end 17 of the core 16 will enter the aperture 6 and close said aperture.

When the valve 3 is so moved to closed position as just described, the washer 23 will be moved away from the air vent 25, thus opening said vent, and the vacuum developed in the system will be broken and the pressure equalized to prevent the return flow of the water through the device. When the normal flow of the water again occurs

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through the device, the valve will be moved to its open position and the vent closed by the washer 23, as the valve is moved to its open position, or that shown in Fig. 1.

While I have herein shown a single embodiment of the invention, it is obvious that the same is not to be restricted thereto since various modifications in shape, arrangement and materials of the several parts of the device may be made without departing from the spirit of the invention. For example, while the outer shell 1 is shown in Fig. 1 to be relatively smooth, the same may be fluted as shown at 30 in Fig. 9 and various other changes are readily made as will be appreciated by those skilled in this art.

What I claim is:

1. A vacuum breaker for water supply lines comprising, a tubular housing having a wall within it, said wall having a central opening, an inner sleeve fitted within the housing, said inner sleeve having a wall within it, said wall having a central opening, a baffle formed in the inner sleeve, said baffle having a vent extending through it and establishing communication between the interior of the sleeve and atmosphere, a valve slidably mounted within the sleeve and confined in the sleeve between the wall of the inner sleeve and the wall of the housing, said valve having a rounded end portion for entry in the opening of the inner sleeve of the housing, said valve having spaced fingers at its opposite end fitted and movable within the opening in the wall of the inner sleeve, the valve having a plurality of spaced radial fins located between its rounded end and the fingers, the valve having a hollow interior and provided with elongated slots located between the fins and establishing communication between the interior of the inner sleeve and the interior of the valve, the interior of the valve being closed at the end provided with the rounded portion and open at the end provided with the fingers.

2. A vacuum breaker for water supply lines as provided for in claim 1, wherein the valve is provided within its hollow interior at one end thereof with a plurality of deflecting surfaces for directing water to flow out through its open end between the fingers.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
651,289	Benton	June 5, 1900
2,159,691	Fox	May 23, 1939
2,189,694	Work	Feb. 6, 1940
2,282,188	Horne	May 5, 1942