C. STICKLE.

VACUUM VALVE MECHANISM.

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1,015,596.

Patented Jan. 23, 1912.

Fig. 2.

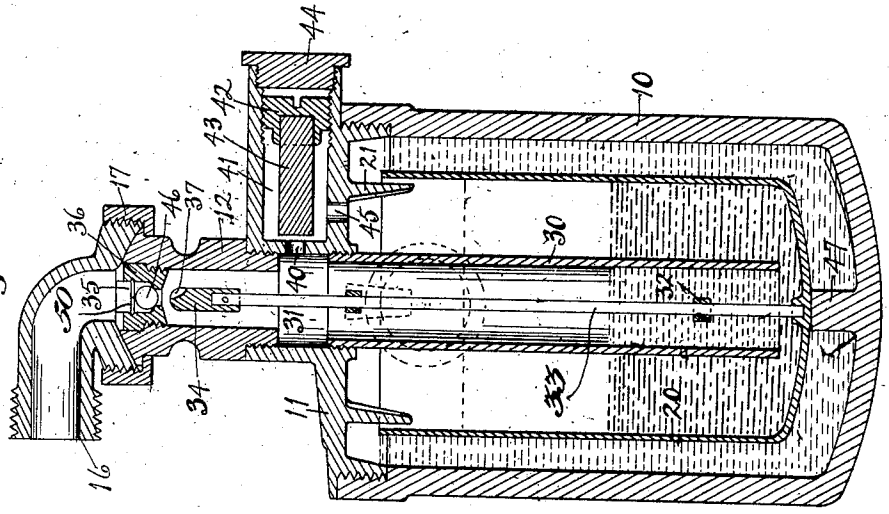


Fig. 1.

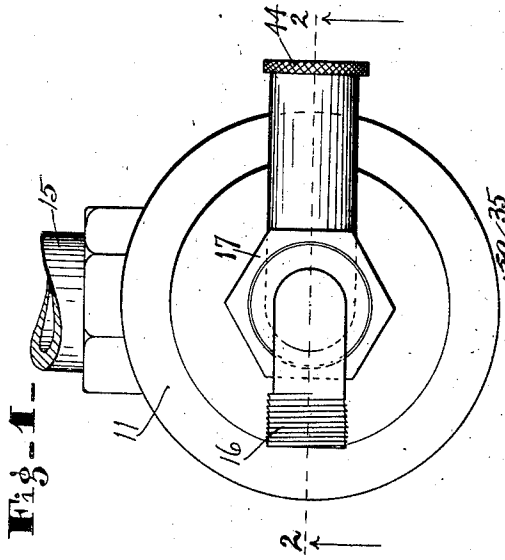
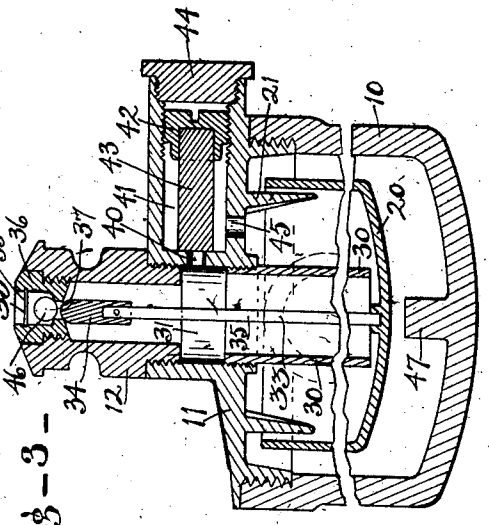


Fig. 3.



WITNESSES:

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VACUUM-VALVE MECHANISM.

1,015,596. Specification of Letters Patent. Patented Jan. 23, 1912.

Application filed December 1, 1910. Serial No. 595,138.

To all whom it may concern:

Be it known that I, COLE STICKLE, of Indianapolis, county of Marion, and State of Indiana, have invented a certain useful Vacuum-Valve Mechanism; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings.

The object of this invention is to improve the construction and operation of vacuum valve mechanism for steam heaters, radiators and the like by providing a by-pass for the air and condensation water to escape before the steam enters the device, which by-pass is closed by an expansion plug or thermal valve influenced by the heat of the steam when it enters the construction. While the device is cold, the by-pass or port is open, because of the construction of the expansion plug and then the cold air and water can escape directly until the steam strikes the expansion plug and causes it to expand and close said by-pass. This and the other features of the invention will be understood from the accompanying drawings and the following description and claims.

In the drawings Figure 1 is a plan view of the device with a steam supply pipe partly broken away. Fig. 2 is a central vertical section on the line 2—2 of Fig. 1 and showing the parts in position before steam enters the device. Fig. 3 is a similar section with the intermediate parts broken away and showing the position of the parts after steam has entered the device.

10 is a cup shaped vessel with a top plate 11 secured thereon and said plate has a central opening 31 into which what may be termed a valve casing 12 is screwed.

15 is an inlet from the steam radiator or other steam filled device.

16 is an outlet to the exhaust device, not shown. Said outlet 16 is secured to the valve casing 12 by a union 17.

Within the vessel 10 there is a bucket 20 which is open at its upper end and constitutes a float, as will hereafter appear. The upper end of the float surrounds guide arms 21 extending downward from the top 11. The float 20 extends above the inlet opening 15. The chamber between the float 20 and vessel 10 fills with condensation water soon after the device is started and ordinarily the water stands in that chamber up to the top of the float and flows into the float.

A tube 30 extends down from the top 11 in line with a central opening 31 through said top nearly to the bottom of the float and it has cross bars 32 in it for a valve stem 33 of a valve 34 secured on the upper end of the stem. The lower end of the stem is secured by the bottom of the float. The arrangement is such that when the outer chamber is full of water, the float will be maintained in its upper position, as shown in Fig. 3, and will cause the valve 34 to close the outlet port 35 through the plug or valve seat 36 which is secured in the upper part of the valve casing 12. The valve 34 has a V-shaped groove 37 cut obliquely in its upper end so that when the valve is in a closed position, there will be a permanent, but reduced outlet.

There is in the top 11 a port 40 leading to the chamber 31 from a cylindrical chamber 41. The outer end of this chamber 41 is internally threaded to receive a screw nut 42 which carries a thermal valve 43 made of hard rubber or other material which extends and contracts quickly when influenced by heat or cold. A cap 44 closes the outer end of the chamber 41. A port 45 leads to the chamber 41 from the upper part of the main chamber 10. There is a ball check valve 46 in an enlarged portion of the port 35 which closes the reduced portion thereof against back pressure or movement of the fluid; said ball valve is held from escape upwardly by a cross wire 50. A lug 47 projects upwardly from the inside of the bottom of the chamber 10 and supports the float 20 within its lower portion.

The operation of the device is as follows: Assume it to be connected with one or more steam radiators. When the device starts it first draws the air out of the radiator, the same making a short circuit from the upper part of the chamber 10 through the port 45, chamber 41, port 40, chamber 31 and out through the port 35 and outlet 16. This will let out at once and directly the cold air and also cold water will pass through it, but when the steam reaches the thermal valve 43 and expands it to the position in Fig. 3, its passageway through the port 40 is closed and remains closed as long as the device is in operation and heated. After the steam enters, condensation water flows into the float and rises and fills the tube 30 in addition to clos-

ing and expanding the thermal valve and closing the port 40. This cuts off, by the water seal in the bottom of the float 20, the passage of the steam through the tube 30 and, therefore, through the device. The mechanism is then in its working condition and the valve 34 is closed as shown in Fig. 3. After a time the condensation water will accumulate in the float until it rises high enough in there to cause the float chamber to descend, as shown in Fig. 2, and then the exhausting apparatus will draw the water out of the float through the tube 30 and port 35 until the float rises again and causes the valve to close the port. Thus it appears that with this device there is an immediate and very rapid discharge, comparatively, of the cold air through the ports 45 and 40 so that a radiator will operate much more quickly than with a device not equipped as is this device. The passageway 37 and valve 34 will also prevent any escape of steam because of its small size and because of its being water sealed with moisture.

When the device is cold and the float is in its upper position, as shown in Fig. 3, and the valve 34 is closed, the thermal valve 43 will be in open position, as shown in Fig. 2, and then the air and gases which pass through the ports 45 and 40 will pass out through the reduced outlet 37 and that is the function of said outlet 37. It is made V-shape and cut in the top of the valve so that it will not be liable to fill with sediment when the valve is closed, and when the valve opens the sediment, if any has collected, will be immediately cleared out by the discharge of water.

I claim as my invention:

1. A vacuum valve mechanism for steam heaters and the like including a condensation chamber, an open-top bucket float therein, a conduit extending up through said float and the top of said chamber from a point near the bottom of said float so that the lower end of said conduit may be water sealed, a valve for controlling the outlet from the upper end of said conduit, a passageway leading from the top of said condensation chamber at a point over said float to said conduit at a point below said valve, and a thermal valve for controlling said last-mentioned passageway and arranged so that said passageway will be opened before steam enters the device and will be closed while the device is heated.

2. A vacuum valve mechanism for steam heaters and the like including a condensation chamber, a bucket float in said chamber, an outlet conduit extending from near the bottom of said bucket float to an outlet above said chamber, a valve for controlling the outlet from said conduit and which is connected with and actuated by said bucket float, a passageway from the upper part of said chamber to said conduit at a point above the bucket float and below the valve in said conduit, and a thermal valve for controlling said chamber whereby said passageway will be opened before steam enters the device and will be closed while the device is heated.

3. A vacuum mechanism for steam heaters and the like including a condensation chamber, a removable top therefor with a central opening, a valve chamber secured to said top and containing an outlet port, a bucket float in said condensation chamber, a tube extending from the opening through the top to a point near the bottom of said float, guides secured to said tube, a valve stem secured to the float and extending up through said tube and guides, a valve on the upper end of said stem for closing the outlet port, a thermal valve, a thermal valve chamber in said top which is threaded, a nut which screws into the threaded portion of said chamber for carrying and adjusting the thermal valve, a port leading from the upper part of the condensation chamber to the thermal valve chamber, and a port leading from the thermal valve chamber to the outlet conduit below the valve at the upper end thereof and in position to be closed by the thermal valve when expanded and opened when said valve is contracted.

4. A vacuum valve mechanism for steam heaters and the like including a condensation chamber, an outlet conduit leading from the lower part of said chamber and provided near its upper end with an outlet port, a valve closing said port on its upper side, a float controlled valve for controlling said outlet on its under side, said valve having V-shaped groove in its upper end arranged so that when said valve is in closing position there will be a small outlet passageway through the port, substantially as set forth, another passageway leading from said condensation chamber to said outlet, and a thermal valve for controlling said passageway, whereby when said first mentioned valve is closed and said thermal valve is opened air will pass through said V-shaped groove.

In witness whereof, I have hereunto affixed my signature in the presence of the witnesses herein named.

COLE STICKLE.

Witnesses:
G. H. BOINK,
H. J. WELLS.