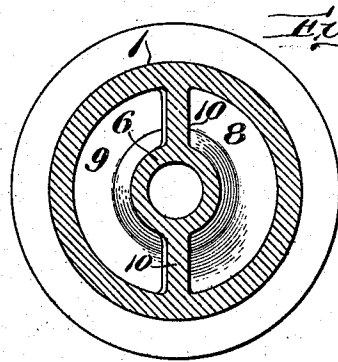
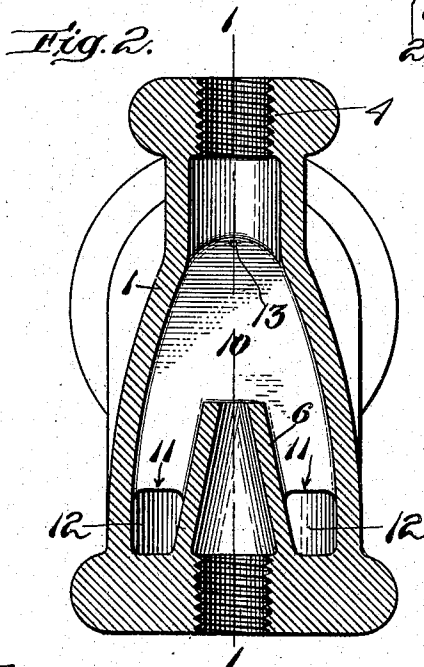
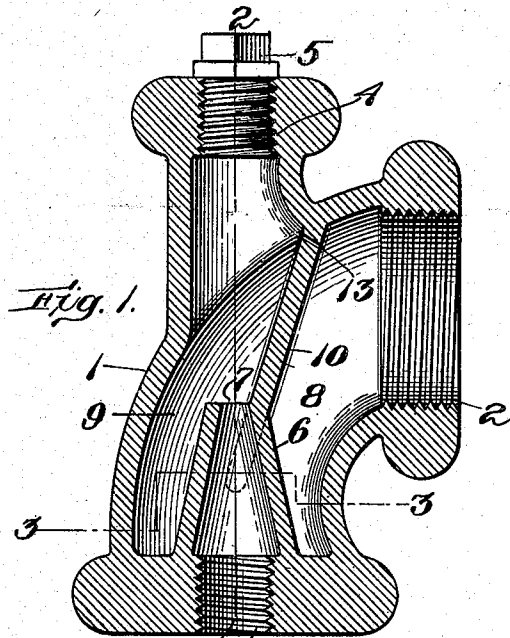


No. 885,805.

PATENTED APR. 28, 1908.

W. E. TILLINGHAST.
WATER SEAL VACUUM RETURN PIPE FITTING.
APPLICATION FILED SEPT. 24, 1907.



Witnesses:

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UNITED STATES PATENT OFFICE.

WALLACE E. TILLINGHAST, OF WORCESTER, MASSACHUSETTS.

WATER-SEAL VACUUM RETURN-PIPE FITTING.

No. 885,805.

Specification of Letters Patent.

Patented April 28, 1908.

Application filed September 24, 1907. Serial No. 394,306.

To all whom it may concern:

Be it known that I, WALLACE E. TILLINGHAST, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented an Improvement in Water-Seal Vacuum Return-Pipe Fittings, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention is a return pipe-fitting for use in steam heating systems to connect the discharge or outlet passage of radiators, steam pipe coils, main riser drips, and the like, with the customary exhaust or vacuum pumps, and is intended to take the place of the usual vacuum valves with their movable parts, pistons, diaphragms, or thermostatic plugs, which when moved by the collection of water of condensation open the normally closed discharge opening of said valves to permit the discharge of the water of condensation from the radiators, etc.

The objects of my invention are to provide a simple and inexpensive fitting which has no movable parts and therefore cannot get out of order, does not require or permit adjustment, is thoroughly reliable and certain in its action, capable of positively preventing the flooding of the radiator, etc., by an excess volume of water.

Further advantages and the constructional details of my invention will be pointed out in the course of the following description taken in connection with the accompanying drawings, in which I have shown a preferred embodiment of the invention.

In the drawings, Figure 1 is a central vertical sectional view of the fitting taken on the dotted line 1—1, Fig. 2; Fig. 2 is a similar sectional view taken on the dotted line 2—2, Fig. 1; and Fig. 3 is a horizontal sectional view taken on the dotted line 3—3, Fig. 1.

As made already prominent, one chief purpose of my invention is to make the fitting, trap, or vacuum-T, simple in construction and incapable of getting out of order, and to this end I have succeeded in reducing the construction to a single piece. I regard this accomplishment as one of the most important of the invention, as it effectually eliminates all valves, diaphragms, floats, thermostatic plugs, or other movable members, and all adjustment of every kind. When correctly made it is always correct, as

it requires no adjustment and is incapable of being adjusted.

To this end the device consists of a casting or other molded or spun, continuous piece, comprising an external casing 1 having a threaded inlet 2, outlet 3, and preferably an upper clean-out opening 4 normally closed by a plug 5, a vertical suction cone 6 extending coaxially vertically above the outlet 3 and terminating at its top edge 7 approximately flush with the bottom of the inlet 2, the internal space of the fitting or trap being divided into two chambers 8, 9 by an oblique wall 10 formed integrally with, or at least closing tightly against, the outer walls or casing 1 and the cone 6 as clearly shown in Fig. 2. The oblique wall 10 extends forwardly and downwardly in front of the inlet opening 2 and terminates at 11 so as to provide ports 12 for the water of condensation from the chamber 8 and the chamber 9, which, rising in the chambers 8 and 9 to the top 7 of the cone 6, acts as a water seal to prevent the escape of steam through the ports 12. Above the top of the cone 6 the oblique wall 10 is provided with a small air vent or vapor vent 13 shown as extending obliquely upward adjacent the top of the slanting wall or partition 10.

In use, the threaded opening 2 receives the discharge end of the radiator or other heating device which is to be connected, and the outlet connection or return pipe is threaded into the opening 3 leading to the usual exhaust or vacuum pump of a heating system. The water of condensation quickly collects in the bottom of the fitting or trap, flowing down the inclined wall or partition 10 and closing the ports 12 at the base of the suction cone 6. As soon as the water has risen above the edges 11 of said oblique wall or partition 10, the valve or fitting is thereby effectually sealed, but because of the simple air or vapor vent 13 the steam of the heating system has continuous free passage from the inlet opening 2 to the outlet opening 3. It is to be particularly noted that my invention provides a construction open to its full area at all times both to the inlet passage leading from the radiator, coil or other device being drained, and to the return pipe leading to the exhaust or vacuum generating device of the system, and yet the ports 12, 12 are closed or sealed by the water collected around the suction cone, thereby preventing the direct flow of

uncondensed steam through the suction cone
 and return or discharge main to the vacuum
 generating device, and protecting the vacuum
 generated by the latter in the chamber 9. As
 5 the suction at the discharge end or return
 pipe exhausts the air from the chamber 9,
 communicating with the radiator through
 the fine air or vapor opening 13, inlet cham-
 ber 8 and inlet 2, it withdraws or exhausts air
 10 from the radiator thereby causing the water
 of condensation to flow toward the fitting or
 trap to fill the void left by the air or vapor
 withdrawn from the chamber 9. This water
 of condensation enters the inlet 2, flows down
 15 the oblique wall 10 to the bottom and then
 through the ports 12, 12 and surrounds the
 suction cone 6 until the two chambers 8 and
 9 are full of water to the top of the suction
 cone. Every particle of water overtopping
 20 the suction cone at once flows down through
 the latter into the return or discharge pipe.
 The small quantity of steam which may be
 drawn through the air vent 13 is effectually
 condensed before it can reach the discharge
 25 main or outlet in a sufficient quantity to
 break or relieve the vacuum generated in the
 chamber 9, the condensation therefrom flow-
 ing down the oblique wall 10 to the bottom
 of chamber 9. It will also be particularly
 30 noted that although the inlet or top of the
 suction cone is effectually sealed at all times
 by the water seal against any undue rush or
 influx of steam or vapor from the inlet 2, it is
 nevertheless open at all times to its maxi-
 35 mum area and ready to handle any sudden
 flooding or influx of water of condensation
 from the radiator or other heating device being
 drained. The ports 12, 12 are always sealed
 40 by the water of condensation and yet the air
 and vapor vent or opening 13 is always open
 to the passage of air from the steam in the
 radiator being drained, thereby allowing the
 requisite passage of a sufficient quantity of
 45 steam and vapor to maintain the heating sys-
 tem in proper operative condition and obvi-
 ating all chances of excessive vacuum in
 chamber 9 and all danger of the water seal
 around the suction cone 6 being siphoned
 50 over the top of the suction cone and drawn
 out of the fitting.

The above operation and all the advan-
 tages mentioned are secured without the pres-
 ence of any movable part and without any
 adjustment of the device. On the contrary,
 55 said advantages are accomplished by a one-
 piece article of manufacture, which, not hav-
 ing any adjustment, cannot be tampered
 with, requires no special skill for its use, is
 easily applied and is inexpensive, durable
 60 and efficient.

It will be understood that while one of the
 important advantages of my invention is its
 capability of manufacture as a single-piece
 article, I do not wish to preclude myself from
 65 making the same in separate parts; and also

I wish it understood that my invention in
 some of its broader aspects, as pointed out in
 certain of the following claims, is capable of
 different embodiments as many changes and
 modifications may be made without depart-
 70 ing from the spirit and scope of my inven-
 tion as defined in said claims.

Having described my invention, what I
 claim as new and desire to secure by Letters
 Patent is,

1. A trap, provided with an inlet in its up-
 per portion for connection to a radiator or the
 like, and an outlet in its lower portion for con-
 nection to a return discharge pipe, said trap
 having an internal cavity, an upright parti-
 75 tion dividing said cavity into an inlet cham-
 ber and a vacuum chamber, the upper portion
 of said partition having a small air vent af-
 fording communication between said cham-
 bers, the trap being provided with a water
 port between said chambers at the lower end
 80 of said partition, and a tubular portion con-
 taining a discharge passage extending up from
 said outlet above said port and opening into
 said vacuum chamber.

2. A trap, provided with an inlet in its up-
 per portion for connection to a radiator or
 the like, and an outlet in its lower portion for
 connection to a return discharge pipe, said
 trap having an internal cavity, an upright
 85 partition dividing said cavity into an inlet
 chamber and a vacuum chamber, the upper
 portion of said partition having a small air
 vent affording communication between said
 chambers, the trap being provided with a
 90 water port between said chambers at the
 lower end of said partition, and a suction
 cone extending into said vacuum chamber
 vertically above the outlet provided with a
 discharge passage communicating at its lower
 95 end with said outlet and opening into said
 vacuum chamber at its upper end in approxi-
 mate alinement with the bottom edge of said
 inlet.

3. A trap, provided with an inlet in its up-
 per portion for connection to a radiator or the
 like, and an outlet in its lower portion for con-
 nection to a return discharge pipe, said trap
 having an internal cavity, an upright parti-
 100 tion extending obliquely downward and for-
 ward, dividing said cavity into an inlet cham-
 ber and a vacuum chamber, and having a
 small air vent through its upper portion
 affording communication between said cham-
 bers, said trap being provided with a water
 105 port between said chambers at the lower end
 of said partition, and a tubular discharge de-
 vice extending up from said outlet above
 said port into said vacuum chamber and pro-
 vided with a discharge passage affording
 110 communication between said vacuum cham-
 ber and outlet.

4. A trap formed in a single piece, pro-
 vided with an inlet in its upper portion for
 connection to a radiator or the like, and an
 115

outlet in its lower portion for connection to a return discharge pipe, said trap containing an internal cavity, an upright partition extending obliquely downward and forward dividing said cavity into an inlet chamber and a vacuum chamber and containing a small air vent through its upper portion affording communication between said chambers, said trap being provided with a water port between said chambers at the lower end of said partition, and a suction cone extending into said vacuum chamber vertically above the outlet, terminating at its upper end in approximate alinement with the bottom of the inlet and provided with a discharge passage affording communication through said cone between said vacuum chamber and outlet.

5. A trap, consisting of a casing provided in one side with an inlet, an outlet in its bottom, and a clean-out in its top, and provided with an internal cavity, an upright partition

extending from side to side of said cavity, located between the clean-out and the inlet, dividing said cavity into an inlet chamber communicating with said inlet and a vacuum chamber communicating with both the outlet and the clean-out, said partition having an air vent through its upper portion affording communication between said two chambers, the trap being provided with a water port below said partition and with means cooperating with said water port to provide a water seal between said chambers and at the same time to permit the free escape of air and water from the vacuum chamber.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

WALLACE E. TILLINGHAST.

Witnesses:

WM. J. PIKE,

M. J. SPALDING.