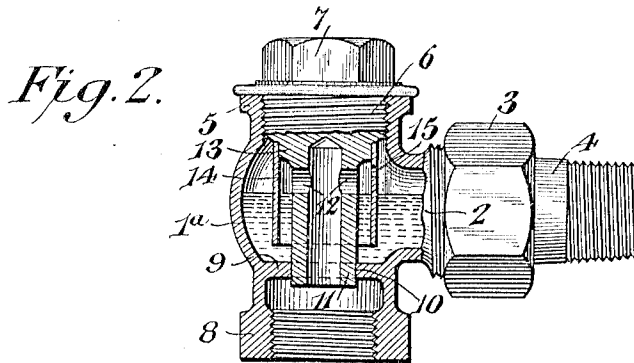
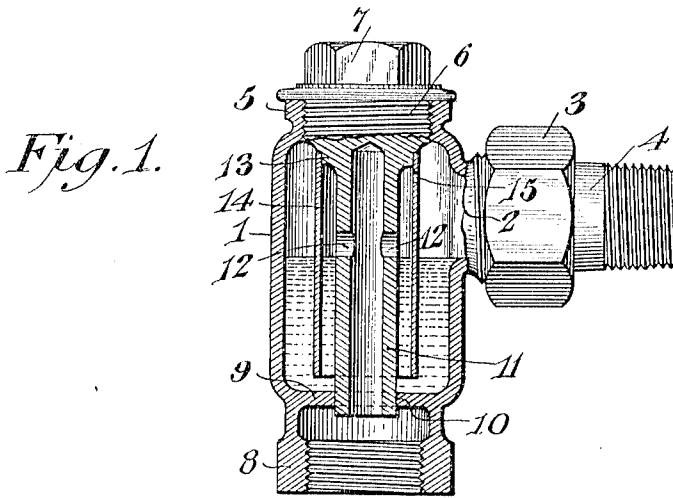


E. G. WILEY.  
WATER SEAL RADIATOR TRAP.  
APPLICATION FILED DEC. 4, 1912.

1,072,287.

Patented Sept. 2, 1913.



WITNESSES

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# UNITED STATES PATENT OFFICE.

EDGAR C. WILEY, OF LYNCHBURG, VIRGINIA.

WATER-SEAL RADIATOR-TRAP.

1,072,287.

Specification of Letters Patent.

Patented Sept. 2, 1913.

Application filed December 4, 1912. Serial No. 734,970.

*To all whom it may concern:*

Be it known that I, EDGAR C. WILEY, a citizen of the United States, residing at Lynchburg, in the county of Campbell and State of Virginia, have invented a new and useful Water-Seal Radiator-Trap, of which the following is a specification.

This invention has reference to improvements in water seal radiator traps designed more particularly for use in connection with low pressure steam heating systems, usually termed vapor heating systems, the purpose of the trap being for the passing of the water of condensation from the radiator.

Traps of this character have a water sealed passage offering but a slight resistance to the flow of low pressure steam or vapor directly through from the radiator into the return pipe or from the return pipe back into the radiator. This slight resistance causes the low pressure steam or vapor to completely fill the interior of the radiator without blowing through the return opening, and also prevents backward flow of any steam or vapor which may be present in the return pipe when it is desired to have the steam supply cut off from the radiator. In the system for which the present invention is designed steam is admitted to a radiator through a steam supply valve of the graduating type with a restricted opening, so that just enough steam may be admitted to fill the radiator without a surplus to blow through the return opening and the air in the radiator finds passage to the return pipe. The steam pressure may amount to but a few ounces and just enough steam may be admitted to the radiator to heat its surface, while the water sealed trap will allow air and water of condensation to escape and at the same time offer some little resistance to the flow of steam from the radiator. By preventing the blowing back of steam or vapor from the return pipe when the valve is shut off heating of the radiator is prevented when not desired.

The present invention comprises a structure including an outer casing with union and nipple for attachment to the radiator and a readily removable plug member having tubular extensions which may be in concentric relation, one of which extends through an opening in what may be termed the bottom of the casing where it connects to the return pipe, while the outer tube stops short of the bottom of the casing, and

through it there is provided a small hole, while in the inner tube a larger hole or holes are provided at a suitable point to determine the water level of the trap. When steam is admitted to the radiator air will pass through the small hole directly to the inner tube and so to the return pipe, while water of condensation gravitates to the bottom of the casing and rises through the outer tube or thimble until it overflows through the hole or holes in the inner tube and so escapes to the return pipe. This constitutes a water seal trap against the passage of vapor or steam in large quantities, while the amount which passes through the small hole in the outer tube is negligible, although the small tube is sufficient to pass the air from the radiator in a reasonable length of time.

The improved trap is so constructed that the passageways are not choked by any particles which would be large enough to choke the overflow openings, and from time to time the water trap which catches any such large particles may be quickly cleansed by the simple operation of removing the plug, the tubes going with the plug and allowing a free downward passage into the return pipe for the water of condensation and any obstructing particles lodged in the trap.

The invention will be best understood from a consideration of the following detailed description, taken in connection with the accompanying drawings, forming a part of this specification, with the further understanding that while the drawings illustrate the application of the invention where the structure is wholly new, and also where the structure is only in part new, it is susceptible of other practical embodiments, wherefore the invention is not confined to any strict conformity with the showing of the drawings, but may be changed and modified so long as such changes and modifications mark no material departure from the salient features of the invention.

In the drawings:—Figure 1 is a longitudinal diametric section of a water seal trap embodying the present invention and showing some parts in elevation. Fig. 2 is a similar view except that the invention is shown adapted to a standard angle pattern radiator valve.

Referring to the drawings, there is shown in Fig. 1 an elongated casing 1 provided

with a side neck 2 threaded for the reception of a union 3 and a nipple 4, which latter may be such as is customarily employed for the connection of the water seal traps to the body of a radiator, which radiator is not illustrated in the drawings.

In practice the casing 1 is attached to the radiator so as to be upright, and one end 5, which may be termed the upper end, is internally screw threaded for the reception of a screw plug 6 having its accessible end 7 shaped for the reception of a manipulating tool, it being customary to make such end hexagonal for the application of a wrench.

The other end of the casing 1, which may be termed the lower end 8, is internally screw threaded for the reception of a return pipe. The neck 2 is in the structure shown in Fig. 1 near the upper end of the casing, and the said casing is expanded laterally throughout the greater portion of its length with respect to the diameter of the ends 5 and 8, this being for a purpose which will hereinafter appear. Adjacent to the end 8 the casing is provided with an internal web 9 forming a bottom for the main chamber inclosed by the casing and entered by the neck 2. This web 9 is, however, provided with a substantially central passage 10 of a size to receive one end of a tubular extension 11 preferably formed on the plug 6 and of a length to extend through the web 9 when the plug 6 is screwed into the end 5, so as to be firmly seated therein in steam tight relation to the casing with respect to the steam pressure employed. The tube 11 is of comparatively small external diameter with respect to the internal diameter of the casing 1, and at an appropriate point in the length of the tube are two passages 12, although any number of passages from one up may be provided. The passage or passages 12 determine the depth of the water seal, for they form a means of communication between the chamber within the casing 1 and the return pipe through the interior of the tube 11.

Surrounding the junction point of the tube 11 with the plug 6 is an annular shoulder 13 designed to form a seat for a sleeve or thimble 14 which may be formed separately from the plug and forced on to the shoulder 13. The sleeve or thimble 14 is of sufficiently greater internal diameter than the external diameter of the tube 11 to provide a space between the thimble and tube with which the openings or passages 12 communicate. Moreover, the sleeve 14 which is open at the lower end is of a length to provide an appropriate space between its lower end and the upper face of the web 9, so that water may readily flow around the lower end of the sleeve into the space between said sleeve and the tube 11. The

sleeve 14 is provided near the end where it engages the shoulder 13 with a small hole or passage 15 preferably in position to face the neck 2.

The structure so far described has in the main its counterpart in the structure shown in Fig. 2, and those parts of Fig. 2 which are substantially identical with those of Fig. 1, except as to length, are indicated by the same reference numerals, the only difference between the structures being that in Fig. 2 there is shown a casing 1<sup>a</sup> somewhat shorter than the casing 1 of Fig. 1. The reason for this showing is that the casing 1<sup>a</sup> is that of a standard angle pattern radiator valve, and by a slight modification of the present invention particularly as to the length of the tubes 11 and 14 it may be readily adapted to such casings and thereby correspondingly cheapening the application of the invention to existing systems.

Let it be assumed that the nipple 4 is attached to a radiator and that the end 8 of the casing is attached to the return pipe of the system and let it further be assumed that a water seal has been established by the accumulation of water within the casing 1 or 1<sup>a</sup> above the web 9 to a level determined by the overflow passage or passages 12, such passages being at a lower point than the hole or passage 15.

If steam be turned on at the radiator inlet valve it will flow into the radiator and force air in the radiator directly out through the passage or hole 15 into the space between the sleeve or thimble 14 and the tube 11, and this air finds direct and ready escape through the passages 12 into the interior of the tube 11 and by way of the latter into the return pipe. The hole or passage 15 is purposely quite small, so that while permitting the outflow of the air from the interior of the radiator within a reasonably short time the amount of steam which will flow through the radiator because of the presence of the hole 15 is so small that its loss may be neglected, while the water seal within the trap is sufficient to prevent the small pressure of steam from breaking the seal and so escape in any material quantity through the trap. Should it be desired to stop the heating action of the radiator the main valve is closed, and then steam or vapor which may be in the return pipe is of too low a pressure to pass the water seal and will move in such small quantities through the hole or passage 15 as to fail to be felt in the body of the radiator.

If, as sometimes occurs, the water of condensation carries along with it particles of scale or other matter liable to choke the openings permitting the outflow of the water of condensation, such particles cannot pass through the comparatively minute opening 15 and so drop into the space be-

tween the thimble 14 and the inner wall of the casing 1 or 1<sup>a</sup>, but the space between the lower end of the thimble and the web 9, as well as the space between the inner wall of the thimble 14 and the outer wall of the tube 11, is too small to permit the travel of any particles of material large enough to clog or choke the passages 12, so that these larger particles will simply accumulate within the water seal portion of the trap upon the web 9.

From time to time the water seal is cleansed by unscrewing the plug 6 which takes with it the tube 11 and thimble or sleeve 14, and then if the tube 11 be long enough so that the plug 6 may be wholly unscrewed before the tube 11 is completely removed from the passage 10, the outflow of the accumulated water of condensation will carry with it into the return pipe all or most of the accumulation of solid particles in the water seal portion of the trap, but should this not occur it is an easy matter to reach the web 9 through the then open upper end 5 of the casing to cleanse the interior of the casing thoroughly from all foreign matter. Upon replacing the plug 6 working conditions are again established.

The facility with which the trap may be cleansed is an important feature of the present invention, since traps of this kind stop up very readily owing to the indirectness of their passages and where a large heating system is installed the quickness with which the trap may be cleansed and restored to working conditions means the saving of very considerable time. The trap may also become clogged by sand or dirt or grease or various other materials which often pass from the radiators through the return connection, and may be readily cleansed therefrom. Moreover, the trap of the present invention has the advantage of offering but little opportunity for obstruction from any accumulated matters and no liability of obstruction at all so far as the overflow openings are concerned. Furthermore, the extreme simplicity of the trap makes it very cheap to manufacture, and the construction is such that thorough inspection and thorough cleansing may be performed at any time with the greatest ease.

What is claimed is:—

1. A water seal trap for steam radiators, comprising a casing with an inlet and an outlet, and a web with a central opening and defining the bottom of a chamber within the casing between the inlet and the outlet, and a readily removable plug introducible into the casing through the end thereof remote from the outlet and shaped to receive the plug, the latter carrying two concentric tubular members, the outer one of which is of a length to stop short of the web and the inner one of which is of a length and di-

ameter to extend through and closely fit the opening in the web, such inner tube having a passage through its walls between the plug and web, the inner diameter of the casing about the tubular members being related to the outer diameter of the outer tubular member and the inner diameter of the outer tubular member being related to the outer diameter of the inner tubular member to provide a space between the two tubular members of less diameter than between the outer member and the casing and of less diameter than the passage through the walls of the inner tubular member.

2. A water seal trap for steam radiators comprising a casing with an inlet at one side and an outlet at one end, and a threaded opening at the end opposite the outlet, and a removable plug adapted to the threaded opening and provided with concentric tubular members in fixed relation to the plug and introducible into the casing and removable therefrom with the plug, each tubular member having a passage through its walls with the passage through the outer member at a greater height than that through the inner member, the casing having a web with a central passage there-through near the outlet end of the casing and defining the bottom of a water chamber, and the inner tubular member being of a length and diameter to extend through and snugly fit the passage in the web, with the outer tubular member of a length to stop short of the web when the plug is seated.

3. A water seal trap for steam radiators comprising a casing with an inlet between its ends, an outlet at one end, and a readily removable plug adapted to the other end of the casing, said plug having integral therewith a central tubular member and provided with a sleeve concentric with the central member, the central tubular member having a passage through its walls at an intermediate point and the sleeve having a smaller passage therethrough at a higher point, the casing having near the outlet a web defining the bottom of a water chamber, and said web having a central passage therethrough, the outer diameter and length of the central tubular member being such as to cause the said member to project through the opening in the web in snug fitting relation thereto and the length of the sleeve being such as to stop short of the web when the plug is seated in the casing.

4. A water seal trap for steam radiators comprising a casing with an inlet between its ends, an outlet at one end and a readily removable plug adapted to the other end of the casing, said plug having integral therewith a central tubular member and provided with a sleeve concentric with the central member, the central tubular member having a passage through its walls at an intermedi-

ate point and the sleeve having a smaller  
passage therethrough at a higher point, the  
casing having near the outlet a web defining  
the bottom of a water chamber and said web  
5 having a central passage therethrough, the  
outer diameter and length of the central  
tubular member being such as to cause the  
said member to project through the open-  
ing in the web in snug fitting relation there-  
10 to and the length of the sleeve being such as  
to stop short of the web when the plug is  
seated in the casing, the spacing of the

sleeve from the inner tubular member be-  
ing less than the free opening of the inter-  
mediate passage through the walls of said 15  
tubular member.

In testimony that I claim the foregoing  
as my own, I have hereto affixed my signa-  
ture in the presence of two witnesses.

EDGAR C. WILEY.

Witnesses:

KATIE E. JENNINGS,  
ALICE L. KREBBS.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,  
Washington, D. C."

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