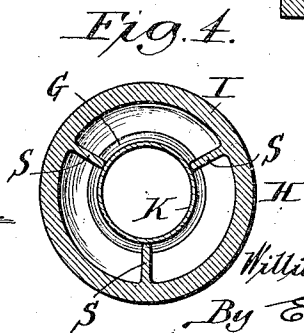
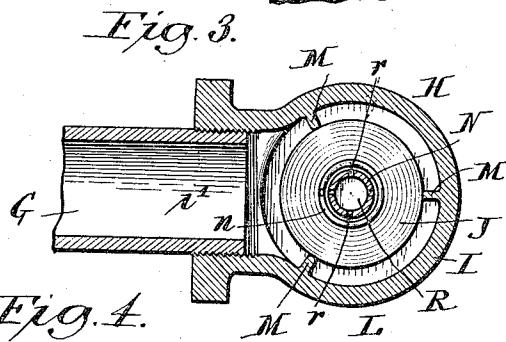
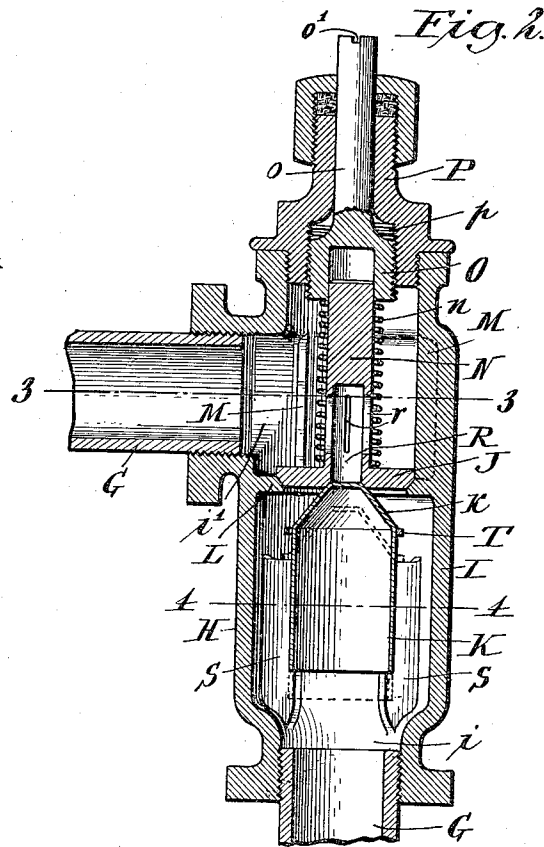
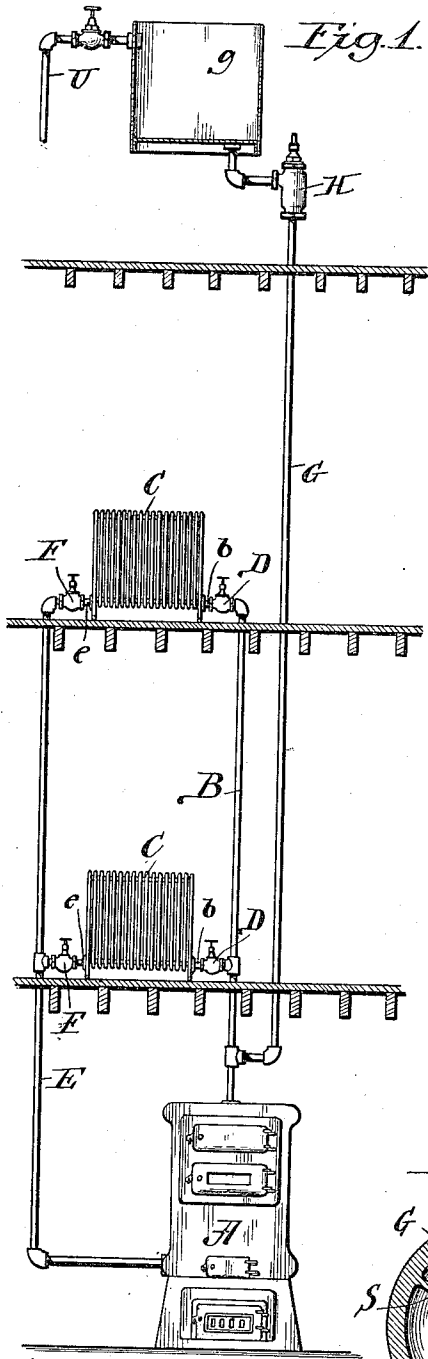


W. C. McKEOWN.  
 INTENSIFIER FOR HOT WATER HEATING SYSTEMS.  
 APPLICATION FILED JAN. 2, 1913.

1,139,130.

Patented May 11, 1915.



Witnesses:  
 Jacob Oberst, Jr.,  
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# UNITED STATES PATENT OFFICE.

WILLIAM C. McKEOWN, OF BUFFALO, NEW YORK.

INTENSIFIER FOR HOT-WATER HEATING SYSTEMS.

1,139,130.

Specification of Letters Patent.

Patented May 11, 1915.

Application filed January 2, 1913. Serial No. 739,742.

To all whom it may concern:

Be it known that I, WILLIAM C. McKEOWN, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Intensifiers for Hot-Water Heating Systems, of which the following is a specification.

My invention relates to intensifiers for heating systems in which hot water is employed as the heating medium.

The object of my invention is the production of a device of this kind which is simple in construction and efficacious in action.

The invention further has for its object the provision of a device which will cut-off the expansion chamber, commonly employed in hot water heating systems, from the remainder of the system when the water reaches a certain level in the device.

Still further objects are to provide a device which will permit the escape of air from the system while the latter is being filled and also when the water is being heated, if any remains after filling; to permit the escape of the fluid under excessive pressure from the system, if for any reason the boiler over-heats the water; and to otherwise improve on intensifiers now in use.

To these ends the invention consists in the novel features of construction, and in the arrangement and combination of parts to be hereinafter described and particularly pointed out in the subjoined claims.

In the drawings, Figure 1 is a diagrammatic view of a heating system equipped with my improved intensifier, the same being shown in full lines at an elevated point in the system, which is the preferred arrangement, and in dotted lines at a low point of the system. Fig. 2 is a longitudinal section of my improved intensifier. Fig. 3 is a cross section taken on line 3—3, Fig. 2; and Fig. 4 is a cross section taken on line 4—4, Fig. 2.

Referring in a general way to the heating system shown in Fig. 1, the reference letter A designates a boiler by means of which the water used as a heating medium is heated. Leading from the top of the boiler is a supply pipe B which is connected by branch pipes *b* to radiators C. Each branch pipe *b* may have a valve D whereby the heat of the radiators may be controlled. E is a return pipe which leads to a low point of the boiler and this pipe has branch pipes

*e* connected thereto which in turn are connected to the radiators, each branch pipe *e*, if desired, having a valve F by means of which the return of the water from the radiators may be controlled.

Connected to the supply pipe B at any suitable point is a pipe G which leads to an expansion tank *g* located at the highest point of the system. The system thus far described forms no part of my invention and relates only to one common arrangement of parts constituting a hot water heating system, to which my improved intensifier is applied, as will presently appear; it being of course understood that my invention may be applied to other arrangements or systems. I preferably apply my improved intensifier H to the pipe G adjacent the expansion tank *g*.

The intensifier comprises a casing I, a spring-controlled main valve J and a buoyant auxiliary valve K. The casing may be of any cross-sectional formation, but is herein shown as cylindrical with an inlet *i* at its lower end and an outlet or return *i*<sup>1</sup> at its side; the pipe G having sections thereof threaded into both. Between the inlet and outlet of the casing an internal annular flange L is provided which serves as a valve seat for the main valve J, and projecting inwardly from the wall of the casing above said valve seat is a series of guide ribs M which serve to guide said valve in its movements, said guide ribs extending upwardly from said valve seat.

The main valve has an axial stem N which fits for sliding movement in a thrust sleeve O provided with a stem *o* extending out through a packed cap P, said cap being threaded into the upper end of the body-portion of the casing and having a threaded bore *p* into which said thrust sleeve is threaded to permit of its adjustment vertically. For this purpose the stem *o* has a kerf *o*<sup>1</sup> at its outer extremity, so that the sleeve may be adjusted from the exterior, thus dispensing with the annoying and tedious operation of removing the cap when adjusting said sleeve.

Surrounding the stem N of the main valve is a coil spring *n* which bears with one end against said valve and with its other end against said thrust sleeve O, serving to retain said valve in closed position, the tension of said spring being governed by the adjustment of said thrust sleeve by reason of having the thrust sleeve O threaded within the

packed cap, a wide range of adjustment may be obtained without the possibility of water leaking from the casing when only a few threads of the thrust sleeve are engaged with the threads of the cap and owing to the spring, which surrounds the valve stem N, being arranged between the valve J and the end of the thrust sleeve a comparatively long spring may be used so as to assure a wide variation in resistance against the valve.

The main valve is not intended to entirely close the space or chamber above the valve seat L from that beneath and for this reason is provided with a central bore R which extends upwardly a distance into the stem N and is in communication at all times with the space or chamber above said valve seat through radial passages *r* formed in said stem.

In the casing beneath the main valve is the auxiliary valve K, which in the main is cylindrical in cross section and has at its upper end a tapered or conical portion *k* adapted to close the bore R of the main valve, said bore having its lower end flared to correspond with the taper of the conical upper end of the auxiliary valve and serves as a seat therefor. Said auxiliary valve is guided in its movements by a series of guide-ribs S which project inwardly from the wall of the casing and have their upper ends spaced a distance from the valve seat L of the casing. Said guide-ribs serve to guide the auxiliary valve in its movements and also serve as stops and supports for the same. The auxiliary valve has an outstanding annular flange T at the upper end of its cylindrical portion which rests upon said guide-ribs when in normal position; it rising as soon as the water reaches a certain level in the space beneath said main valve.

The following describes the operation of the device. When filling the heating system, including the boiler, the main valve J is seated against its seat, or is in closed position, as it may be termed, and the auxiliary valve K is lowered or in open position. This allows the air to escape through the intensifier casing and permits the heating system to be filled with water to a point within the intensifier that will cause the auxiliary valve K to rise and close against its seat in the main valve. Now upon starting a fire in the boiler A, the water becomes heated and as soon as sufficient pressure is generated in the system to overcome the tension of the spring N in the intensifier the main valve will open, followed by the auxiliary valve, and the water will pass upwardly into the expansion tank. When the fire in the boiler lowers or when

for any other reason there is a sufficient lowering of the pressure in the lower portion of the intensifier casing the main valve will lower and the auxiliary valve K will gravitate and will permit the water from the expansion tank to return into the system.

It is to be understood that the predetermined pressure at which the main valve is to be opened, varies under different conditions and may be easily and quickly controlled by placing the spring *n* surrounding the stem of the main valve J under the desired tension.

Having thus described my invention, what I claim is,—

1. An intensifier comprising a casing having an inlet, an outlet, two sets of longitudinal internal guide-ribs and a valve seat between said two sets of guide-ribs, a main valve normally seated against said valve seat and adapted to open only at a predetermined high pressure, said main valve being guided in its movements by one set of said guide-ribs and having a passage there-through, and an auxiliary valve guided for movement by the other set of guide-ribs and adapted to close said passage to cut off communication between the spaces at opposite sides of said main valve.

2. An intensifier comprising a casing divided into two parts and having a set of longitudinal guide-ribs in one of said parts, an inlet in said last-mentioned part and an outlet or return in the other part, a spring-controlled valve between said parts having a central bore in communication with both parts, and a hollow valve having a tapered upper end adapted to close said central bore and being guided for movement by said guide-ribs.

3. An intensifier comprising a casing having an inlet, an outlet or return, a valve seat between said inlet and said outlet or return and a set of longitudinal guide-ribs between said inlet and said valve seat, said guide-ribs being spaced from said valve seat, a spring-controlled valve normally closed against said seat and having a central passage in communication with the spaces at opposite sides of said valve seat, and a hollow valve guided by said guide-ribs and having a tapered upper end adapted to close said central passage and an outstanding flange adapted to bear against the ends of said guide-ribs adjacent said valve seat.

In testimony whereof, I have affixed my signature in the presence of two subscribing witnesses.

WILLIAM C. McKEOWN.

Witnesses:

EMIL NEUHART,  
JACOB OBERST, Jr.