(No Model.)

C. E. VAN AUKEN.

VALVE FOR AUTOMATICALLY VENTING HOT WATER HEATING RADIATORS.

No. 458,202. Patented Aug. 25, 1891.

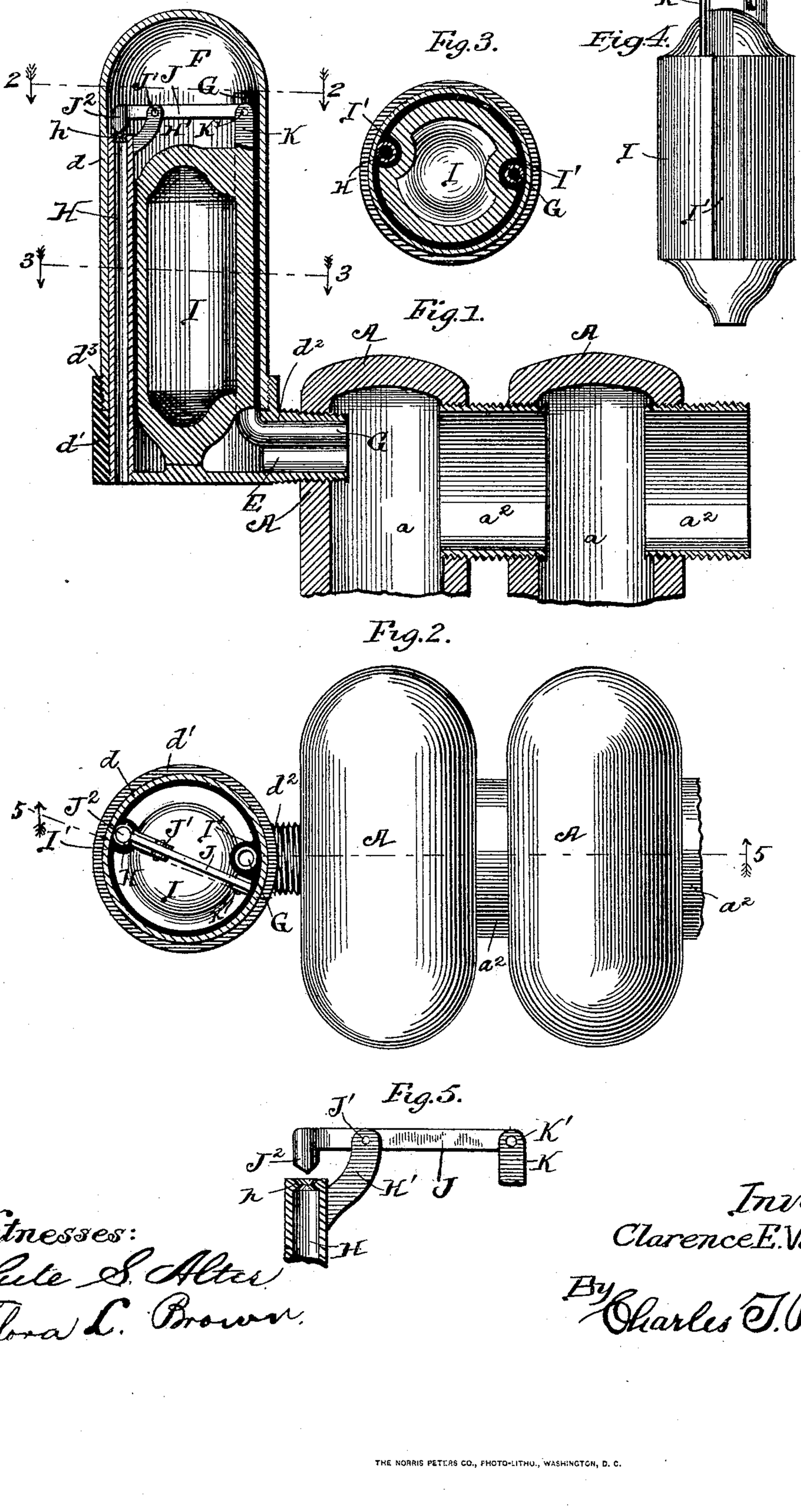

Fig. 1.

Fig. 3.

Fig. 4.

Fig. 2.

Fig. 5.

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VALVE FOR AUTOMATICALLY VENTING HOT-WATER HEATING-RADIATORS.

SPECIFICATION forming part of Letters Patent No. 458,202, dated August 25, 1891.

Application filed March 9, 1891. Serial No 384,301. (No model.)

To all whom it may concern:

Be it known that I, CLARENCE E. VAN AUKEN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Valves for Automatically Venting Hot-Water Heating-Radiators, of which the following, in combination with the drawings accompanying and forming a part hereof, is a complete description.

The object of the invention is to obtain a valve which will, when hot or cold water is forced into the radiator to which the device embodying the invention is attached, allow the air or other gases contained in such radiator to escape therefrom, and which will automatically close thereafter and retain the water therein.

A further object of the invention is to obtain a valve which, when attached to a radiator, will automatically open at any time in the operation of such radiator that air or gas accumulates therein and permit the escape of the same therefrom, and after such air or gas has passed through will automatically close and prevent the escape of any water from such radiator. I am thus enabled by this device to obviate the necessity of constant care and frequent opening and closing of the air-escape valve now and heretofore in use on hot-water radiators.

I have illustrated the device attached to well-known forms of hot-water radiators, but do not of course limit its use to such or any precise form of radiator, as it can be used and attached to any radiator designed to have attached thereto the valves now in use for the escape of air therefrom or to any hot or cold water pipe wherein air occasionally accumulates.

Figure 1 is a sectional view of one corner of a hot-water radiator and of my device attached thereto. Fig. 2 is a top view of the portion of the hot-water radiator, illustrated in Fig. 1, with the top of the valve-casing cut away on line 2 2 of Fig. 1, to show the float and lever operated thereby contained in such casing, and also to show the pipes, through one of which air passes into the casing from the radiator, and through the other of which it passes out therefrom. Fig. 3 is a sectional view of my device on line 3 3 of Fig. 1. Fig. 4 is a front elevation of the float of the valve of the top portion of the pipe, through which air escapes from the valve, and an elevation of the lever actuated by the float; and Fig. 5 is an enlarged view of a lever attached at one end to the float, forming part of the device, and at the other end to a valve-head, which is adapted to fit a seat therefor at the inner end of the pipe or opening from the casing of the device to the outer air.

The same letters of reference indicate the same parts where more than one view thereof is given.

A is a hot-water radiator of the kind known in the art as "direct-heating" radiators.

D is my automatic valve, d being the outer casing thereof; d', the base into which such casing fits at its lower end, and d^2 an extension of base d', having screw-threads thereon adapted to fit into screw-threads in holes therefor extending through the walls of radiator A and by which the valve is attached to the radiator. Casing d can be secured to the base d' of the valve in any suitable manner; but I have heretofore secured it to such base by screw-threads cut on the outside of the casing d fitting into screw-threads on the inside of the base d', such screw-threads being lettered d^3 in Fig. 1 of the drawings.

E is a way or passage through the extension d^2 of base d' of the valve, and this way or passage E extends, when the device is attached to a radiator, from the interior of such radiator into the chamber F of the valve near the bottom of such chamber F, which is formed by casing d and base d' thereof.

G is a pipe forming a passage or way from the upper part or portion of chamber F to the interior of the radiator. The open end of pipe G in the interior of the radiator—that is, in chamber a—must be above the open end of way E in such chamber, and when, as I prefer it shall at all times, the pipe G passes through such way E in extending from chamber F to chamber a it must be placed in the upper part thereof, substantially as illustrated in Fig. 1.

H is a pipe extending from chamber F near the upper part thereof into the open air of the place where the radiator is set up.

I is a float.

I′ I′ are grooves extending longitudinally

along the float I. Grooves I′ I′ are semicircular in cross-section extending loosely around the pipes G and H to permit such pipes, respectively, to extend upward in the casing *d* without interfering with the upward and downward movement of the float I.

J is a lever fulcrumed on pivot J′, having valve-head J^2 at one end thereof and being pivoted at the other end by pivot K′ to abutment K. The pivot J′ is held in rigid arm H′, extending from the upper end of pipe H.

K is an abutment on the upper end of float I.

In hot-water radiators the several coils or chambers constituting the radiator are connected by pipes forming passage-ways at the bottom and top thereof, respectively. Hot water entering the radiator through the upper one of such pipes will circulate through such coils or chambers so connected by the pipes constituting the radiator, the cooled water leaving the radiator through the lower of such pipes and the hottest water being contained in such radiator at the top and the end thereof nearest the upper or hot-water pipe.

When air or gas effects an entrance into or is generated in a hot-water radiator while such radiator is in operation, such air or gas will rise in the radiator, passing through the water contained therein to the top thereof, and will accumulate at the upper end of the coils or chambers *a a* and in the connecting-pipes a^2 a^2 thereof. This device being attached to the radiator in about the position illustrated in Figs. 1 and 2, both inclusive, when so much air or gas has accumulated in chambers *a a* and connecting-pipes a^2 a^2 as to force the water in the radiator downward below the opening to pipe G in chamber *a* such air or gas will enter the pipe G and, extending through it, will pass into the chamber F of this device, and will by the pressure thereof upon the top of the water contained in such chamber F force such water therefrom through passage E into the radiator. The float I will fall in chamber F with the receding water, and the valve head J^2 will be raised from the valve-seat *h*, allowing the air in the chamber F to escape through pipe H. The outgoing current of air thus extending from the radiator through the pipe G into chamber F, and from thence through pipe H to the open air, will very soon vent the radiator, and the water will again rise in the chambers *a a* and connecting-pipe a^2, of the radiator and will extend from the radiator into chamber F toward the pipe H, but upon such water entering the chamber F the float I will be raised and valve-head J^2 again seated on valve-seat *h* and the opening to pipe H thereby closed. The water will continue to rise in chamber F until the pressure of the air in such chamber F is equivalent to that of the water contained therein and in the radiator. If at any time air or gas makes its appearance in chamber *a* of the radiator above described, the operation will be automatically repeated and the accumulation of such air or other gas in the radiator will be thereby prevented.

As is well known to those skilled in the art, pressure is at times attained in hot-water and steam radiators considerably greater than the pressure of the atmosphere, and at such times there is great tendency in the contents of the radiators to escape therefrom where an opening for the escape of air or gas is provided in a valve which is attached thereto, and therefore such opening must be closed tightly and with sufficient firmness against the escape of water from a hot-water radiator and steam from a steam-radiator. In order to insure the proper closing of the valve in steam-radiators, the expansion of some suitable material by the heat of the steam is in practice found to be the most effective and is relied on for such purpose; but in a valve adapted to be attached to hot-water radiators some other mode of effecting the perfect closing of the valve must be provided. I have found that by constructing a float of very light material and attaching it to the lever, closing the valve on the valve-seat in such manner as to obtain considerable leverage, I can attain sufficient power to effectually close such valve by the buoyancy of the float alone and without using the expansibility of any material either to close it or to maintain it in place after such closing. It is for the purpose of obtaining the necessary leverage that the abutment K is placed to one side of the top of the float I and pivotally attached to the lever J in the manner described, so that considerable movement in the float and abutment thereof is required to produce the required (and much less) movement in the valve-head J^2 on and off of valve-seat *h*.

In assembling the several parts forming the device herein illustrated and described as embodying my invention the pipes G H are first secured in their respective places in base *d′*. The float I is then dropped in place with the groove I′ I′ partially and loosely surrounding such pipes G H, respectively. Pivots J′ and K′ are inserted in their respective places and the casing *d* secured on the base *d′*.

In attaching the device to a radiator the threads on extension d^2 are turned firmly into place in corresponding threads in the hole in the casing of the radiator designed therefor, and in such manner that the device shall stand in about the position illustrated in the drawings, so that the float will move freely upward or downward.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. A shell having three passage-ways outward therefrom, one of such passage-ways extending from near the bottom part of the chamber formed by the shell into the radiator to which the shell is attached, one of such passage-ways extending from near the top part of such chamber into such radiator, and

the remaining passage-way extending from near the top part of such chamber to the outside of the shell and having a valve-seat on the inner end thereof, a float contained within the shell, a valve adapted to fit the valve-seat, and a lever connecting the float with such valve in such manner that movement of the float will produce synchronous movement in the valve, but not to the same extent, substantially as described.

2. A shell having two passage-ways therefrom to the radiator to which the shell is attached, one of such passage-ways extending from near the top of the interior of the shell and the other from near the bottom thereof, in combination with a passage-way extending from the interior of the shell near the top thereof outward to the outside of the shell, a lever fulcrumed near one end thereof, a valve on the short end of such lever adapted to fit on a valve-seat at the inner end of the last-named passage-way, a float, and an abutment secured to the top of the float and pivotally attached to the long end of such lever, substantially as described.

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