

A. G. STAPEL.
ACCELERATOR FOR HOT WATER SYSTEMS.
APPLICATION FILED JULY 15, 1910.

980,360.

Patented Jan. 3, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

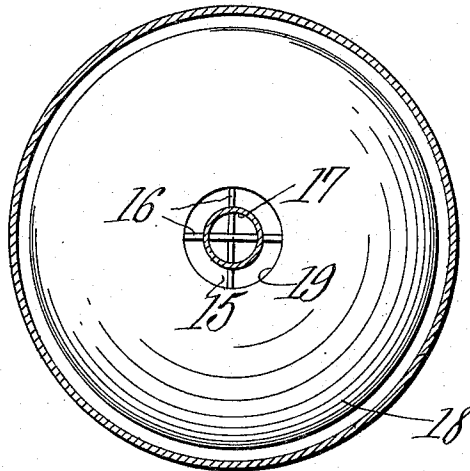
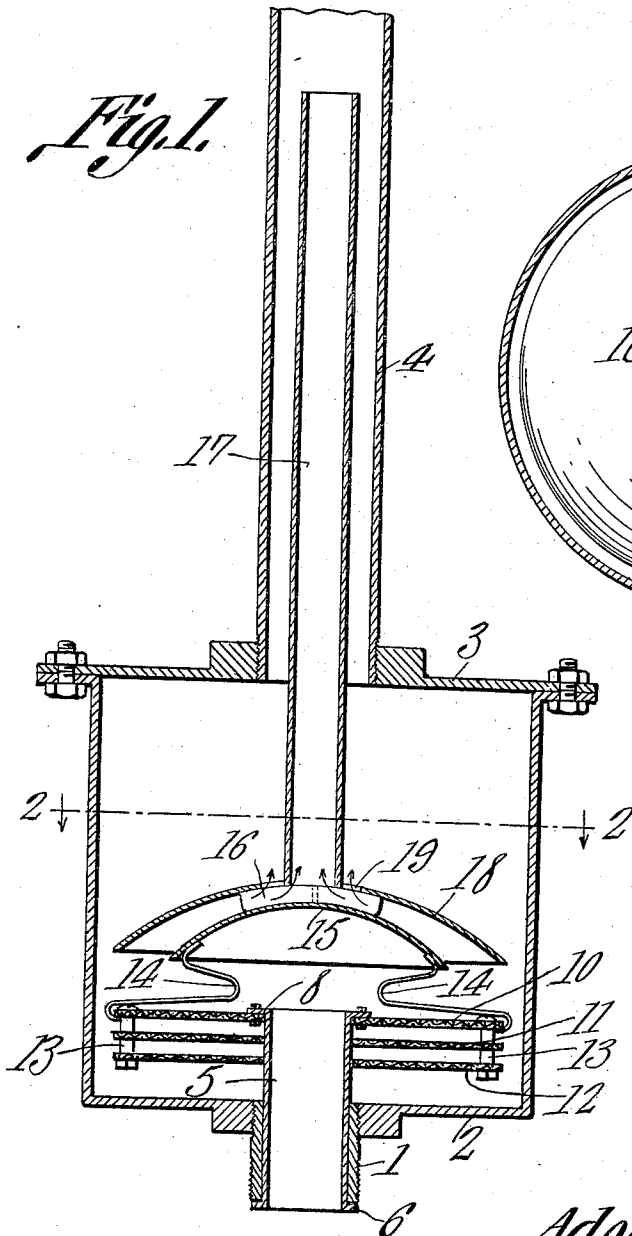


Fig. 2.

Witnesses

J. H. Goulin
W. H. Clarke

Adolf G. Stapel,
Inventor

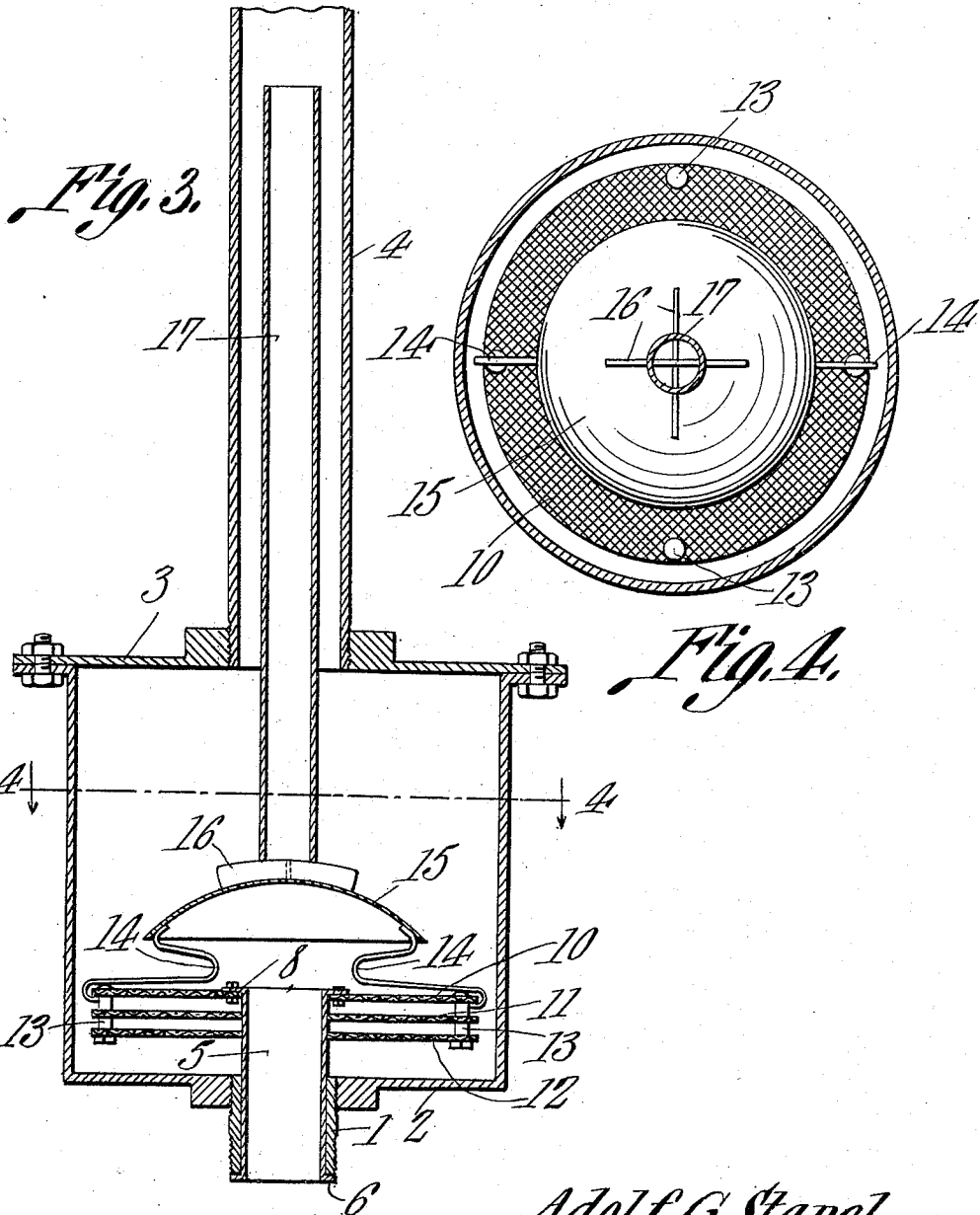
by *C. A. Snow & Co.*
Attorneys

A. G. STAPEL.
ACCELERATOR FOR HOT WATER SYSTEMS.
APPLICATION FILED JULY 15, 1910.

980,360.

Patented Jan. 3, 1911.

2 SHEETS—SHEET 2.



Witnesses
J. C. G. G. G.
W. H. C. Clarke

Adolf G. Stapel,
Inventor
by *C. A. Snow & Co.*
Attorneys

UNITED STATES PATENT OFFICE.

ADOLF G. STAPEL, OF MONTGOMERY, ALABAMA.

ACCELERATOR FOR HOT-WATER SYSTEMS.

980,360.

Specification of Letters Patent.

Patented Jan. 3, 1911.

Application filed July 15, 1910. Serial No. 572,164.

To all whom it may concern:

Be it known that I, ADOLF G. STAPEL, a citizen of the United States, residing at Montgomery, in the county of Montgomery and State of Alabama, have invented a new and useful Accelerator for Hot-Water Systems, of which the following is a specification.

This invention consists of what may be termed an accelerator for hot water heating systems, the principal object of the invention being to accelerate the flow or circulation of water through the heating system, and thereby permit a reduction in the size of the pipes and furnace without reducing the efficiency of the system.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of invention herein disclosed can be made within the scope of the claims without departing from the spirit of the invention.

In the accompanying drawing forming part of this specification—Figure 1 is a vertical section through an accelerator constructed in accordance with the present invention. Fig. 2 is a horizontal section through the construction illustrated in Fig. 1. Fig. 3 is a vertical sectional view of a modification in which the upper steam dome is omitted. Fig. 4 is a section on the line 4—4 of Fig. 3.

Like reference numerals indicate corresponding parts in the different figures of the drawing.

The device of the present invention, briefly outlined, includes means for effecting a partial or complete separation of the steam and the water in the hot water heating system, and then concentrating or gathering the steam into a single ascending column, so that the relatively high velocity of ascent thereof can be utilized in a feasible and practical manner for accelerating the circulation of water in the system, thereby increasing the efficiency of the apparatus and permitting the size of the pipes and furnace to be decreased. The accelerator of the present invention preferably is interposed between the furnace and the expansion tank of the hot water heating system.

The reference numeral 1 indicates a

wrought iron nipple which is connected in any suitable manner with the pipe leading from the furnace. The nipple 1 is threaded into the lower end of the accelerator chamber 2. Extending upward from the upper end 3 of the accelerator chamber is an exit pipe 4 which leads to the expansion tank from which the hot water is distributed throughout the system.

The means for effecting a separation of the steam from the ascending column of water, preferably includes a sleeve or tubular member 5 which fits snugly into the nipple 1 and is provided at its lower end with an outwardly extending annular flange 6 which serves to hold it in proper position. At its upper end, the sleeve 5 is provided with an outwardly extending flange 8. Bolted or otherwise suitably secured to the flange 8 is an outwardly extending annular member 10 formed of foraminated or porous material such for example as metal gauze or cloth. Disposed below the foraminated member 10 is a pair of similar members 11 and 12 which are suitably supported from the member 10 by means such as the bolts 13. Extending outward from the peripheral portions of the foraminated member 10 are a plurality of supporting arms or brackets 14 which serve to support a bell or dome 15. Supported upon the upper surface of the bell or dome 15 are a plurality of shoes or lugs 16 which serve to support the accelerator 17. The accelerator 17 preferably is in the form of a vertically extending pipe or sleeve which is located at the central portion of the chamber 2 and pipe 4 as shown. The lugs or shoes 16 serve to space the lower end of the accelerator 17 from the dome 15 so as to permit steam to enter the accelerator at a point indicated by the arrows. Suitably supported upon the shoes or lugs 16 is an auxiliary dome or steam hood 18 which is spaced away from the lower end of the accelerator 17 so as to permit the upward passage of water on the outside of said accelerator 17 as indicated by the arrows, the water passage being indicated by the numeral 19.

Constructed as described, the operation of the apparatus is substantially as follows: When the heating system is placed in operation, the water soon begins to rise in the accelerator 17 with greater rapidity than on the outside of said accelerator, this being by reason of the fact that the water between the

outer wall of the accelerator 17 and the inner wall of the tubes 4 is necessarily of lower temperature than the water within the accelerator. After the apparatus reaches a sufficient temperature, steam begins to form in the column of water rising through the pipe or nipple 1 in emulsified form. This emulsion of steam and water strikes the dome 15 and is deflected downward onto the upper surface of the foraminated member 10. The buoyant character of the steam bubbles causes their downward movement to be readily retarded by the plates or members 10 and said steam bubbles immediately rise and are caught by the suction exercised by the accelerator 17 and are drawn into the lower end of said accelerator. This suction action acts more readily upon the steam bubbles than on the water. The auxiliary dome 18 serves to facilitate the feeding of the steam to the accelerator 17 by deflecting the steam bubbles toward the center of the apparatus. When the steam is being generated in sufficient quantities, it is found that the accelerator 17 becomes practically filled with steam which, on account of its great buoyancy, rises with great velocity through the accelerator 17 and at the upper end thereof is discharged into the ascending body of water with the effect of driving the same upwardly at greatly accelerated speed. It is found in practice that the accelerator of the present invention acts in a series of regularly recurring impulses. In other words, the rapid generation of steam causes such a strong impulse upward through the accelerator 17, that water is driven around through the apparatus and the relatively cooler column of water which consequently rises at the nipple 1 serves to retard the generation of steam, until the water again reaches such a temperature that steam is generated, after which another impulse is produced by the action of the accelerator 17. The accelerator of the present invention is entirely automatic in its operation and serves not only to increase the efficiency of the heating system in connection with which it is used, but also permits the size of the pipes and furnace to be reduced without producing a corresponding reduction in heat. In other words, by inducing a more rapid circulation than is ordinarily possible, the device of the present invention permits the production of the necessary heat with the use of a smaller amount of water than usual, and thus permits a reduction in the size of the heating pipes and furnace, as well as an economy in fuel.

The modified construction illustrated in Figs. 3 and 4 is exactly the same as that shown in Figs. 1 and 2 except that the auxiliary steam dome 18 is omitted and the suction of the accelerator alone is depended upon to draw the steam thereinto.

What is claimed is:

1. A hot water heating system device having means below the water level for separating a mixture of steam and water into separate simultaneously and continuously ascending columns of steam and water, and then discharging the steam column into the water column. 70
2. A hot water heating system device having separate passages for columns of steam and water, and means submerged in the water for separating steam from a mixture of steam and water and feeding it to the lower end of the steam passage, the upper end of the steam passage serving to discharge said steam into the water column. 75
3. A hot water heating system device having a water conductor, an accelerator tube therein, there being a water passage surrounding the tube, means for separating steam from the mixture of steam and water in said conductor and feeding it to the accelerator, said accelerator tube serving to discharge said steam into the water at its upper end. 80
4. A hot water heating system device having separate water and steam passages, the steam passage being in communication at its upper and lower ends with the water passage and means for separating steam from a mixture of steam and water in the water passage and feeding it to the lower end of the steam passage, the upper end of the steam passage serving to discharge the steam into the water. 85
5. A hot water heating system device having separate water and steam pipes open to each other at their upper and lower ends, a deflector, and a steam separating element adjacent the lower ends of said pipes, said deflector and separating element serving to separate steam from a mixture of steam and water and to feed it to said steam pipe, and said steam pipe serving to discharge said steam into the water at its upper end. 90
6. A hot water heating system device comprising a hot water conductor, a steam pipe arranged adjacent the central portion thereof, a steam deflector arranged slightly below the steam pipe and separated therefrom, and perforated steam separating elements arranged in the path of steam and water deflected by said deflector, whereby to separate steam from a mixture of steam and water and to feed it to said steam pipe, said steam pipe serving to discharge said steam into the water at its upper end. 95

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses. 100

ADOLF G. STAPEL. 125

Witnesses:

WILLIAM CRICHTON CLARKE,
GEO. B. PITTS.