

G. H. AYER.
 ANTISIPHONIC DEVICE FOR BOILERS.
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989,754.

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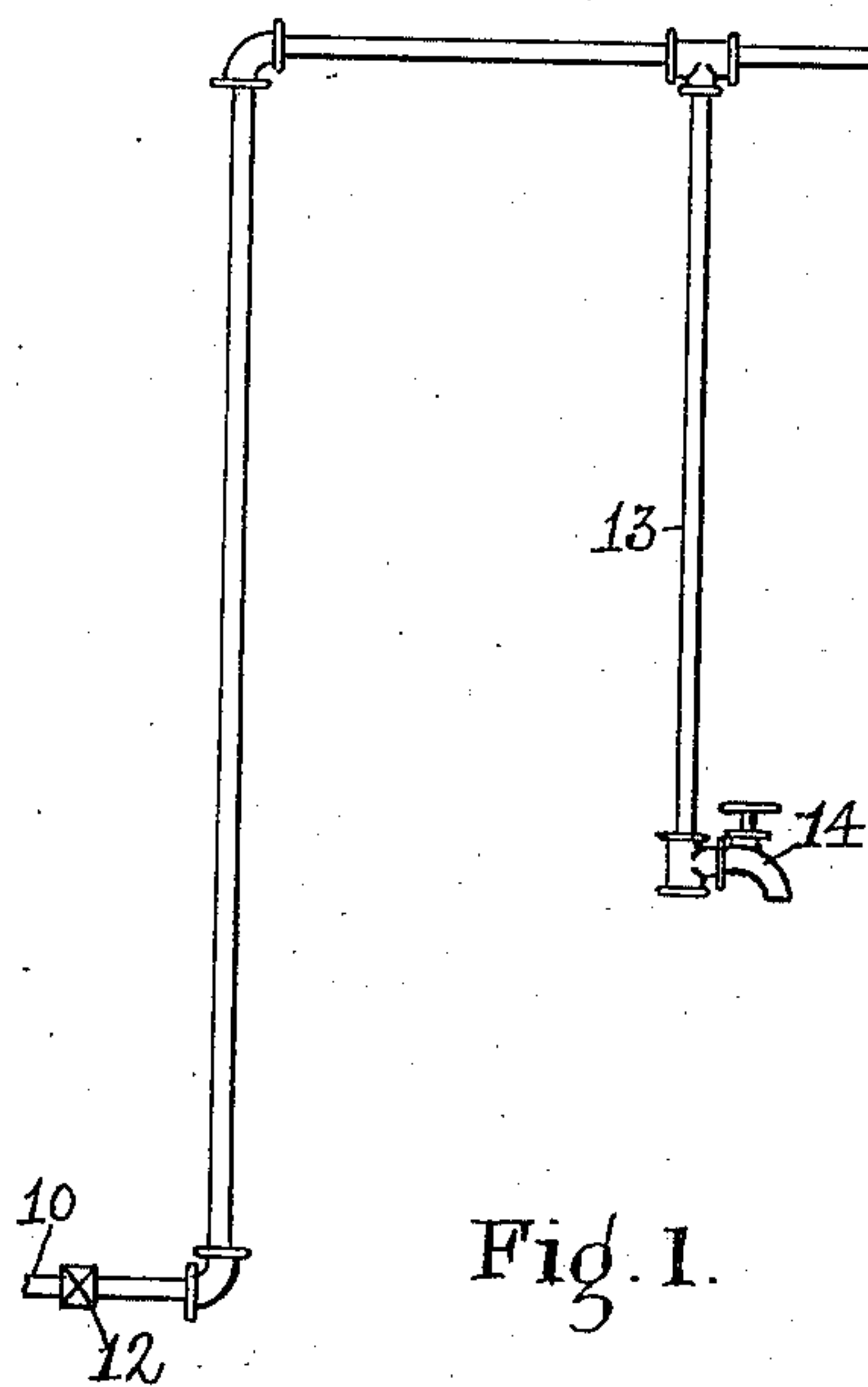


Fig. 1.

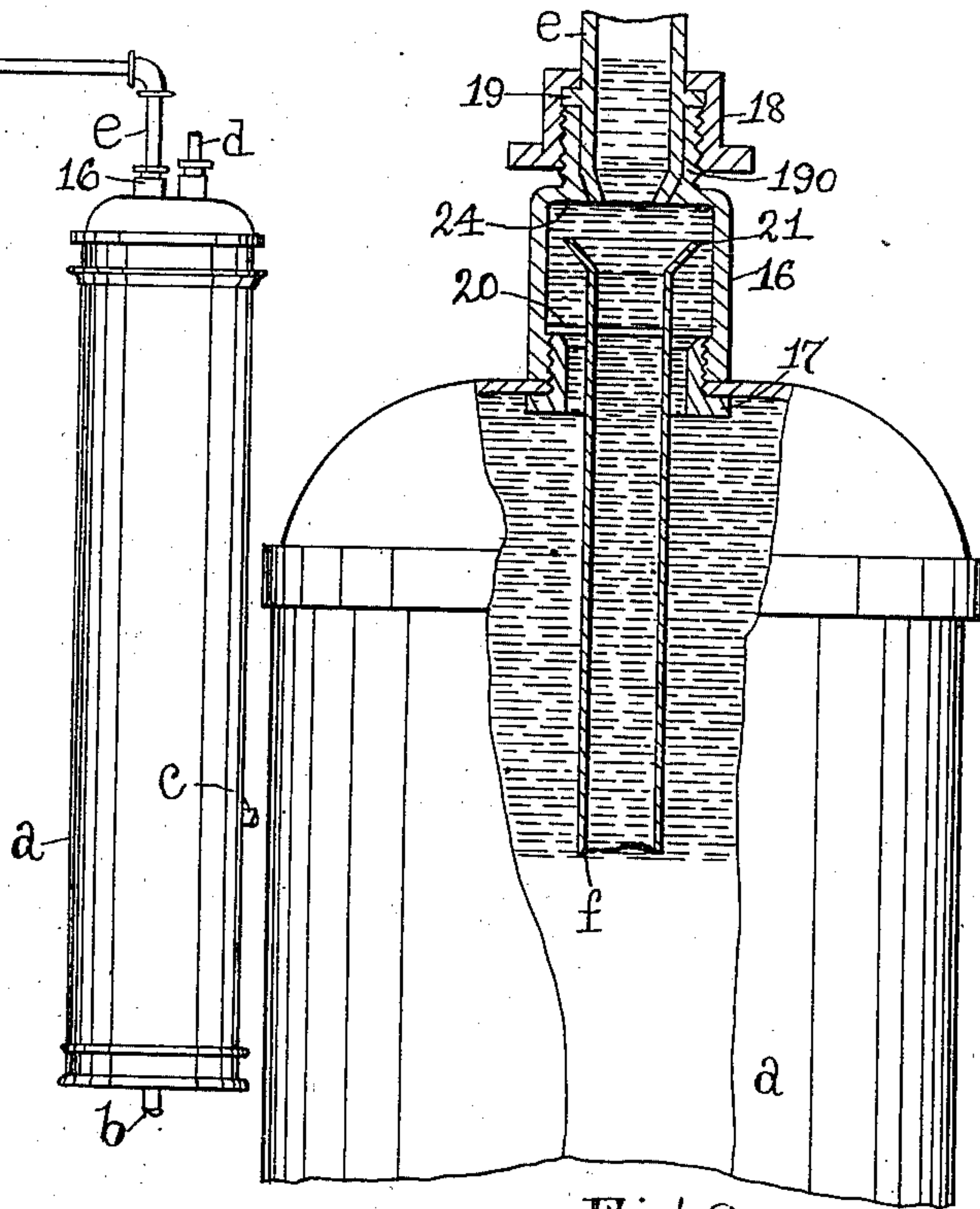


Fig. 2.

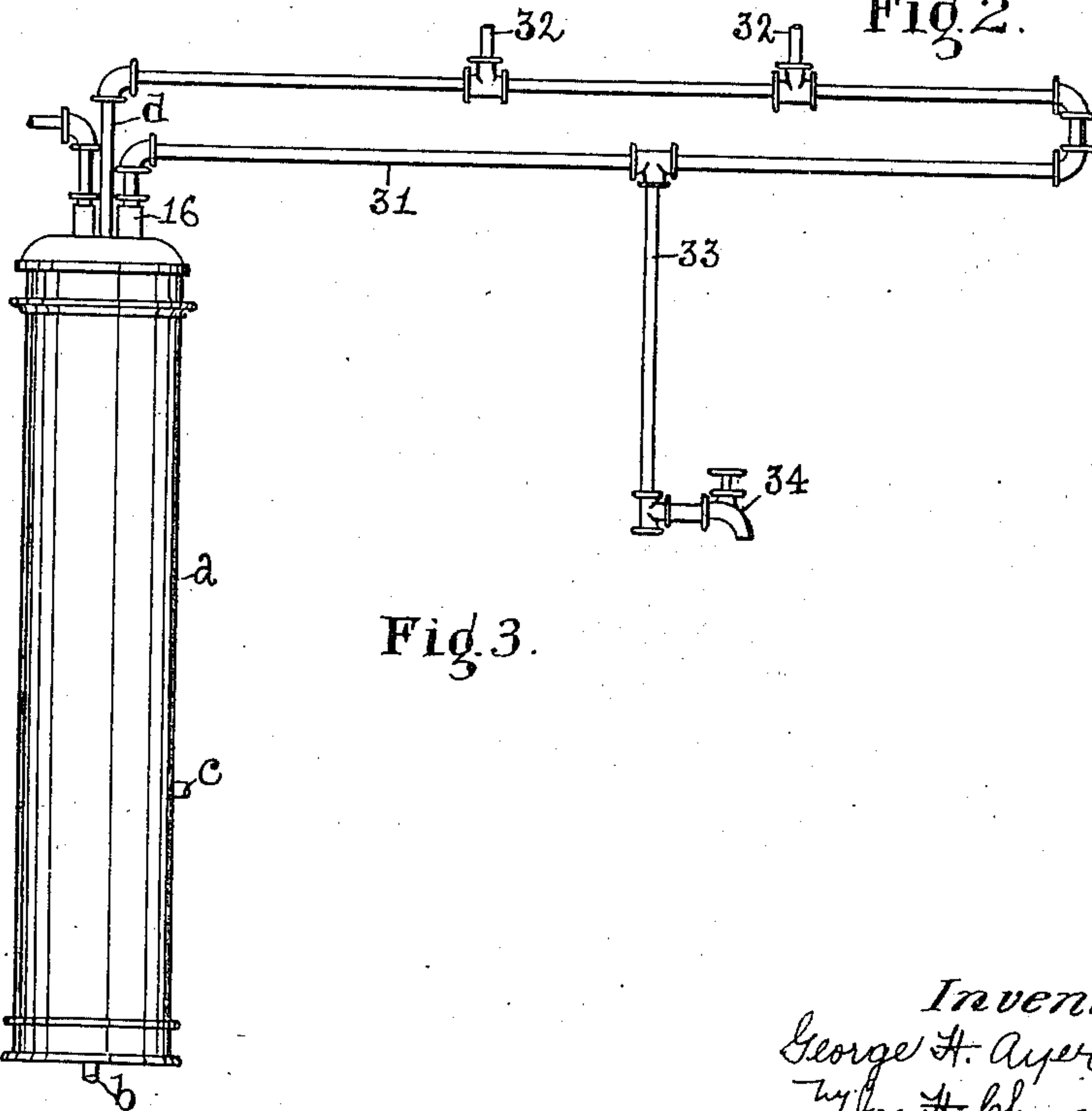


Fig. 3.

Witnesses.
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ANTISIPHONIC DEVICE FOR BOILERS.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, GEORGE H. AYER, a citizen of the United States, residing in Winthrop, county of Suffolk, and State of Massachusetts, have invented an Improvement in Antisiphonic Devices for Boilers, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to a device for preventing hot water boilers or other tanks or receptacles from collapsing by siphonic action.

In accordance with this invention, the hot water boiler, which may be of any suitable or usual construction, such as now commonly employed in dwelling houses and other buildings, is provided with a water inlet pipe, between which and the boiler is interposed a device, which coöperates with the inlet pipe to form a water seal for the inlet pipe under normal conditions of service and to permit said seal to be broken by siphonic action set up in the inlet pipe, whereby said action is rendered ineffective upon the water contained in the boiler. Provision is made for making the device compact and capable of being readily applied to the boiler. These and other features of this invention will be pointed out in the claims at the end of this specification.

Figure 1 shows in elevation a hot water boiler provided with a device embodying this invention. Fig. 2, a detail in elevation and section on an enlarged scale of the upper part of the boiler and the device, and Fig. 3, a modification to be referred to.

Referring to Figs. 1 and 2, *a* represents a hot water boiler of any usual or suitable construction, such as now commonly employed in dwelling and other houses, it being provided with the pipe connections *b*, *c*, for the water back of the range, not shown, the outlet pipe *d* for the hot water and the inlet pipe, which is herein shown as composed of two sections *e*, *f*, which are separated from each other. The pipe section *e* is connected with the supply pipe 10, which is connected with the street main or other source of supply and is provided with the usual shut-off valve 12, and said pipe section is provided with a branch pipe 13 having a faucet 14, and the primary object of the present invention is to prevent the water in the boiler being siphoned out of the same

in case the faucet 14 should be opened when the shut-off valve 12 is closed, and thereby avoid collapsing of the boiler by atmospheric pressure. To this end, the pipe section *f* has its lower end extended into the boiler to near the bottom of the same in the usual manner, and has its upper end extended up out of the boiler and into a casing or reservoir 16 detachably secured to the boiler by a spud 17 with which the bottom of the reservoir is in threaded engagement. The reservoir 16 is provided with an opening in its top with which the section *e* of the water inlet pipe is connected by a nut 18, which engages a flange 19 on the pipe section *e* and engages a threaded nipple 190 on the reservoir to force the flange 19 against the end of the nipple. The pipe section *f* is made of smaller diameter than the diameter of the spud 17 so as to leave a space around the pipe section *f*, which connects the reservoir 16 with the boiler around the said pipe. The pipe section *f* is suspended in the boiler, which is accomplished as herein shown by a pin 20 extended through the pipe *f* and having its ends resting on the upper edge of the spud. The pipe section *f* is provided at its upper end within the reservoir 16 with a flaring mouth or end 21, which is of larger diameter than the outlet end of the pipe section *e*, and is separated therefrom by a space, which is normally sealed by water in the reservoir. The outlet end of the pipe section *e* may terminate flush with the upper wall 24 of the reservoir.

In operation, under normal conditions of use, the reservoir 16 practically forms a part of the water inlet pipe through which the water is supplied to the boiler and is filled with water, as represented in Fig. 2. When, however, the conditions are such that the water in the boiler would otherwise be siphoned out, such as in the case where the faucet 14 is opened with the supply valve 12 shut off, the water in the upper pipe section of the inlet pipe and in the reservoir 16 is siphoned off until sufficient air contained in the water in the boiler has been drawn by the siphonic action into the reservoir, and has accumulated in the reservoir at the upper end thereof to break the continuity of the water between the pipe sections *e*, *f*, whereupon the siphonic action is stopped, leaving the water in the boiler undisturbed and preventing collapsing of the boiler.

In the practical operation of the device herein shown, the siphonic action is inter-

rupted substantially in an instant and before the level of the water in the reservoir has been lowered but slightly below the top of the pipe section *f*.

5 By reference to Fig. 2, it will be seen that opportunity is afforded for the air in the water in the boiler to pass into the reservoir through the space around the pipe between the latter and the spud, and that this air
10 is deflected outwardly toward the top of the reservoir by the flaring mouth of the pipe section *f*. By thus safeguarding the boiler against collapsing a lighter and more inexpensive boiler can be used with safety.

15 In Fig. 1, I have represented the sealing reservoir as forming part of the inlet pipe for cold water, but it is not desired to limit the invention in this respect, as it is also adapted to be included in the hot water pipe
20 of those systems in which the hot water pipe *d* is returned to the boiler and forms a loop from which hot water branch pipes are tapped off. Such a system is shown in Fig. 3, wherein *d* represents the hot water
25 outlet pipe; 31 the return pipe of the loop; 32 represents the branch pipes leading upward, and 33 the branch pipe provided with the faucet 34. In the system shown in Fig. 3, it will be seen that if the cold water supply
30 should be shut off and the hot water faucet 34 opened, the water in the boiler would be siphoned off in the absence of the present invention, but by providing the hot water inlet pipe 31 with sealing device 16
35 above described, this action is prevented.

When the boiler is made of copper or of other metal of sufficient thinness to be collapsed by the atmospheric pressure, the device herein shown prevents such collapse as
40 above described. The device is also equally adapted to be used with boilers of sufficient strength to resist atmospheric pressure, such, for instance, as galvanized steel boilers, but, in this case, the device acts to prevent the water
45 in the boiler being siphoned out and thereby safeguards the user of the boiler against accidents, as, for instance, in case the water in the boiler should become siphoned out to below the level of the pipe *c* connected with
50 the water back of the range, steam is liable to be generated in the boiler, which is liable to start the boiler leaking, burst the pipes connected therewith and blow out the water back in the stove, with liability of accidents,
55 which are avoided by the present invention.

Claims:

1. The combination with a boiler provided with an opening in its top, a spud extended through said opening, a reservoir secured to
60 said spud at its lower end and provided with

a nipple at its upper end said reservoir communicating with the boiler through said spud, a pipe section secured to said nipple, and a pipe section of smaller diameter than said spud and extended through the latter
65 into the boiler and having its upper end extended into the reservoir and provided with a mouth of greater diameter than the pipe section secured to the reservoir, said pipe sections being separated within the reservoir,
70 and means to support the lower pipe section, substantially as described.

2. The combination with a boiler, of a reservoir secured to said boiler and in open communication with the upper portion thereof,
75 of, a water inlet pipe for said boiler composed of an upper section secured to the upper portion of the reservoir and having its lower end in open communication therewith, and a lower pipe section having its lower
80 end extended into the boiler and its upper end into the reservoir and provided with an outwardly flaring mouth of larger diameter than the lower end of the upper section from which it is separated, substantially as described.
85

3. The combination with a boiler of a casing having an opening in its bottom communicating with the upper portion of the boiler, and an opening in the top adapted to
90 communicate with the inlet pipe for the boiler, said inlet pipe, and means to secure it to said casing, and a tube of smaller diameter than the opening in the bottom of the casing extended through the said opening
95 into the boiler and having its upper end extended into the casing toward the inlet pipe but separated therefrom, and means to support said tube, substantially as described.

4. The combination with a boiler, of a reservoir secured to said boiler and in open communication with the upper portion thereof,
100 of, a water inlet pipe for said boiler composed of an upper section secured to the upper portion of the reservoir and having its
105 lower end in open communication with said reservoir, and a lower section extended into the boiler and having its upper end extended up into the reservoir above the bottom thereof and in open communication with said reservoir,
110 and separated from the lower end of said upper section, substantially as described.

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

GEORGE H. AYER.

Witnesses:

JAS. H. CHURCHILL,
J. M. MURPHY.