

G. E. WHITNEY.
BOILER SAFETY DEVICE.

APPLICATION FILED AUG. 28, 1903. RENEWED DEC. 19, 1906.

Fig. 1:

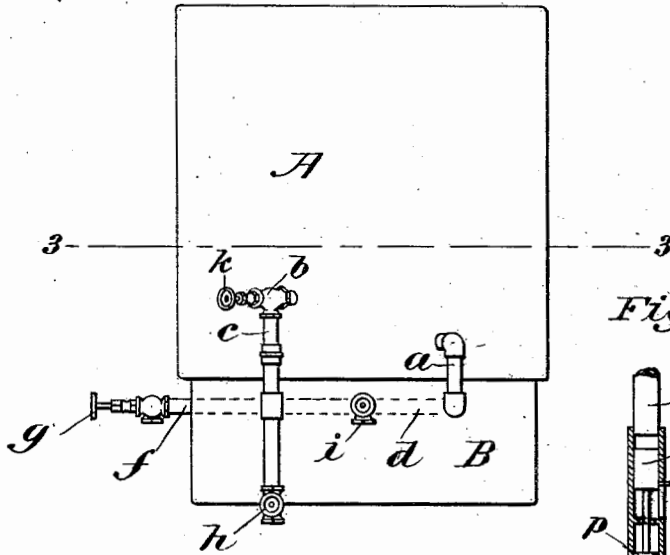


Fig. 4:

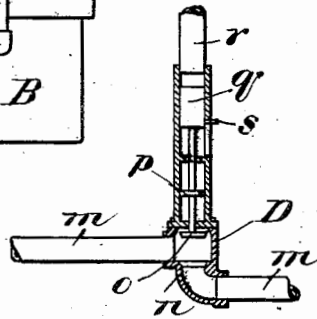


Fig. 2:

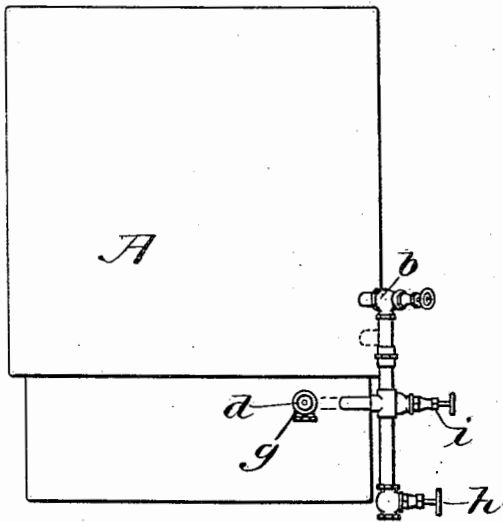
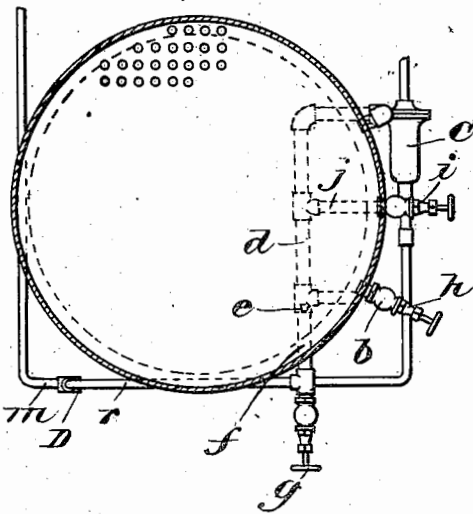


Fig. 3:



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UNITED STATES PATENT OFFICE.

GEORGE E. WHITNEY, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR, BY MESNE ASSIGNMENTS,
TO STANLEY MOTOR CARRIAGE COMPANY, A CORPORATION OF MASSACHUSETTS.

BOILER SAFETY DEVICE.

No. 860,717.

Specification of Letters Patent.

Patented July 23, 1907.

Application filed August 28, 1903, Serial No. 171,059. Renewed December 19, 1906, Serial No. 348,625.

To all whom it may concern:

Be it known that I, GEORGE E. WHITNEY, a citizen of the United States, residing at Bridgeport, in the county of Fairfield, in the State of Connecticut, have
5 invented an Improvement in Boiler Safety Devices, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention comprises an improved safety device
10 for steam generators intended to protect such generators from the injurious effect of a failure in water supply and is particularly, though not exclusively, useful in boilers such as are employed on automobiles and the like.

15 My invention will be best understood from a description of one embodiment thereof.

Referring to the drawings,—Figure 1 is a side elevation of a boiler fitted with one embodiment of my invention; Fig. 2 is a rear elevation of the same; Fig. 3
20 is a plan view in partial section; and, Fig. 4 is a detail.

In the drawings A is a boiler which may be of any construction, but which is here represented of the conventional type ordinarily employed upon automobiles. Into the side of the boiler by suitable connections is secured a pipe *a*, to connect with the water space thereof,
25 and at another point upon the boiler side, but at a level somewhat above the entrance of the pipe *a* is another suitable connection *b*, also with the water space of the boiler and leading to a downwardly extended pipe *c*.
30 Beneath the boiler is provided any suitable source of combustion, such as a hydro-carbon burner, B, through the interior of the casing of which, so as to be exposed to the heat of the combustion therein, is the pipe *d*, having outward lateral connections through the burner casing with the two downwardly extended pipes, *a* and
35 *c*, so that the said pipes *a*, *c*, *d*, constitute in effect a conduit connecting the water space of the boiler at different levels and exposed for a portion of its length to the heat of combustion applied to the boiler. So long
40 as the water level in the boiler is above connection *b*, there is obviously a natural circulation of water through the conduit referred to, between the two connected levels or strata, which are normally of different temperatures, passing downward through the pipe *a* into
45 the burner casing, thence through the horizontal pipe *d* and thence upward through the pipe *c*, again into the water space of the boiler.

The pipe *d* at a suitable location in its length, is provided with a fusible wall, such as the plug *e*, Fig. 3, of
50 tin or other fusible metal, normally closing an outlet from the conduit of which *d* forms a part, such outlet being provided by the pipe *f*, leading to the outside of the burner casing and having an exit to the external air controlled by the hand valve *g*.

So long as the water level in the boiler is above the
55 connection *b*, which point may be selected at some safe level, the circulation of water is through the conduit, as described, and the fusible plug *e* being cooled by the circulating water remains intact, separating
60 the conduit from the outlet pipe *f*. When for any reason whatever the water level has fallen below the connection *b*, however, the circulation through the conduit ceases, and the plug *e*, being no longer cooled by
65 the water circulation, is fused through the heat of combustion in the burner chamber, and the boiler blows off through the outlet conduit *f*, and the valve
70 *g*, which is normally maintained open. The provision of the valve *g* permits the apparatus to be restored to normal working conditions by closing the same after
75 which the boiler may be again given its necessary water supply, so that while the fusible plug protects the boiler from the consequences of a stoppage of its water supply, the melting of the plug does not incapacitate
80 the boiler from immediate further use, but by closing the valve *g*, it may be operated pending the subsequent restoration of the plug.

Since the conduit described is apt to become clogged with foreign matter, I have provided the blow-off
valve *h* in an extension of the depending pipe *c*, and
85 the second blow-off valve *i* in a branch pipe *j*, connected with the pipe *d* and extending laterally out of the burner casing. The globe cut-off valve *k* is also provided to intercept communication between the
90 pipe *c* and the water space of the boiler. By closing the valve *k* and opening the valve *i*, any obstruction in the pipe *a* is readily removed by the compulsory
95 circulation which the boiler pressure enforces through the pipes *a* and *d* and out through the valve *i*. By closing the valve *k* and opening the valve *h*, any obstruction in the pipes *a* and *d* may be similarly removed; while by opening the valve *h* only, the boiler
100 may be blown off through the pipe *c*, to remove any obstruction therein. It will thus be seen that I have provided means for positively compelling a circulation
105 through the conduit described to remove any foreign matter which may have lodged therein.

It sometimes happens that through carelessness or inattention, the water level of a boiler will fall below a given limit during the absence of the one having
110 charge of such boiler. In order to provide automatic means for reducing the heat of combustion under such circumstances, I preferably employ the following devices connected to my safety device to positively cut
115 off or reduce the supply of combustible to the hydro-carbon burner B, when the fusible plug melts. At C is the burner diaphragm regulator controlled by the
120 boiler pressure for normally varying the supply of combustible to the burner. The oil supply pipe is in-

licated at *m*, Fig. 3, and, before entering the burner, passes through a controlling valve, *D*, shown in detail in Fig. 4.

As will be seen by referring to Fig. 4, the burner pipe *m*, passes through a suitable casing *n*, provided with a valve *o*, having a plunger controlled by a dash pot or other suitable retarding device, *p*, provided with a piston *q*, controlled by the pressure in a pipe *r*, connected with the outlet pipe *f*, so that when the plug *e* is melted and the boiler blows off, the piston *q* will be forced downward to close the valve *o* and cut off the supply of combustible through the conduit *m*, the dash pot *p* maintaining the valve in such closed position after the pressure in the pipe has dropped. The valve *o* may be readily raised into the opening position shown in Fig. 4 by the pin *s*, projecting through a slot in the side of the casing *d*.

It will be obvious that my invention is in no wise limited to the specific details which I have herein shown nor to the arrangement or relation of parts herein described, but the same is capable of embodiment in a great variety of forms without departing from the spirit thereof.

Claim.

1. A safety device for steam generators comprising a conduit connected with the water space of the boiler and exposed to the heat of combustion thereof for a portion of its length, a fusible wall in said exposed conduit portion to normally close an outlet therein, and controlling means to cut off the exit through said outlet independently of the said fusible wall.
2. A safety device for steam generators comprising a conduit connected with the water space of the boiler and exposed to the heat of combustion of the boiler-heating means for a portion of its length, a fusible wall in the ex-

posed conduit portion, and an outlet conduit normally closed by said fusible wall and leading away from said heating means to cause the discharge of its contents out of the radius of action thereof.

3. A safety device for steam generators comprising a conduit connected with the water space of the boiler and exposed to the heat of combustion of the boiler, heating means for a portion of its length, a fusible wall in the exposed conduit portion, an outlet conduit normally closed by said fusible wall and leading away from said heating means to cause the discharge of its contents out of the radius of action thereof, and an externally arranged controlling valve for controlling said conduit.

4. A steam boiler having a hydro-carbon burner, a conduit connected with the water space of the boiler and exposed to the heat of combustion from said boiler for a portion of its length, a fusible wall in said conduit portion and means dependent upon the fusing of said wall for controlling the supply of fuel to said burner.

5. A safety device for steam generators comprising a conduit connected with the water space of the boiler and exposed to the heat of combustion for a portion of its length, a fusible wall in said exposed conduit portion, and means for enforcing a circulation of water under the boiler either through said conduit or a portion thereof to remove obstacles therein without interference with said fusible wall.

6. A safety device for steam generators comprising a conduit connected at opposite ends with different levels of the water space in the boiler, said conduit being exposed for a portion of its length to the heat of combustion beneath the boiler, a fusible wall in said exposed conduit portion, an outlet conduit normally closed by said fusible wall and leading away from the boiler heating means, and additional means for controlling said outlet conduit.

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

GEORGE E. WHITNEY.

Witnesses:

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