(No Model.)

G. B. ESSEX.

SAFETY WATER GAGE.

No. 513,492. Patented Jan. 30, 1894.

Fig. 1.

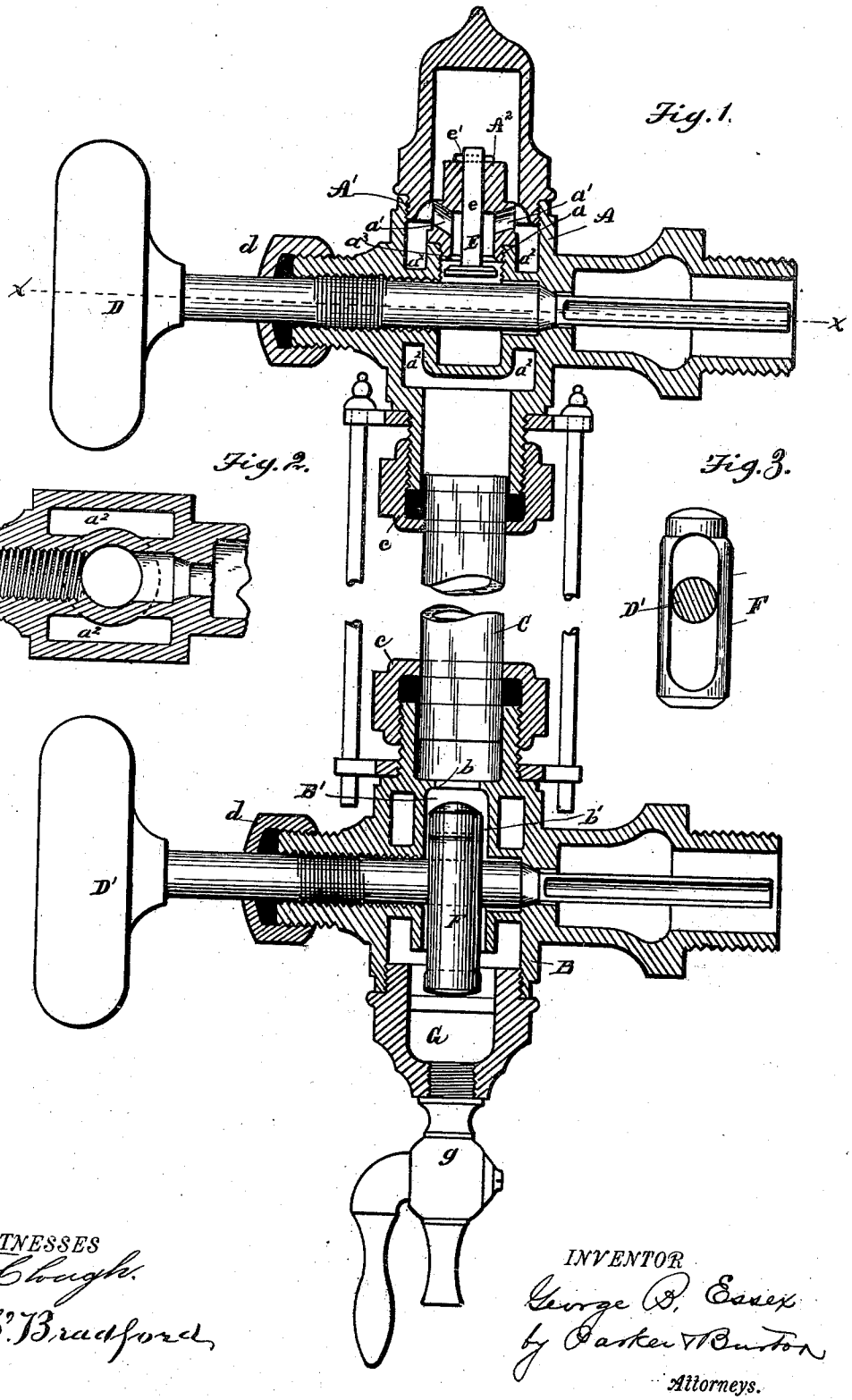

Fig. 2.

Fig. 3.

WITNESSES
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GEORGE B. ESSEX, OF DETROIT, MICHIGAN.

SAFETY WATER-GAGE.

SPECIFICATION forming part of Letters Patent No. 513,492, dated January 30, 1891.

Application filed April 17, 1893. Serial No. 470,780. (No model.)

To all whom it may concern:

Be it known that I, GEORGE B. ESSEX, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Safety Water-Gages; and I declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to water gages for steam boilers, and has for its object a simple and certain means of preventing the escape of the contents of the boiler to which the gage is attached, in case of the accidental breakage of the glass observing tube, and at the same time securing these results by a simple and economical construction of parts; and it consists in a peculiar arrangement and combination hereinafter described and claimed.

In the drawings, Figure 1, shows an elevation largely in section of the gage, the center being broken away and showing the details of construction of both the upper and the lower valve cases. Fig. 2, is a longitudinal sectional view of the upper valve case, on the line x, x, Fig. 1, with the valve stem and gland removed. Fig. 3, is an elevation of the lower valve, showing the opening through which the main valve stem passes, the valve stem being shown in section.

In the drawings, similar letters refer to similar parts.

A represents the upper valve case, and B, the lower valve case.

C, represents the glass water tube of the usual construction.

D, D′, represents the upper and lower stop valves, which are of the usual construction, and are operated by being threaded and inserted in internally threaded portions of the valve cases A and B, and packed by glands at d, d, in the usual manner. About these there is nothing new, nor is there about the manner of securing the glass by the usual packing and glands, c, c, in the upper and lower valve cases. The valve stems of the valves D, D′, pass centrally through the valve cases A, B.

At A′, the upper valve case A, is closed by a hollow cap attached to its upper portion by screw threads. The exact form of this cap or means of connecting it to the upper valve case, is unimportant, except that it should be connected in some manner as to be steam-tight, and capable of resisting the internal pressure of steam. A plug, A^2, is located within this cap A′, and is attached by means of appropriate screw threads at a, interiorly to the upper portion of the valve case A. This plug is hollow, the lower portion having a cavity of larger diameter than the upper portion. The lower portion is concaved at its mouth a^3, to form a valve seat. The upper portion of this plug A^2 receives a valve stem, e, of a valve E. This stem fits somewhat loosely in the perforation in the plug A^2, and is held therein by a pin passing through it at a'. The valve E, rigidly attached to the stem, is conical, and fits the valve seat a^3, when brought in contact therewith. It is obvious that the rising of the valve E, a short distance would bring it in contact with the seat, and that gravity would, on the release of pressure, compel it to fall until its further motion was arrested by the pin e', leaving the valve E, a short distance below the seat a^3.

Through the walls of the plug A^2, are formed a number of passage-ways, of which two are shown at a'. These passage-ways afford means of communication between the chamber formed in the plug and circumferential or annular spaces a^2, a^2, formed in the walls of the valve case A. These spaces open into and communicate below the valve D, with the glass tube C.

In Fig. 2, is shown the manner in which the annular space passes by upon either side of the seat for the valve stem D. It is obvious, therefore, that steam, being permitted to enter into the valve case A, by the withdrawal of the upper valve D, from its seat, would pass first into the space below the valve E; and the valve, being in position shown in the drawings, would rise above it into the chamber formed in the plug A^2, and above the valve E; thence passing through the passage-way a', a', into the annular space a^2, a^2; and thence communicating to and with the glass tube C. Upon the breaking of the glass tube, a sudden rush of steam or any current thereof, would lift the valve E, against the force of

its weight, until it was firmly seated in the valve seat a^3, when the passage of steam would be entirely prevented as the pressure upon the other side would be relieved, and the continued pressure upon the lower side of the valve E, would keep it closed until the pressure should be relieved.

The lower valve case B, has a valve seat formed just below the lower end of the tube C, at *b*. This seat is adapted to receive the face of the valve F, which rests directly under it, and is held in position by means of a slot formed therein. This valve F, nearly fills the chamber B′, in which it is located. The weight of the valve F, withdraws it from the valve seat *b*, so as to permit free communication between the water space in the boiler and the lower end of the glass tube, on opening the valve D′.

The lower portion of the case B, is closed by means of a hollow cap G, firmly attached thereto, and to the bottom of the cap is attached a pet-cock *g;* by which the whole apparatus may be drained.

In case of the breakage of the glass C, while the valves D, D′, are opened, the rush of water through the lower valve case and through the passage brings an upward pressure against the valve F, which overcomes its weight, causes it to rise and seats it water-tight against the valve seat *b*. This with the simultaneous closing of the valve E, in the manner heretofore described, at once prevents the escape of anything more than the amount of water or steam contained in the cases A and B, and the tube C.

What I claim is—

1. In a safety water gage, the combination of an upper and a lower valve case, a glass tube connecting the two, a common source of steam and water supply, a steam chamber located in the upper valve case communicating with the source of steam supply, a valve located in said channel of communication, steam passages leading from the upper portion of said steam chamber and formed in the walls thereof, to the glass tube, a valve seat located in the upper portion of said chamber, and a valve adapted to be seated therein and closing upwardly, adapted to close the outlet from the steam chamber into said passage-ways, a water chamber located in the lower valve case, a passage-way leading therefrom directly to the glass tube, and a plug valve adapted to be actuated upwardly by the flow of water to close said passage-way, substantially as described.

2. In combination with the lower valve casing of a safety water gage, the stop valve D′ traversing the chamber horizontally, an automatic closing valve F having a slot therein through which the stem of the valve D′ passes, whereby the stem of the valve D′ holds the check valve in position when open and guides it in its upper motion, substantially as described.

3. In a safety water gage, the combination of a valve casing A, valve D, a source of steam supply, a glass tube C, said valve casing having an interior steam chamber formed therein, valve E, valve seat a^3, steam ports a', a', a removable cap A′, and removable plug A^2, having therein steam passages, valve seat and valve, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

GEORGE B. ESSEX.

Witnesses:

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