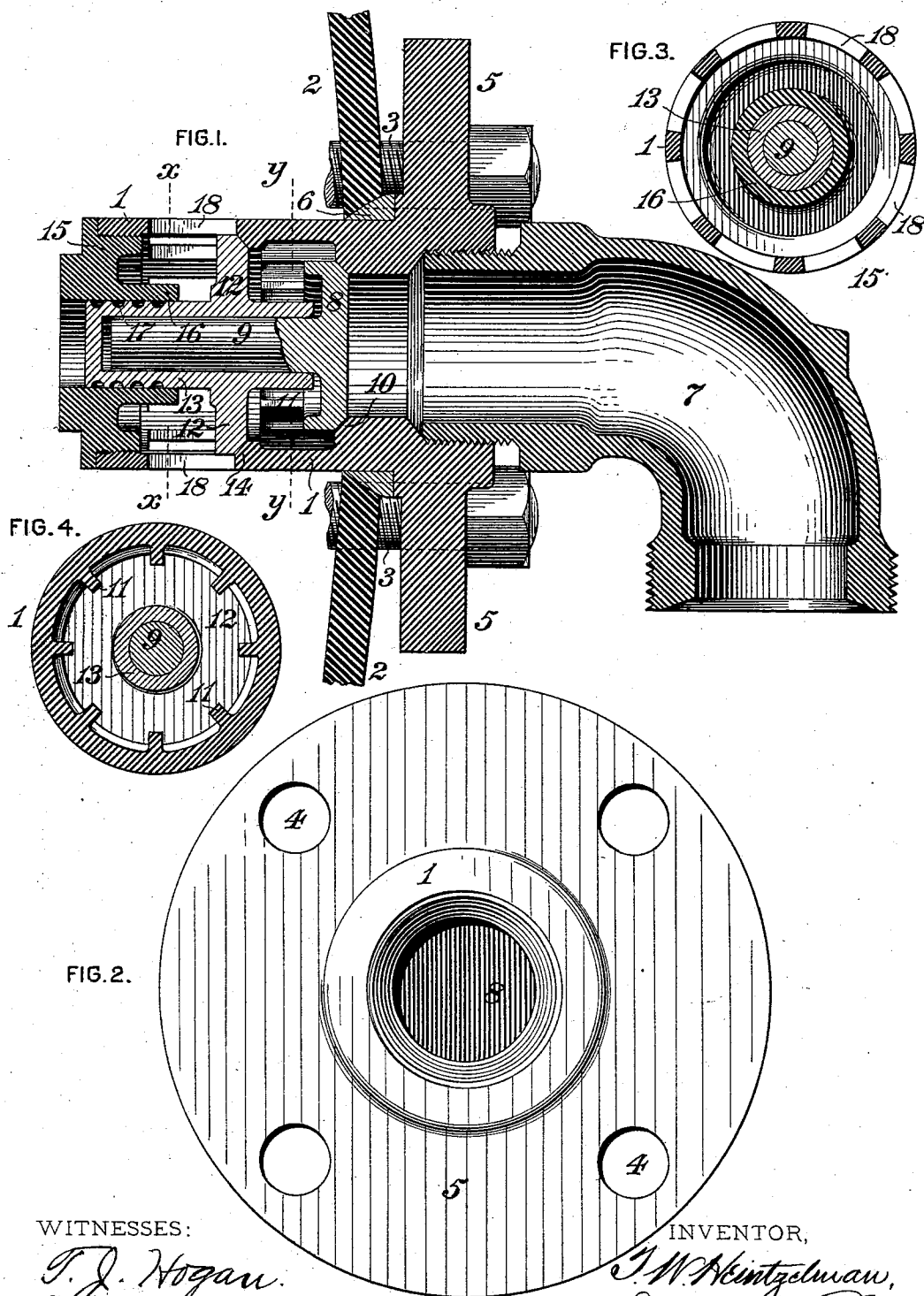


(No Model.)

T. W. HEINTZELMAN.
SAFETY CHECK VALVE FOR STEAM BOILERS.

No. 537,038.

Patented Apr. 9, 1895.



WITNESSES:

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TAYLOR W. HEINTZELMAN, OF SACRAMENTO, CALIFORNIA.

SAFETY CHECK-VALVE FOR STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 537,038, dated April 9, 1895.

Application filed November 16, 1894. Serial No. 528,849. (No model.)

To all whom it may concern:

Be it known that I, TAYLOR W. HEINTZELMAN, of Sacramento, in the county of Sacramento and State of California, have invented
5 a certain new and useful Improvement in Safety Check-Valves for Steam-Boilers, of which improvement the following is a specification.

My invention relates to boiler feed appliances of the class or type embodying a check valve which is located on the inside of the boiler, and is provided for the purpose of preventing the more or less serious accidents occasioned by the escape of water and steam,
15 resultant upon the breakage of a feed pipe connection exterior to a steam boiler.

The object of my invention is to provide a valvular device, of simple and inexpensive construction and capable of application in the
20 ordinary manner, which shall effectively perform the function of a safeguard as above stated and which shall be free from liability to displacement or imperfect operation of its valves.

To this end, my invention, generally stated, consists in the combination of a valve casing, and two check valves, serially controlling the passage of fluid through said casing, and seating on the inner side of the plane in which
30 the casing bears against a boiler shell when connected thereto.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawings: Figure 1 is
35 a vertical central section through an appliance embodying my invention, in operative position on a boiler; Fig. 2, a face view of the valve casing, with the feed pipe detached, and Figs. 3 and 4, transverse sections, at the
40 lines *x, x*, and *y, y*, respectively, of Fig. 1.

In the practice of my invention, I provide a valve casing 1, which is, preferably, of cylindrical form, and is adapted to be inserted
45 in, and, in operative position, project into, a steam boiler or other receptacle of fluid under pressure to which fluid is to be supplied, being connected to the shell, 2, of the boiler, by tap bolts, 3, passing through holes 4, in a flange, 5, formed on the outer end of the valve casing.
50 A ring 6, having a face turned to the form of a segment of a sphere, and fitting in a correspondingly bored recess in the boiler

shell, is preferably interposed between the latter and the flange 5, to insure a tight joint having a certain degree of flexibility. The
55 feed pipe 7, through which water is forced, by an injector or pump, to the valve casing, is connected to the outer end thereof, the section of the feed pipe shown being an elbow, which is screwed into the valve casing, and
60 is externally threaded at its lower end to engage an ordinary union coupling by which it is connected to the next feed pipe section.

A primary check valve 8, which is of the puppet or lift type, and is provided with a
65 stem 9, is fitted to reciprocate in the valve casing 1, and to shut off the flow of fluid through the same, when forced by the pressure in the boiler against a seat 10, which is shown as about in line with the inner surface
70 of the boiler shell, but which may be located in any desired position substantially within, or on the inner or delivery side of, the plane in which the casing bears against the boiler shell. The valve 8 is guided in its movements
75 by longitudinal ribs or projections 11, on the inside of the chamber or space in the casing in which said valve works, the ribs being bored out to fit neatly around the valve 8, as well as by the tubular stem 13, of a secondary
80 check valve 12, which incloses its own stem 9.

The secondary check valve 12, which is of larger diameter than the primary valve 8, reciprocates in line axially therewith, and closes
85 on a seat 14, in the valve chest, located at the inner or delivery end of the space in the casing in which the valve 8 works. The valves 8 and 12 are held securely in the casing, with the capacity of their desired and determined
90 lift, by a cap 15, screwed into the inner end of the casing and provided with a central sleeve 16, within which the tubular stem 13 of the valve 12 traverses, and which serves as a guide to insure rectilinear movement of said
95 stem and valve. The valve 12, when lifted to the maximum degree from its seat 14, abuts against the adjacent or inner end of the sleeve 16, which thus serves as a stop, and the valve 8, when lifted to the maximum degree from its seat 10, abuts against the adjacent or inner
100 end of the tubular stem 13 of the valve 12. It will be seen that both the check valves are so guided as insure their true rectilinear movement, the valve 8 having both the ribs

11 and the tubular stem 13 as guides, and the valve 12 being maintained truly in axial line with the valve 8, by its bearing on the sleeve 16 and on the stem 9.

5 As shown in Fig. 1, a slight space or lost motion, in practice about one sixteenth of an inch, is left between the valve 8 and stem 13, when the valves 8 and 12 are both seated, so that the valve 8 can be lifted, for such
10 distance, without coming in contact with the stem 13 and unseating the valve 12. A series of packing grooves 17, may be turned in the stem 13, to receive water which will act as a lubricant or packing between said stem
15 and the sleeve 16. Water fed to the valve casing by the injector or pump, is delivered from the casing to the interior of the boiler through a series of lateral ports 18, formed in the valve casing on the inner side of the
20 valve seat 14.

In the operation of the appliance, both the valves 8 and 12 are normally held seated, by the pressure in the boiler, during the periods in which water is not being fed to the boiler.

25 When the injector or pump is started, the water which is thereby forced into the valve casing 1, unseats the primary valve 8, and fills the space between it and the secondary valve 12. The pressure of the entering water, as well as
30 the contact of the primary valve, after it has lifted through the degree of lost motion provided, with the stem 13 of the secondary valve, unseats the latter, and the feed water is delivered into the boiler, through the lateral ports
35 18, in all directions except directly against the tubes, thereby obviating tendency to the formation of incrustation at or near the valve seats. Upon the relief of external pressure, by the cessation of the action of the injector
40 or pump, or the rupture of the feed pipe, the pressure in the boiler instantly closes the check valves, the operation of both valves, in opening and in closure, being simultaneous, except as to the degree of independent lift of
45 the primary valve permitted by the space between its inner side and the adjacent end of the stem of the secondary valve.

I claim as my invention and desire to secure by Letters Patent—

50 1. The combination, substantially as set forth, of a valve casing, a primary check valve, and a secondary check valve, said valves serially or successively controlling the flow of fluid through the casing, and each seating on
55 the inner side of the plane in which the casing bears against a boiler shell when connected thereto.

2. The combination, substantially as set forth, of a valve casing, a primary check valve,
60 and a secondary check valve, said valves working in line axially in the casing and on the inner side of the boiler shell to which the same is connected, and being actuated, both in opening and in closure, one by the other.

65 3. The combination, substantially as set

forth, of a valve casing, a primary check valve fitted to reciprocate therein, on the inner side of the boiler shell to which the same is connected, a secondary check valve seating in the casing in line axially with, and on the de- 70
livery side of, the primary valve, in position to be unseated by the contact thereof, and an end stop which limits the lift of both the primary and the secondary valve.

4. The combination, substantially as set 75
forth, of a valve casing, a primary check valve fitted to reciprocate therein, a secondary check valve seating in the casing in line axially with, and on the delivery side of, the primary valve, a stem on the receiving side of the secondary 80
valve, of such length as to allow a short preliminary lifting traverse of the primary valve independently of the secondary valve, and an end stop which limits the lift of both the primary and the secondary valve. 85

5. The combination, substantially as set forth, of a valve casing, a primary check valve fitted to reciprocate therein, a secondary check valve seating in the casing in line axially with, and on the delivery side of, the primary valve, 90
in position to be unseated by the contact thereof, a cap closing the inner end of the valve casing and having a stop which limits the lift of both the primary and the secondary valve, and a series of lateral ports formed in the valve 95
casing, on the delivery side of the secondary valve.

6. The combination, substantially as set forth, of a valve casing, a primary check valve fitted to reciprocate therein and having a stem 100
on its delivery side, a secondary check valve, seating in the casing on the delivery side of the primary valve, a tubular stem on said secondary valve inclosing the stem of the primary valve and adapted to abut against said 105
primary valve, and a cap connected to the inner end of the valve casing and having a central sleeve fitting the stem of the secondary valve, against which stem said secondary valve abuts at its maximum lift. 110

7. The combination, substantially as set forth, of a valve casing, a primary check valve fitted to reciprocate in a chamber therein and having a stem on its delivery side, a series of longitudinal guide ribs formed on the cham- 115
ber and fitting the periphery of said primary valve, a secondary check valve seating in the casing on the delivery side of the primary valve, a tubular stem on said secondary valve inclosing the stem of the primary valve and 120
adapted to abut against said primary valve, and a cap connected to the inner end of the valve casing and having a central sleeve fitting the stem of the secondary valve, against which stem said secondary valve abuts at its 125
maximum lift.

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Witnesses:

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