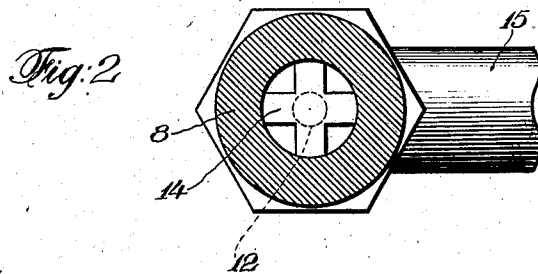
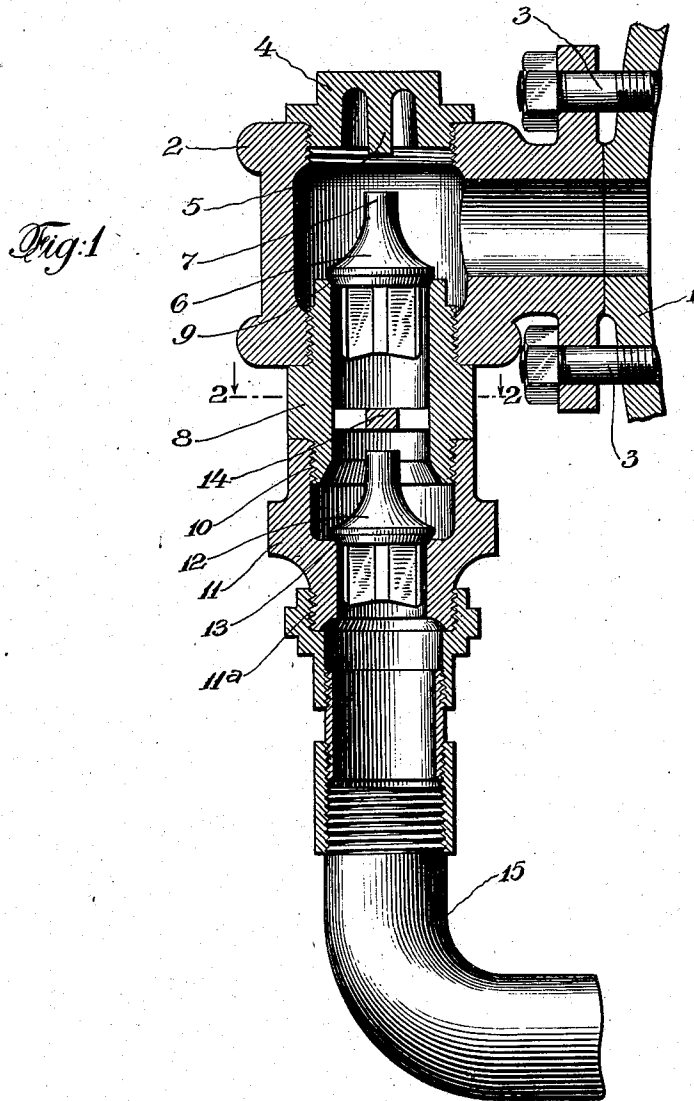


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CHECK VALVE.

APPLICATION FILED JULY 20, 1908.

Patented Oct. 19, 1909.

937,288.



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CHECK-VALVE.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CHARLES J. DRURY, of La Junta, in the county of Otero and State of Colorado, have invented a new and useful
5 Improvement in Check-Valves, and do hereby declare that the following is a full and exact description thereof.

The object of my invention is to provide a check valve which is especially designed
10 for use in the injector inlets of boilers, although it is capable of application to various other devices. In the past, great difficulty has been encountered in obtaining a check valve of this nature that was thor-
15 oughly satisfactory. The check valves that have been in use become readily stuck through the interference of particles of foreign matter of different kinds, such as bolt heads, solid impurities in the water, parti-
20 cles of rubber, etc. When this has occurred, it has almost invariably been found necessary, owing to the inaccessibility of the parts of the check valve, to allow the steam to escape from the boiler, to remove the water,
25 and overhaul the boiler generally; and in the case of locomotives it has been found necessary to return the engine to the round house and overhaul the boiler in the same way.

30 The check valve, which is an embodiment of my invention, has been designed to avoid all of these difficulties. In general, it is a double check valve. The lower one of the valves, the valves being so constructed that
35 they operate independently of each other, is smaller in diameter than the upper one of the valves, and has a very much smaller throw or lift than the upper valve. In fact, the throw or lift of the upper valve is prefer-
40 ably, although not necessarily, exactly twice as great as that of the lower valve. In a construction of this kind it will be readily seen that any foreign particles that might
45 get into the injector pipe might, by some possibility, stick the lower valve, and retain it in an inoperative position. Under these circumstances, however, the check valve would continue to operate perfectly, owing
50 to the fact that the upper check valve would effectively retain the boiler pressure until the lower check valve could be repaired. Should such a particle get by the lower check valve, it would, of course, in no wise interfere with the operation of the upper
55 check valve, as the opening between this valve and its seat is, of course, very much

larger than the corresponding opening for the lower check valve. Again, owing to this arrangement, should any hard particle scratch the lower valve and then pass
30 through, this particle would readily pass beyond the upper valve into the boiler without scratching it. In such an event, the upper valve would continue to work perfectly and retain the boiler pressure, while the
35 lower valve could be detached and repaired, as above indicated.

Furthermore, one of the main features of my invention is to provide a valve structure comprising two independently operable superimposed valves, having an intermediate web with more or less restricted openings.
70 The purpose of this construction is to prevent any broken parts of the lower valve, should the lower valve become broken, from reaching the upper valve and sticking it.

In the accompanying drawings Figure 1 is a vertical section of a valve and valve casing, located in an injector pipe, which is connected to a boiler; and Fig. 2 is a horizontal
80 section taken through the valve casing, looking down upon the web.

1 represents a fragment of a steam boiler, to which is connected a right-angled coupling 2 by means of bolts 3. This right
85 angled coupling 2 has located in its top a screw cap 4, having depending from its bottom a stop 5. A valve 6 is located within the coupling 2. The upper part of the valve is provided with a stem 7 which is adapted
90 at times to contact with the stop 5.

Screw threaded into the bottom of the right angled coupling 2 is a pipe section 8, which has located on its top a valve seat 9 for the valve 6. The lower part of the pipe
95 section 8 is screw threaded at 10 to receive an interiorly screw threaded pipe coupling 11, constituting a valve casing for the lower valve 12, which is smaller in diameter than valve 6. This pipe coupling 11 is provided
100 with a valve seat 13 for the valve 12. A web 14 is fixedly secured in the pipe section 8 immediately above the valve 12, but separated therefrom by a suitable interval. This interval is preferably exactly one-half of
105 the distance between the stem 7 of the valve 6 and stop 5 therefor, although this exact relation I do not consider essential. The lower part of the pipe coupling 11 is exteriorly screw threaded at 11^a so as to fit
110 the end of an injector pipe 15. I have so constructed these parts that the exterior

screw thread 10 on the pipe section 8, and the exterior screw thread on the pipe coupling 11 are exactly the same size, so that in case of injury to the lower valve, or threads

5 on valve cage the valve and the pipe coupling containing a valve seat therefor, might be entirely discarded for the time being and the injector pipe 15 coupled directly to the pipe section 8.

10 In the operation of the device, should any solid particle succeed in sticking the lower valve, the upper valve would continue to operate successfully to retain the boiler pressure until the particle could be removed

15 from the lower valve. If, however, such a particle should pass the lower valve, it could, of course, by no possibility, stick the upper valve, since the throw of the latter is, as has been indicated above, preferably twice

20 as great as the throw of the lower valve. Again, should the lower valve become scratched by the passage of some hard particle therethrough, and thus be rendered leaky, such a particle would not, owing to

25 its size, in all probability, scratch the upper valve. Such being the case, the upper valve would operate perfectly alone until the lower valve could be taken out and ground.

One of the important features of my invention comprises the insertion of the web 14 between the valve seats of the two valves 6 and 12. Should the lower valve for any reason become broken, the particles could not, owing to their size, reach the valve seat

30 of the upper valve, owing to the small size of the openings provided through the web. It must be obvious that should not such a web be provided, any large particle that might become detached from the body of

35 the lower valve might readily succeed in sticking the upper valve. With the provision of the interposed web, the efficiency of the upper valve is very markedly increased. In fact, the operation of repairing the lower

40 valve might, in the case of locomotives, be accomplished without returning the locomotive to the round house, that is to say, that the pipe coupling 11 with the valve 12 contained therein could be taken entirely off

45 while the locomotive is on the road, and the end of the injector pipe 15 be attached directly to the pipe section 8; or, in case the damage to the lower valve is so slight that it could be repaired by the locomotive engineer, the coupling containing this valve

50 might be unscrewed, the valve repaired by

him, and the coupling returned to the pipe without the necessity of returning the engine to the round house for repairs. In such an arrangement it will be obvious that a

60 very great saving in time and expense can be effected.

While I have described my invention as applied particularly to a pair of vertical check valves, I do not wish it to be understood that I am necessarily limited to valves located in this position, as my invention can be readily adapted to valves located in other positions, and to different types of check valves. The improvements which I have

65 applied to the valves described might readily be applied to check valves of other kinds, that is to say, by providing the forward valve, *i. e.* the one nearest the outlet of the pipe, with a larger diameter and a larger throw

70 than the rearward valve. It is obvious also that many other changes might be made in the details of the construction without departing from the spirit of my invention.

What I claim and desire to secure by Letters Patent is:

1. In a device of the character described, the combination of an inlet pipe and two independently movable check valves contained therein, the forward valve having a larger

75 throw or lift than the rearward valve.

2. In a device of the character described, the combination of an inlet pipe and two independently movable check valves contained therein, the forward valve being larger in

80 diameter and having a larger throw or lift than the rearward valve.

3. In a device of the character described, the combination of an inlet pipe, two check valves contained therein, and a web having

85 restricted openings interposed between the valves.

4. In a device of the character described, the combination of an inlet pipe, two independently movable check valves contained

90 therein, the forward valve being larger in diameter and having a larger throw or lift than the rearward valve, and a web having restricted openings interposed between the

95 valves.

In testimony that I claim the foregoing I have hereunto set my hand.

CHARLES J. DRURY.

Witnesses:

J. R. HICKMAN,
JOHN E. HALL.