No. 850,483. PATENTED APR. 16, 1907.

C. E. MISER.

CHECK VALVE FOR WATER GAGES.

APPLICATION FILED JAN. 5, 1907.

Fig. 1.

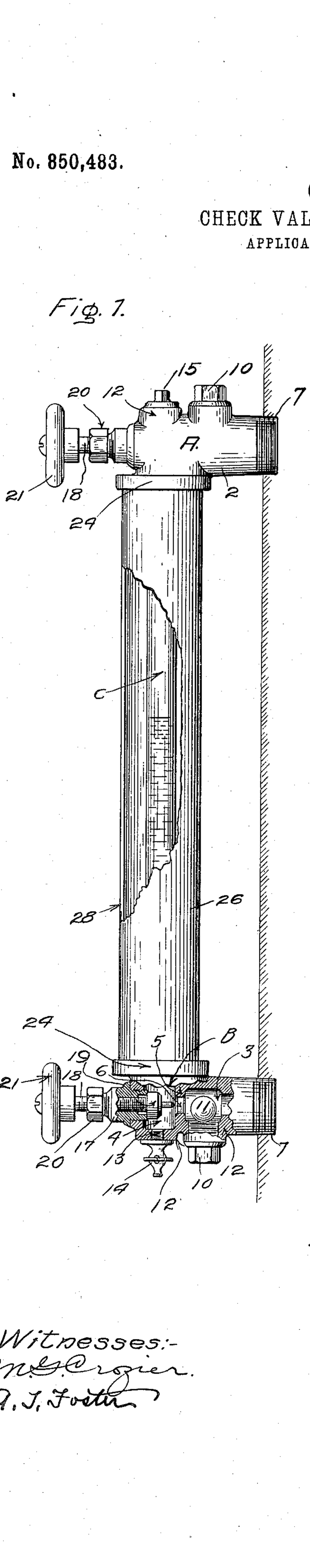


Fig. 2.

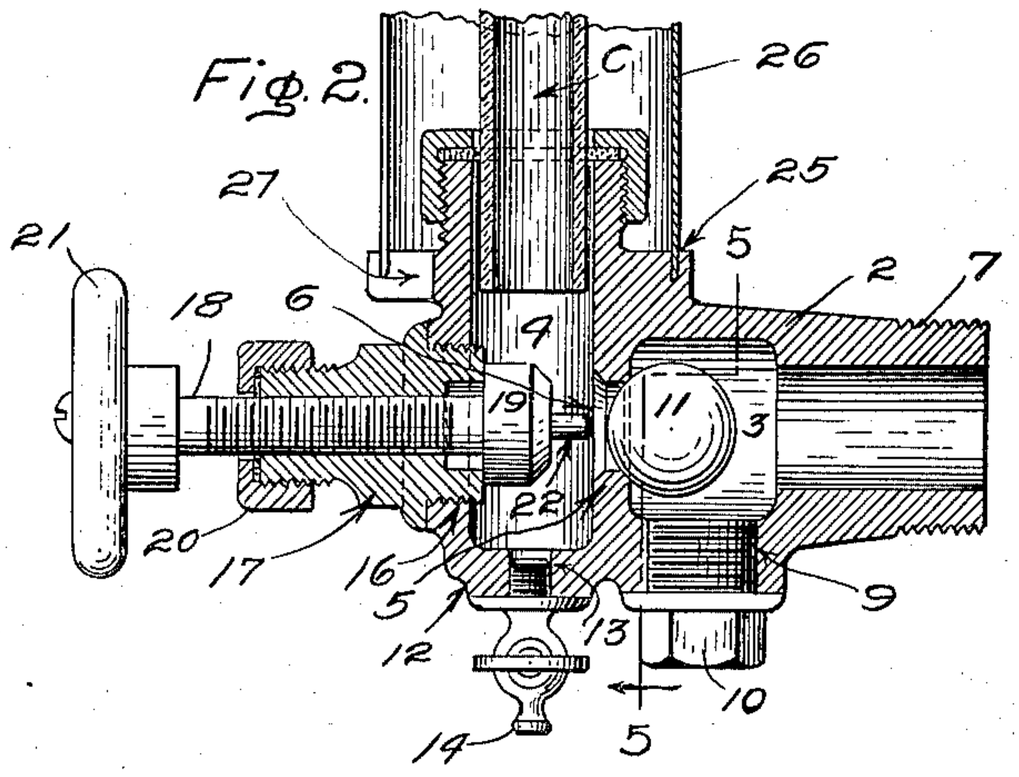


Fig. 3.

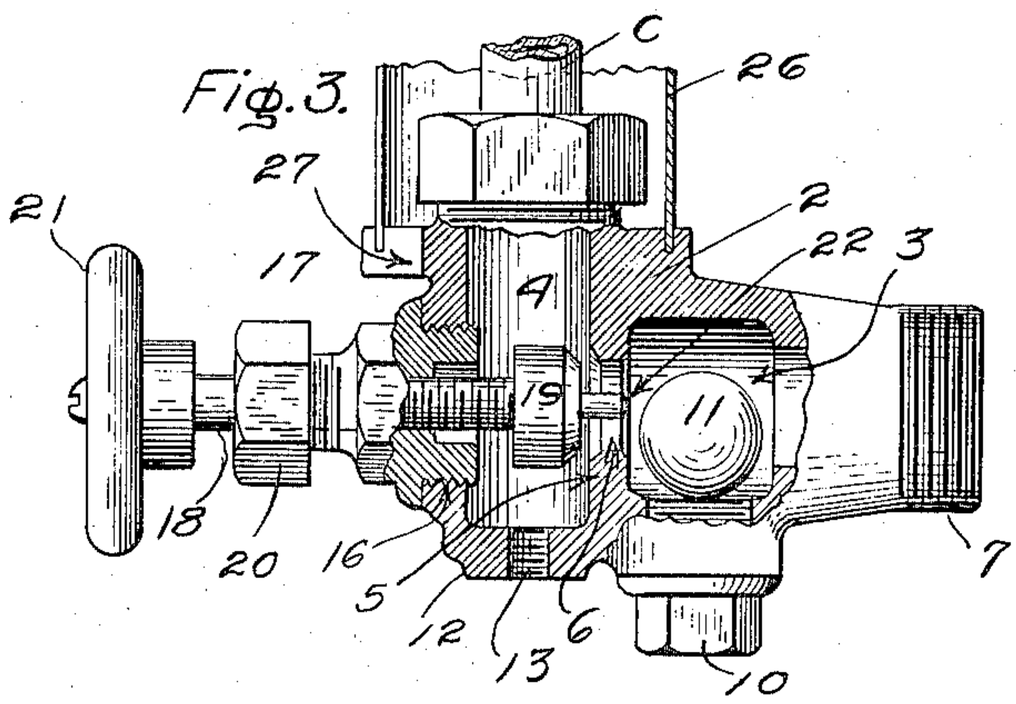


Fig. 4.

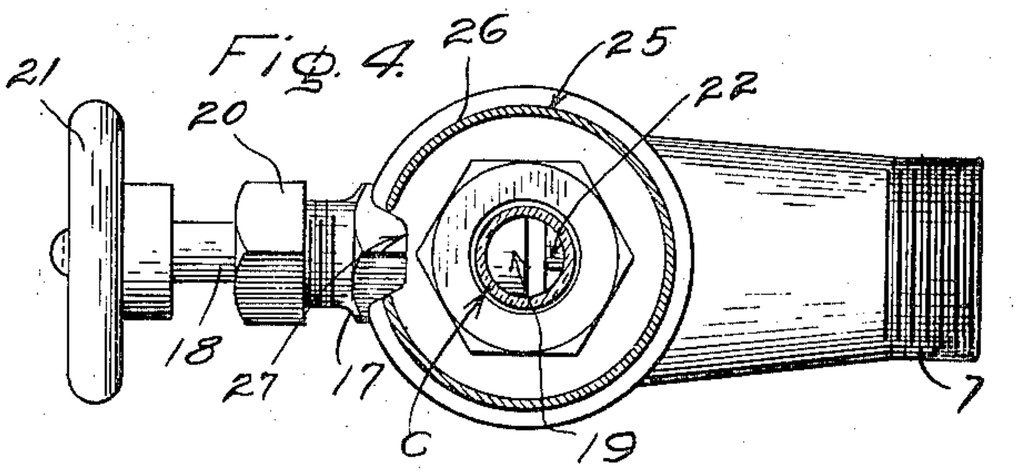
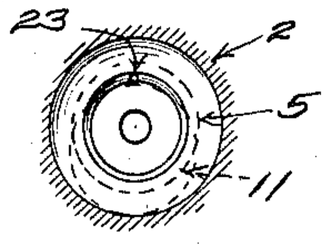


Fig. 5.



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UNITED STATES PATENT OFFICE.

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CHECK-VALVE FOR WATER-GAGES.

No. 850,483. Specification of Letters Patent. Patented April 16, 1907.

Application filed January 5, 1907. Serial No. 350,881.

To all whom it may concern:

Be it known that I, CHARLES E. MISER, a citizen of the United States, residing at Watertown, in the county of Jefferson and State of New York, have invented certain new and useful Improvements in Check-Valves for Water-Gages, of which the following is a specification.

This invention relates to improvements in check-valves designed for use in connection with water-gages attached to locomotive and other boilers to prevent automatically the escape of water and steam in the event of the breaking or removal of the gage-glass.

The invention relates particularly to improvements in the devices described and shown in Letters Patent of the United States granted to William S. Pitts, Charles A. Tanner, and Floyd G. Spink, numbered 838,055, dated December 11, 1906.

The object of the invention is to provide a simple check-valve and a stop-cock combined in a one-part casing capable of being connected directly to a boiler or like part, the said check-valve having no direct mechanical connection with the said casing or with any other parts of the device.

A further object of the invention is to provide a check-valve which will close a port or passage leading from the boiler to the water-gage quickly upon the breaking of the gage-glass and thus prevent loss or waste of the boiler-pressure or damage to the surroundings; and a further object is to provide means entirely independent of said check-valve for forcing and holding the same open during intervals in which the gage-glass or casing is being blown or cleaned out.

The invention consists principally in providing a check-valve in the form of a metallic ball or globe and disposing the same in a horizontal chamber extending between the gage and the boiler in such manner that at the instant the glass breaks the ball will be forced by the pressure into a seat, thereby preventing the steam and water from escaping and permitting the engineer to install a new glass in a safe and convenient manner.

A further feature consists in arranging the interior of the casing so that the ball will gravitate away from its seat shortly after a new glass has been installed without assistance from any one.

The invention further consists in providing simple means in connection with the stop-cock whereby the ball check-valve may be moved and held away from its seat for the purpose of blowing out the gage parts whenever desired; and the invention further consists in providing a simple shield for the protection of the gage-glass.

Other features and parts of the invention will be fully understood from the detail description which follows and from the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a view, partly in elevation and partly in section, showing a pair of my check-valves and a water-gage combined, also showing the shield surrounding the gage-glass. Fig. 2 is a central longitudinal section of one of the valves, showing the check-ball seated to present the escape of the boiler-pressure from the check-valve chamber into the gage-chamber, also showing the stop-cock in open position. Fig. 3 is a view, partly in elevation and partly in section, showing the stop-cock partially closed and the ball check-valve unseated. Fig. 4 is a plan view of the lower valve, showing the grooved flange which receives and supports the glass-shield. Fig. 5 is a view of the central port, substantially on the line 5 5 of Fig. 2, showing by-pass or duct formed in the check-valve seat.

Similar reference characters are assigned to corresponding parts throughout the several figures.

In the drawings, A represents the uppermost valve complete, B the lowermost valve, and C the glass tube comprising the water-gage, which is disposed between and may be connected with the said valves in any suitable manner.

2 represents the casings of the valves A and B, which are preferably made of tough brass and formed so as to provide one horizontal and one vertical chamber (designated by the numerals 3 and 4, respectively.) The two chambers in each casing are separated by a vertical wall 5, the latter being perforated centrally to provide a circular passage or port 6, through which water and steam may flow from the boiler through chamber 3 into gage-chamber 4.

7 represents external threading on the inner end of the casing 2 for use in connecting the valves to a boiler.

The casings of valves A and B are made or formed exactly alike and are therefore interchangeable; but when they are installed with a water-gage the upper casing is inverted, as

compared with the lower one. In each of the casings an opening 9 is formed through the wall leading to horizontal chamber 3, into which a threaded plug 10 is tightly fitted. The object of this opening is to permit of the insertion or removal of the check-valve or ball 11. The threaded portion of the plug 10 is formed to a length which will allow the ball in the lower casing to stand upon it when not seated in the same position with relation to the center of port 6 as does the ball in the upper or inverted casing. A boss 12 is formed on the outside of each casing central with the closed end of the vertical chamber 4, and a threaded hole 13 is made through each boss.

The glass tubes of all water-gages become clouded and dirty after they have been in use for a time and therefore require frequent cleansing. In order to provide simple and effective means for such cleaning out the lowermost valve-casing is equipped with a blow-out cock 14, which is screwed tightly into the threaded hole 13. As only one blow-out cock is required in a device of this kind, the threaded hole in the upper casing A is tightly closed by the insertion of a plug 15. If for any reason it is desired to reverse the position of the two valves, plug 15 may be removed and cock 14 substituted, and then the upper valve is ready for service in the lower position.

At the front end of each casing a threaded opening 16 is made through the wall leading to chamber 4, directly in line with the interior port 6, into which a flanged bushing 17 is fitted. This bushing forms part of a stuffing-box which supports the guide-stem 18 of stop-cock 19. A gland-nut 20 closes the outer end of said bushing, and a hand-wheel 21 is suitably fitted to the outer end of stem 18. The inner end of the stop-cock is made cone-shaped to fit a countersunk seat forming the outer end of the port 6. A similar seat is formed at the inner end of port 6 to receive the ball or check-valve 11 when the pressure from the boiler seats the same. 22 represents an inwardly-projecting tine or part, preferably formed integrally and centrally with stop-cock 19. This tine or part should be made a little longer than the thickness of the wall 5, so that when the stop-cock is screwed inwardly the said tine will engage and unseat the ball-valve before the stop-cock itself is seated. The object of this feature is to provide a simple means for unseating and holding the ball away from the mouth of port 6 at times when the engineer desires to blow out the gage-glass. It will be observed that the construction and arrangement of the valve parts are such that when the stop-cock is screwed outwardly far enough to leave a free passage through port 6 that the tine 22 will also be drawn outward through said port a sufficient distance to permit the ball to take its seat in case any emergency should arise, such as the breaking of the gage-glass or the opening of the blow-out cock connected with the lower casing.

23 represents a small duct or by-pass formed in each check-valve seat at the inner end of port 6, (see Fig. 5,) provided for the purpose of allowing a slight flow or feed of both water and steam through said ports into the gage-chambers. These ducts are employed to effect the balancing of the pressure in a newly-installed gage-glass, and they are made small, so there will not be a sudden inrush of the hot fluid, which might cause the breaking of the unseasoned or untempered glass.

Frequently when a gage-tube bursts the glass is broken into small pieces, which are thrown with great force in every direction and sometimes injure persons who happen to be in the immediate vicinity. In order to guard against such injury, I have provided each of the casings with a flange 24, which surrounds the walls of the vertical chamber 4 and form in the outer face thereof a groove 25, into which a detachable shield 26, preferably made of thin flexible sheet brass or tin, is placed. At a convenient point in the circle of the flange 24 a notch 27 is formed for the purpose of providing means for inserting the shield. The notch 27 extends inwardly beyond groove 25, and therefore permits of the shield being entered at either of the open ends of said groove. The metal of the shield should be flexible enough to readily follow and conform to the small circle of the groove when forced inwardly by hand. The shield may be readily and quickly removed after the breaking of a glass to permit of the installing of a new one and then replaced in the manner described. The shield is made from a sheet of metal of less width than required to form a complete tube when disposed in the groove 25, and when placed in position as described a slotted opening 28 appears in the front side, through which a view of the gage-glass may be obtained whenever desired; but this slot should not be large enough to allow the particles of a broken glass to escape and cause any damage or injury.

In practice my safety-valves are attached to a boiler in substantially the position and relation as shown in Fig. 1. After the valves have been secured to the boiler and the gage-glass in stalledthe shield 26 is then cut and put in place. When everything is in readiness for steaming up, the engineer will turn hand-wheels 21 to the left until the shoulders of cocks 19 come to a stop against the inner end of bushings 17. Then the passages or ports 6 will be open and free, and tines 22 will be drawn forward far enough to allow balls 11 to take their seats in case such action becomes necessary. As long as the gage-glass remains intact the pressure in the boiler and gage parts will be balanced or equalized, and

owing to the nature and disposition of the ball-valves the latter will be held away from their seats by gravity and during such intervals will stand in substantially the position shown in Figs. 1 and 3. Nothing in the ordinary working of a boiler or gage mechanism can cause the seating of the balls. They may roll around to some extent within the enlarged portion of cavity 3; but they cannot get out of the path of the pressure. At the instant that the gage-glass breaks or upon the opening of blowout-cock 14 the force of the pressure from the boiler seeking an escape as soon as the equilibrium has been destroyed will force or lift the balls in both of the casings and carry them into their respective seats, as shown in Fig. 2. The balls being considerably larger than the ports 6 and being truly spherical readily fit the said seats and close the circular ports and prevent any violent outrush of the steam and water. There will be a slight dripping or oozing of the fluid through the small grooved ducts 23; but the volume will not be great enough to injure anything or to seriously interfere with the installing of a new glass.

To cleanse the glass, blowout-cock 14 should be opened. The instant said cock is opened the balls in both casings will become seated, and as the amount of water and steam which may pass through the small ducts in the check-valve seats will not be sufficient to effect the cleaning of the glass the engineer will then screw in the stop-cock in the upper casing until tine 22 pushes the ball away from its seat far enough to allow a strong stream of steam to pass into the gage-chamber, and thus accomplish the washing of the glass. After the glass has been cleaned he should screw the upper stop-cock outwardly until it strikes the stop referred to and at the same time close the blowout-cock. The ball in the upper casing will then take its seat and both balls will remain seated until equilibrium of the pressure is restored in the gage parts, after which they will gravitate away from ports 6, as described.

The construction of my check-valves is very simple. They are practically self-cleaning and indestructible and not likely to get out of order.

Obviously many of the details and parts may be changed or modified within the scope defined by the appended claims, and I therefore do not restrict myself to the precise construction and arrangement of the device as described and shown herein.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A safety device of the class described, comprising a pair of interchangeable casings interiorly divided to form two chambers connected by a port or passage, a water-gage forming a fluid-passage for one casing to the other, a pair of free spherical check-valves disposed in corresponding chambers in said casings adapted to be simultaneously seated in said port or passage and thereby allow only a slight flow of fluid from the check-valve chambers into the other chambers when said gage-glass breaks, the said check-valves adapted to be unseated simultaneously by gravity when a new gage-glass has been installed, a flange having a groove forming part of a circle formed on each of said casings concentric with said gage-glass, and a shield comprising a sheet of metal adapted only to be inserted in said grooves after said casings have been attached to a boiler and thereby form a shield to partly surround said gage-glass, substantially as described.

2. A safety device of the class described, comprising a pair of interchangeable casings threaded at their inner ends to connect with a boiler, and interiorly divided to form an inner and an outer chamber in each casing, the inner chamber communicating with the boiler by means of a reduced passage or opening, the said chambers being connected with each other by a central port disposed in line with said reduced passage or opening, and each of said casings provided with a threaded opening formed through the wall leading to the inner chamber, a gage-glass supported by and connecting the outer chambers of said casings, free check-valves capable of being inserted into said inner chambers through said threaded openings and confined therein by screw-plugs fitting said threaded openings, the check-valve in the lower casing adapted when at rest to stand upon the inner end of said screw-plug, and the check-valve in the upper casing adapted when at rest to stand upon the lower floor of the inner chamber, in a position opposite the screw-plug, a flange having a groove forming part of a circle formed on each casing concentric with said gage-glass, and a sheet of metal adapted to be inserted in said groove after the casings have been attached to a boiler, for the purpose of forming a shield to partly surround said gage-glass, substantially as described.

3. A safety device of the class described, comprising interchangeable casings threaded at one end to connect with a boiler, and interiorly divided to form horizontal and vertical chambers, the horizontal chambers communicating with the boiler by means of an unrestricted opening or passage having a smaller area than said chamber, the chambers of each casing being connected by a port disposed in line with said opening or passage, and each casing provided with a threaded opening leading to the horizontal chamber, a gage-glass connecting the vertical chambers of said casings, a spherical check-valve capable

of being inserted into said horizontal chambers through said threaded openings and confined therein by screw-plugs fitting said threaded openings, a flange formed on each casing having a groove forming part of a circle concentric with said gage-glass, and a shield comprising a thin sheet of metal adapted to be inserted in and removed from said grooves after the casings have been secured to a boiler, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES E. MISER.

Witnesses:
HARRY DE WALLACE,
EDGAR V. BLOODOUGH.