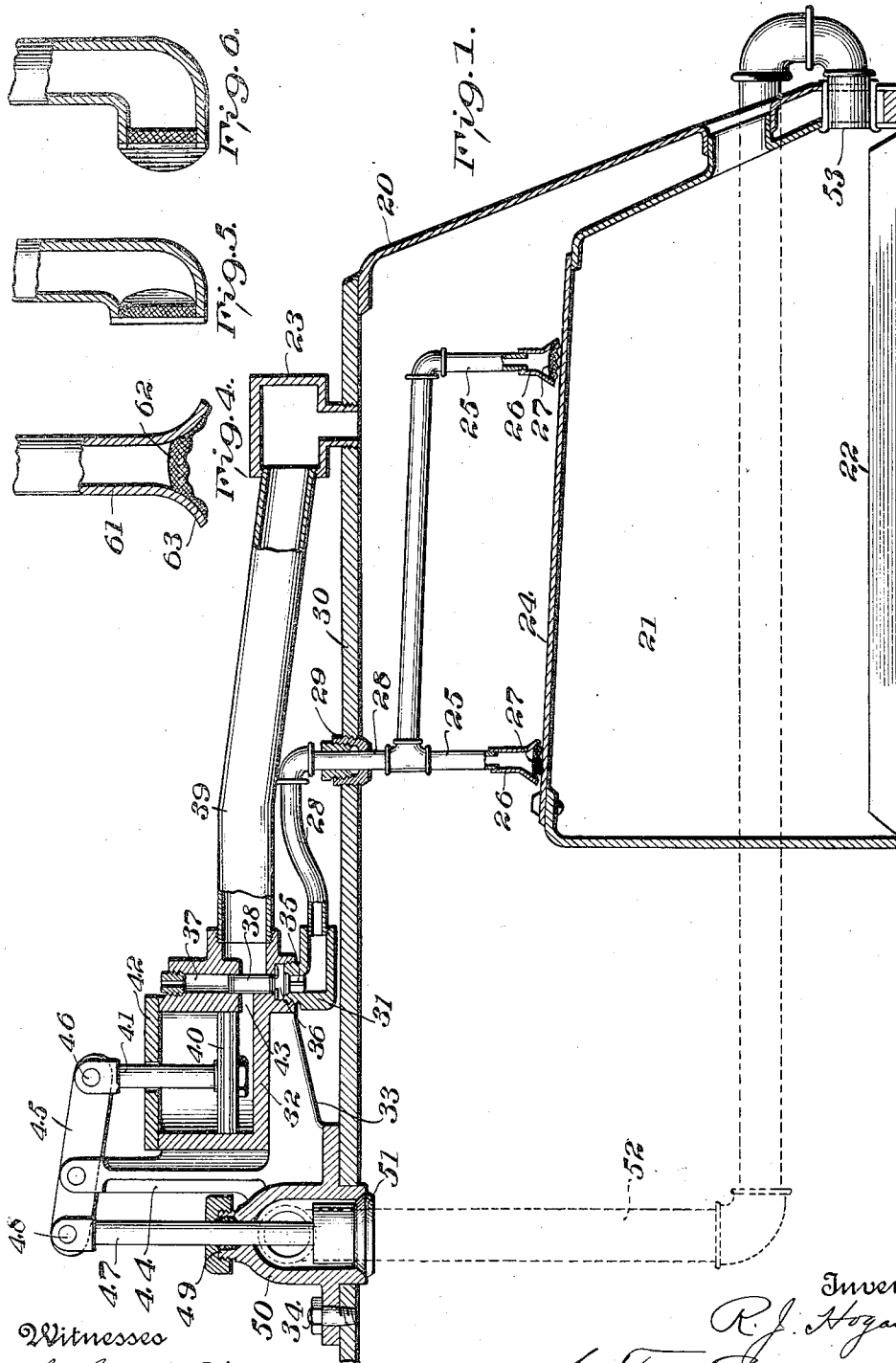


R. J. HOGAN.
SAFETY DEVICE FOR BOILERS.
APPLICATION FILED SEPT. 30, 1911.

1,036,494.

Patented Aug. 20, 1912.

2 SHEETS—SHEET 1.



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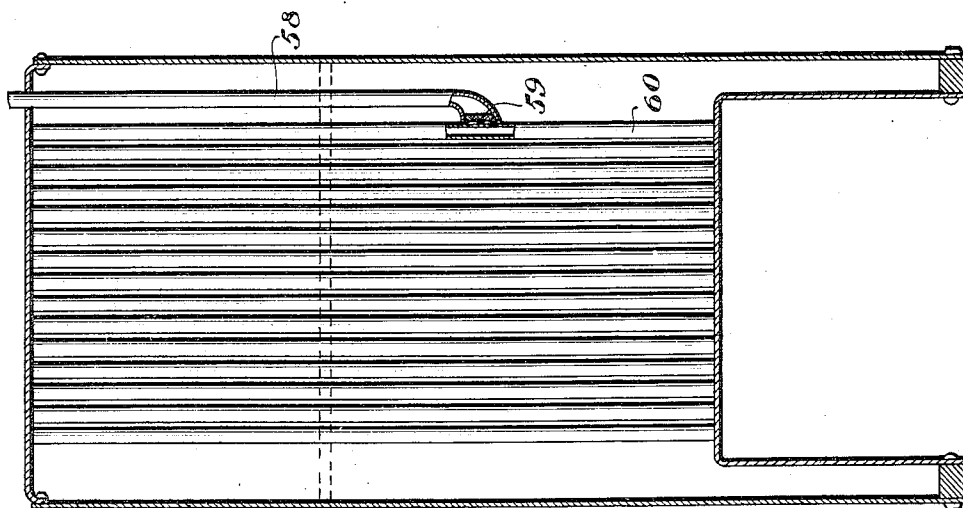


Fig. 3.

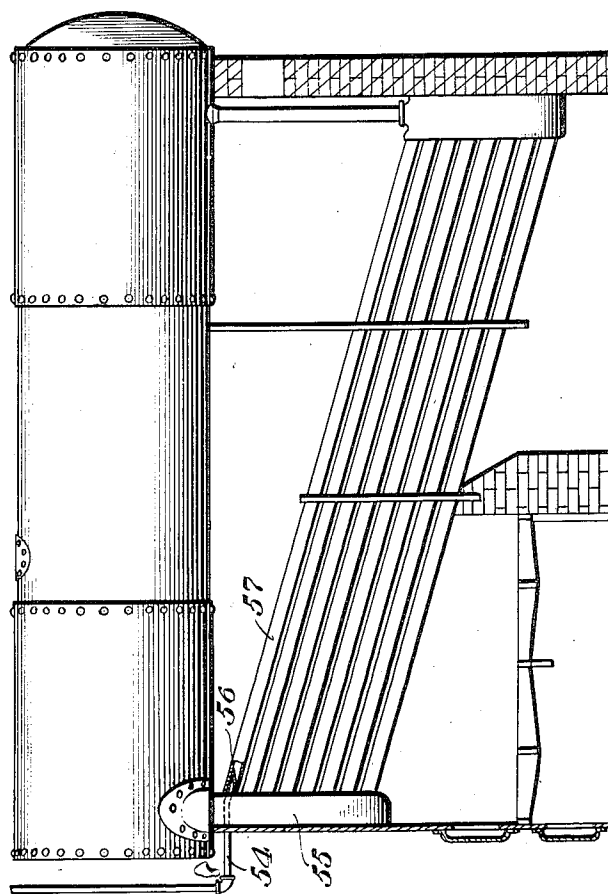


Fig. 2.

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UNITED STATES PATENT OFFICE.

RICHARD J. HOGAN, OF POCATELLO, IDAHO.

SAFETY DEVICE FOR BOILERS.

1,036,494.

Specification of Letters Patent. Patented Aug. 20, 1912.

Application filed September 30, 1911. Serial No. 652,128.

To all whom it may concern:

Be it known that I, RICHARD J. HOGAN, a citizen of the United States, residing at Pocatello, county of Bannock, State of Idaho, have invented certain new and useful Improvements in Safety Devices for Boilers, of which the following is a specification.

This invention relates to a safety device for boilers and its object is to provide means in boilers of various types which will operate to put out the fires and relieve the steam pressure whenever the surfaces exposed to the fire become over-heated on account of low water.

The novel features of the invention will be apparent from the accompanying drawings, in which,

Figure 1 shows my invention as applied to a locomotive boiler. Fig. 2 shows the invention as applied to a water tube boiler. Fig. 3 shows the invention as applied to a tubular boiler. Figs. 4, 5 and 6 show various forms of the fusible plug which I use in the different types of boilers.

Referring to Fig. 1, I have shown a locomotive boiler 20 of the usual construction, having a fire-box 21, grates 22 and fountain 23. Above the crown-sheet 24 I arrange one or more pipes 25, which have their lower ends provided with fittings 26, preferably of copper and having fusible plugs 27, lying adjacent to the crown-sheet 24. The pipes 25 are suitably connected, as shown, with the pipe 28, leading through the stuffing-box 29, in the outer shell 30 of the boiler. The pipe 28 leads to the valve body 31, which is secured to the cylinder 32, carried on a suitable bracket 33, which is attached to the shell 30 of the boiler by means of suitable bolts 34. The valve body 31 is provided with a suitable valve 35, adapted to be opened by pressure within the valve body. The valve 35 opens into a chamber 36, which communicates with the lower portion of the valve chamber 37, in which the piston valve 38 slides. A pipe 39 is arranged to connect the fountain 23 or any other suitable source of steam pressure with the valve chamber 37. Within the cylinder 32 is arranged a piston 40, having attached thereto the piston-rod 41, extending through the upper head 42 of the cylinder. The portion of the cylinder 32, above the piston 40, is in open communication with the external atmosphere, as by means of the space in the head 42, surround-

ing the piston-rod 41. A port 43 forms a means of communication between the valve chamber 37 and the cylinder 32, below the piston 40. The bracket 33 is provided with the upwardly extending arm 44, to which is pivotally connected the lever 45. This lever has a loose pivotal connection with the piston-rod 41, as indicated at 46, and a similar connection with the valve stem 47, as at 48. The valve stem 47 extends through the stuffing-box 49 of the valve body 50, provided with the valve 51, arranged to open downwardly into the steam space of the boiler. A pipe 52 communicates with the side of the valve body 51 and leads around the exterior of the boiler and projects into the fire-box 21, substantially on a level with the grate 22, as shown at 53. There will preferably be two of the pipes 52, leading from opposite sides of the valve body 50 and around the opposite sides of the boiler and, if desirable, I may arrange several branches leading to different points of the fire-box in the manner shown at 53.

The operation of the mechanism just described is as follows: In case the water level in the boiler gets below the top of the crown-sheet 24, the latter will be overheated and the fusible plug 27 will melt and allow the steam to pass up through the pipe 28 and lift the valve 35 off its seat. This will admit pressure to the bottom of the piston valve 38 and force the same to the upper end of the chamber 37, thereby admitting steam from the pipe 39 to the cylinder 32, below the piston 40. The pressure acting on the piston 40 will lift the latter and open the valve 51, allowing steam to pass from the boiler through the pipe or pipes 52 to the fire-box and thus put out the fire and at the same time relieve the pressure in the boiler and prevent further overheating of the crown-sheet and thereby eliminate the possibility of an explosion.

The mechanism above described may be applied to a water tube boiler in the manner indicated in Fig. 2, in which the pipe 54, corresponding to the pipe 28 of Fig. 1, will lead through the header 55 and have its end provided with the fusible plug 56, arranged against the upper side of one of the tubes 57 of the top row. The plug 56 will be preferably arranged in contact with the highest point of the tube 57, as this will be the portion of the tube which will be first affected by the heat in case of low water. The

other portion of the mechanism will be arranged in a manner similar to that shown in Fig. 1.

In Fig. 3 I have shown an upright tubular boiler of the usual form, having my invention applied thereto. In this instance a pipe 58 extends into the boiler and has its end provided with the fusible plug 59, arranged in contact with the outer surface of one of the tubes 60, at a point just below the lowest allowable water level. The pipe 58, in this construction, corresponds to the pipe 28 shown in Fig. 1 and the mechanism will otherwise be the same as that shown in Fig. 1.

In Figs. 4 to 6 I have shown various forms of the fusible plugs which I use with the different types of boilers. Referring to Fig. 4, it will be seen that the pipe 61 has its lower end flared outwardly and provided with the fusible plug 62, having a corrugated outer surface. This construction is adapted for use in horizontal tubular and marine boilers of the fire tube-type. Fig. 5 shows a construction adapted for use in water tube boilers, where it is desirable to bring the pipe 25 into the boiler substantially parallel with the tube. Fig. 6 shows a construction for use in boilers of the type shown in Fig. 3. It will be observed that in all of the various forms shown in Figs. 4 to 6, I employ corrugations to allow water to circulate between the fusible metal and the heating surface of the boiler.

It will be understood that the area of the valve 51 and the piston 40 may be varied, as desired, by changing the relative length of the arms of the lever 45 and also that many modifications may be made in the details of construction without departing from the spirit of my invention as defined in the following claims.

Having thus described my invention, what I claim is:—

1. In a device of the class described, the combination of a boiler, a pipe having one end projecting into the fire-box of the boiler and adapted to discharge onto the fire therein, and having its other end leading to the interior of the boiler, a piston-actuated valve for normally closing communication between said pipe and the interior of the boiler, and means for supplying steam to said piston and comprising a pipe extending into the boiler and having its end provided with closing means arranged close to a heating surface of the boiler, and said closing means being adapted to automatically open when said end is above the water in the boiler.

2. In a device of the class described, the

combination of a boiler, a pipe having one end projecting into the fire-box of the boiler and adapted to discharge onto the fire therein, and its other end leading to the interior of the boiler, a valve for normally closing communication between said pipe and the interior of the boiler, a piston for actuating said valve, and means for controlling said piston and comprising a conduit having one end arranged close to a heating surface of the boiler and provided with a fusible plug, and a valve in said conduit adapted to be opened by the pressure in said conduit when an opening is formed through said fusible plug.

3. In a device of the class described, the combination of a boiler, a pipe having one end projecting into the fire-box of the boiler and adapted to discharge onto the fire therein, and its other end leading to the interior of the boiler, a valve for normally closing communication between said pipe and the interior of the boiler, a cylinder having a piston therein, means connecting said piston and said valve, and means for controlling said piston and comprising a conduit having one end arranged close to a heating surface of the boiler and provided with a fusible plug, a conduit for supplying steam to said cylinder, a valve in said conduit adapted to be actuated by the pressure in said first-mentioned conduit when an opening is formed through said fusible plug.

4. In a device of the class described, the combination of a boiler, a pipe for conveying steam to the exterior of the boiler and having an end arranged within the boiler and in close proximity to a heating surface of the boiler, and a fusible plug in said pipe and substantially in contact with a heating surface of the boiler and having its outer surface corrugated to permit water to circulate between the plug and the heating surface of the boiler.

5. In a device of the class described, the combination of a pipe adapted to be arranged within a boiler with one end thereof in close proximity to a heating surface of the boiler, and a fusible plug in the end of the pipe and having its outer surface substantially in contact with a heating surface of the boiler and provided with indentations adapted to permit water to circulate there-through, as and for the purpose described.

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

RICHARD J. HOGAN.

Witnesses:

J. J. CLOONON,
C. P. RALPH.