Oct. 23, 1923. 1,471,564

W. A. McKEOWN

LOW WATER ALARM FOR STEAM BOILERS

Filed May 2, 1921

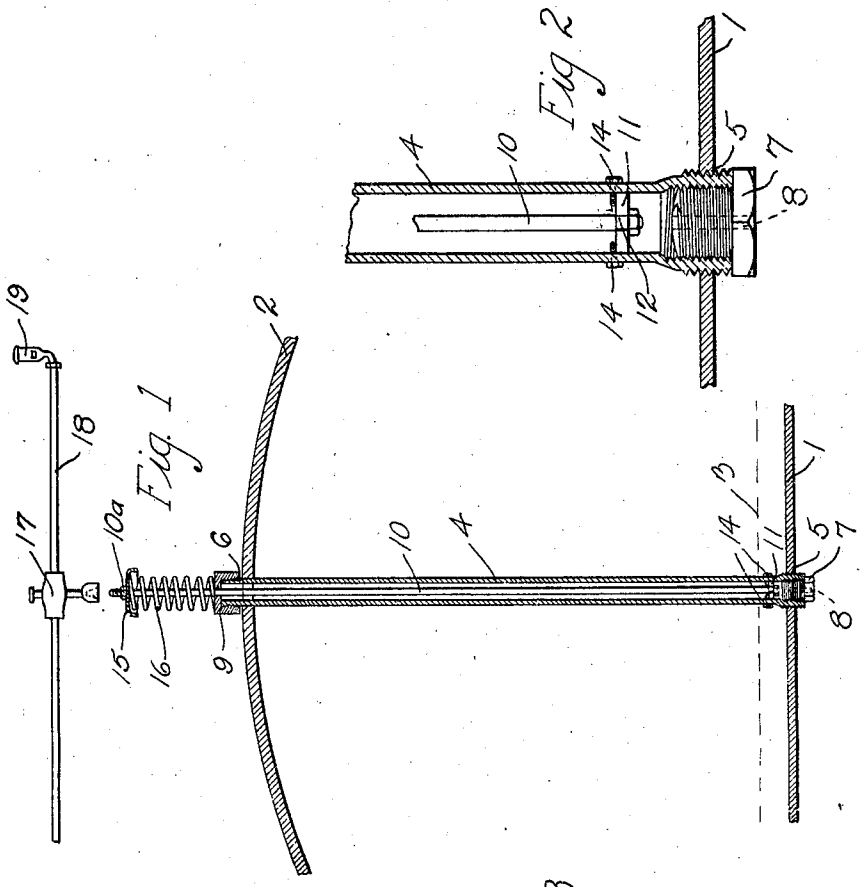


Fig. 1

Fig. 2

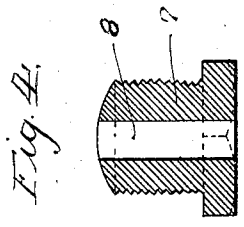


Fig. 4

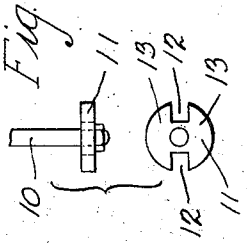


Fig. 3

INVENTOR.
William A. McKeown
BY
Dill & Kistler
ATTORNEY.

Patented Oct. 23, 1923. 1,471,564

UNITED STATES PATENT OFFICE.

WILLIAM A. McKEOWN, OF COLUMBUS, OHIO.

LOW-WATER ALARM FOR STEAM BOILERS.

Application filed May 2, 1921. Serial No. 466,321.

To all whom it may concern:

Be it known that I, WILLIAM A. McKEOWN, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Low-Water Alarms for Steam Boilers, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to improvements in low-water alarms for steam boilers, having for its object to provide an effective safety device for this purpose, which will be readily adaptable to locomotive, marine, stationary, or portable types of boilers, and equally applicable in principle to vats or tanks in which liquids are brought to a high temperature.

An object of the invention is to provide low-water alarm mechanism of simple construction, which can readily be applied to a boiler, which will be dependable as to operation and which will not prevent continued operation of the boiler after the alarm mechanism has been actuated to indicate the low level of the water therein, also which can be restored to normal after each operation thereof for repeat operation without drawing the fire from the boiler or blowing-off the steam and water.

My invention as herein illustrated, is shown as applied to the boiler of a locomotive and in a form of construction suitable for steam or air pressure operation of the alarm which is here shown in the form of a whistle located, preferably, in the engineer's cab of the engine. It will be obvious, of course, that any suitable signal, as a bell or light, may be substituted for the whistle and that electrical connections may be used with equal facility to operate the alarm when the water in the boiler is reduced to a predetermined level where safety of operation requires a further supply of water.

The invention, as here shown, comprisies but few simple parts and is, therefore, cheap to manufacture and to install, and, having direct connections and positive action, the mechanism is dependable and effective as to operation.

In the drawings only such detail parts of construction of a locomotive boiler are shown as are essential to properly illustrate the construction and operation of the invention.

As here shown:

Fig. 1 is a detail view in transverse section through the roof sheet and crown sheet of a locomotive boiler showing my improved alarm mechanism as applied thereto, and the connections to the alarm signal;

Fig. 2 is an enlarged detail view of the lower portion of the alarm mechanism adjacent the crown sheet, and

Fig. 3 is a detail view of a fusible element comprised in the mechanism detailed in Fig. 2.

Fig. 4 is a view in vertical section of a detail of the mechanism illustrated in Fig. 2.

The assembly of the alarm mechanism, as here shown, comprises the crown sheet 1 and roof sheet 2 of the locomotive boiler, the low-water level in the boiler being indicated at 3. The housing or casing for the alarm mechanism consists of a tube or pipe section 4, enlarged somewhat at its lower end and threaded to form a water-tight juncture with the crown sheet as indicated at 5, the upper end of the tube being substantially smaller than the lower end to provide for passing the tube endwise through the aperture in the crown sheet to bring its lower end into engagement with the threaded aperture in the lower plate, the juncture being then made by turning the tube into position and threading a screw cap on its upper end, the joints being sealed in the usual manner to make the same water-tight.

Tube 4 is closed at its lower end with a screw plug 7 having an aperture 8 extending therethrough, and at its upper end with an apertured screw cap 9 which serves as a bearing and guide for shaft 10 which extends into tube 4 and has secured to its lower end, a fusible element, here shown in the form of a disc 11, which is provided with opposite clearance notches 12 and intervening solid portions 13 which are adapted to engage opposite stop plugs 14 threaded into the lower portion of tube 4, thus to prevent displacement of the disc and upward movement of shaft 10 as long as the disc 11 remains intact.

Shaft 10 extends beyond cap 9 and has its upper end threaded to receive a retaining nut 10^a for a spring base 15 which forms a seat for the upper end of a compression spring 16 interposed between base 15 and cap 9, and acting normally to exert pressure upwardly on shaft 10 and to project the

shaft upwardly when released at its lower end by fusing of disc 11.

As here shown, the upper end of shaft 10 is adapted, when the shaft is released to engage the mechanism of a valve 17, which serves normally to close a steam or air pressure pipe 18 connected to the alarm whistle 19, and thus to open the valve and cause operation of the alarm to indicate the low-water state in the boiler. Operation of the alarm will be continuous until the mechanism is again adjusted for repeat operation, which is effected by removing shaft 10 from tube 4, securing a new fuse disc to the shaft and again inserting the shaft in the tube with the clearance notches 12 of the disc in alignment with the stops 14, thus permitting the disc to clear the stops as it is lowered to position in the tube, the disc being brought into engagement with the stops by giving shaft 10 a quarter turn thus preventing upward movement of the shaft as long as the fuse disc remains intact.

The fusible element 11 may be formed of any suitable metal which will fuse at a given approximate temperature. Thus the same may be supported in tube 4 at any desired height above the crown sheet, and the low-water level established at such a depth over the crown sheet as safety of operation may require. When the disc 11 fuses the molten metal will escape through the aperture in plug 7 and thus prevent accumulation of the metal in the lower portion of tube 4 which would interfere with normal action of the fusible element in repeat operations.

Having described my invention, I claim:

In a device of the character described, in combination with a low-water signal and the crown sheet of a boiler, a tube supported relative to the crown sheet, a shaft supported in said tube and operably connected to the signal, means to operate said shaft, a fusible element secured to the shaft, a stop secured in the tube adjacent the fusible element and normally cooperating therewith to prevent operation of said shaft, said fusible element having clearance providing for movement of said shaft relative to the stop in one direction and portions adapted to engage the stop to prevent movement of the shaft in the opposite direction.

In testimony whereof, I affix my signature.

WILLIAM A. McKEOWN.