(No Model.)

F. W. GREENGRASS.

SAFETY APPLIANCE FOR STEAM BOILERS.

No. 589,944. Patented Sept. 14, 1897.

FIG. 1.

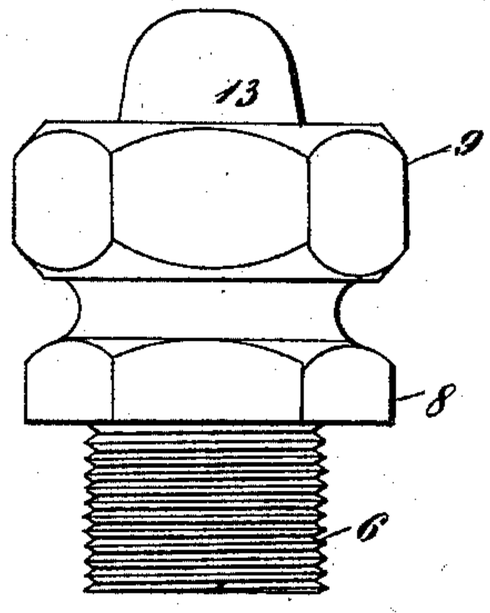
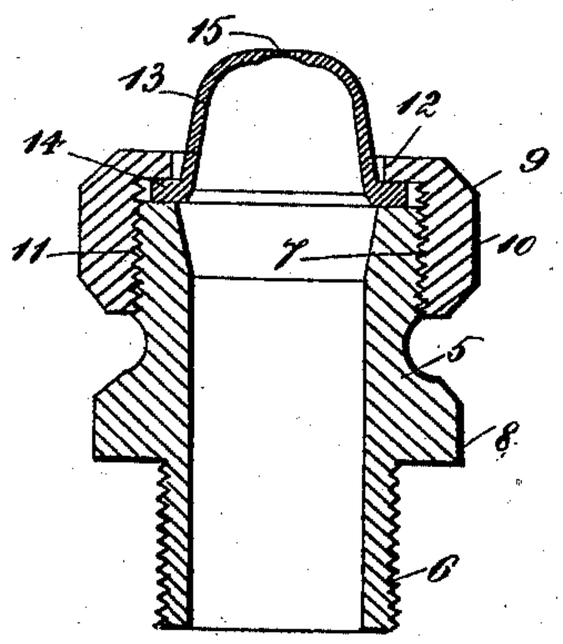


FIG. 2.



WITNESSES

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SAFETY APPLIANCE FOR STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 589,944, dated September 14, 1897.

Application filed April 3, 1897. Serial No. 630,554. (No model.) Patented in England September 6, 1895, No. 16,707.

To all whom it may concern:

Be it known that I, FRANCIS WILLIAM GREENGRASS, a subject of the Queen of Great Britain, residing at Epsom, in the county of Surrey, England, have invented certain new and useful Improvements in Safety Appliances for Steam-Boilers, Steam-Engines, &c., (for which I have received Letters Patent of Great Britain, No. 16,707, granted September 6, 1895,) of which the following is a full and complete specification, such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to safety appliances for steam-boilers, steam-engines, and other steam apparatus, and particularly to that class thereof wherein a metallic diaphragm or similar device is used to close a pipe which is in communication with the steam-supply and is adapted to withstand a given pressure and to rupture when that pressure is exceeded.

The object of the invention is to provide a cheap, simple, and reliable restraining device of the character described which will relieve the pressure without the danger, noise, and violent consequences attending the rupture of flat metal diaphragms of uniform thickness, such as have hitherto been used.

My invention involves a semispherical or dome shaped pressure-restraining device composed of lead or an alloy of lead, or of any suitable material, said device being of a graduated thickness, the thickness thereof decreasing from the maximum at the base to a minimum at the crown or apex, whereby the thickness of the material is so regulated as to just withstand a given pressure, said pressure being determined by experiment, and around the periphery of the base of the dome is cast, pressed, or otherwise formed, a flange or rim of suitable width by which the appliance is flexed with its concave side adjacent to the steam supply or vessel with which it is connected.

The invention is fully disclosed in the following specification, of which the accompanying drawings form a part, in which the separate parts of my improvement are designated by the same numerals of reference throughout both the views, and in which—

Figure 1 is a side view of the attachment or improvement which I employ, and Fig. 2 a central longitudinal section thereof.

In the practice of my invention I provide a steam-pressure-regulating device of the class herein referred to, which comprises a tubular attachment 5, which is screw-threaded at both ends, as shown at 6 and 7, and the end 6 is adapted to be connected with the steam-supply or with a steam-boiler, steam-radiator, steam-pipe, or any portion of a steam apparatus, and formed on said tubular attachment is an annular shoulder 8.

I also provide an annular cap 9, which is composed of an annular band 10, which is screw-threaded on its inner surface, as shown at 11, and an inwardly-directed annular flange or rim 12, and my improved steam-pressure regulator or safety attachment consists of a hollow conical device 13, the base of which is provided with an annular outwardly-directed flange or rim 14, and the apex of which is preferably slightly circular in cross-section, and the thickness thereof is reduced, as shown at 15, the thickness of this portion being such as to just withstand the required pressure of steam, and whenever this pressure is exceeded the outer end of the safety device will be blown out, as will be readily understood.

The safety device 13 may be of any preferred form, but I prefer the same to be of the dome-shaped or semispherical form shown in the drawings, and the effect of the graduated thickness of the metal, which attains a minimum at the crown or apex, is that when the given pressure is exceeded a simple puncture results and there is no violent tearing away or rupture of the device, as is usually the case with disks or diaphragms of uniform thickness. The pressure being relieved in the manner described, the necessity for a lead-away pipe which opens to the atmosphere through external walls or otherwise is avoided, and this constitutes an additional advantage, for the reason that a pipe of this description is liable to be sealed by frost or ice.

That portion of the conical or dome shaped end of the restraining or safety attachment which is designed to be blown out when the pressure of the steam reaches a certain point is preferably very small, and I may also apply a whistle or other alarm device thereto, so as to give notice of the rupture thereof.

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

The herein-described safety appliance for steam-boilers, comprising a tubular attachment 5 having screw-threaded ends 6 and 7, a cap 9 consisting of a band 10, which is screw-threaded, and a rim 12, a safety attachment 13 mounted on the end of said tubular attachment 5 and having a flange 14 adapted to engage said rim 12, said attachment being substantially dome-shaped in form and being thickest adjacent to said flange and gradually diminishing in thickness to the apex of the dome which is made of a predetermined tensile strength, substantially as and for the purpose described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of the subscribing witnesses, this 2d day of December, 1896.

FRANCIS WILLIAM GREENGRASS.

Witnesses:

W. M. HARRIS,

STANLEY REYNOLDS DOCKING.