F. LUNKENHEIMER.

Safety-Plug.

No. 213,292. Patented Mar. 18, 1879.

Fig.1

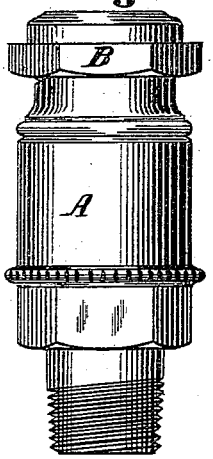


Fig.2

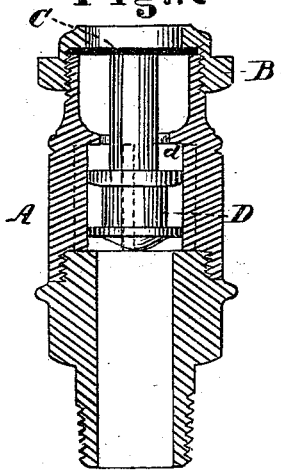
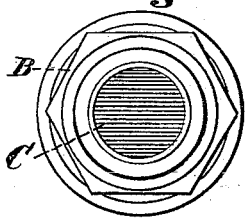


Fig.3



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UNITED STATES PATENT OFFICE.

FREDERICK LUNKENHEIMER, OF CINCINNATI, OHIO.

IMPROVEMENT IN SAFETY-PLUGS.

Specification forming part of Letters Patent No. **213,292**, dated March 18, 1879; application filed December 2, 1878.

To all whom it may concern:

Be it known that I, FREDERICK LUNKENHEIMER, of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Safety-Plugs, of which the following is a specification:

The object of my invention is to provide a safety-plug for air-vessels of water and other pumps, where the resistance to the action of such pumps is liable at times to exceed the strength of the air-vessel, and where without a positive means of relief of pressure the internal strain overbalances the tensile strength, and the air-vessel is ruptured.

I do not intend to limit the use of the plug to pumps having air-vessels, but propose to apply it in all cases where a pump is liable to overstrain from any cause whatever, and can attach it to the pump-barrel, to the delivery-valve, or to the delivery-pipe.

My invention consists of a hollow plug having a common pipe-thread at one end for screwing into the air-vessel or delivery-connections of a pump and a machine-thread and screw-cap at the opposite end. The screw-cap is provided with an opening, and the diameter of this opening is somewhat less than the diameter of the orifice of the plug, so that the cap has an inward-projecting shoulder, and the lower inner edge of this shoulder is formed into a sharp cutting-edge. Between the top or shoulder of the screw-cap and the plug I insert a thin disk of lead or other suitable material, which, when the cap is screwed on the plug, is compressed and held by the annular edge between the shoulder of cap and end of plug.

The under side (or that side next to the disk) of the screw-cap presents a cutting edge, against which the disk is forced under pressure, and by which cutting-edge the disk is sheared when the pressure on the under or internal surface exceeds the shearing resistance of the material of which the disk is made.

When the pressure exceeds the strength of the disk the said disk is cut out as though it were punched, and the annular rim remains between the end of the plug and the screw-cap.

The interior of the plug is fitted with a valve having a long stem, which abuts against the disk. This valve is provided with a seat in the upper part of the plug and with water-ways around the valve-disks, and is guided by longitudinal ribs cast on the interior surface of the plug.

So long as the safety-disk is unbroken, or rather uncut, the pressure on the valve is equalized above and below, excepting the pressure on the area of the stem, which pressure is exerted against the disk precisely as though the valve were removed and the pressure applied directly to the surface of the disk; but when the strain or pressure on the safety-disk exceeds the shearing resistance, the disk is cut by the sharp edge of the shoulder of the cap and blown out, and the valve is driven to its seat with no loss of fluid other than the contents of the plug between the valve and safety-disk.

The expulsion under pressure of the small quantity of fluid over the valve is sufficient to notify the operator of the pump that the maximum working-pressure has been exceeded, and that the resistance to the action of the pump must be modified to avoid an accident.

The screw-cap, with its cutting-edge, as shown, and the thin disk, whose shearing resistance is equal to the maximum working-pressure on the pump, are the essential requisites of my invention.

In the accompanying drawings, Figure 1 is an elevation of my safety-plug fitted with the automatically-closing valve. Fig. 2 is a sectional view of Fig. 1, showing valve and seat; and Fig. 3 is a plan of the plug, showing screw-cap and lead disk.

Similar letters of reference indicate similar parts.

A is the body of the plug, which, in Figs. 1 and 2, is made in two sections and screwed together. B is the screw-cap; C, the safety-disk; D, the valve, and *d* the valve-seat. The disk C, I usually make of thin lead, and adapt the thickness to the desired cutting-pressure.

It is obvious, however, that a lead disk is not essential to my invention, as thin wood, leather, copper, vulcanized rubber, and many other substances will answer the purpose quite as well as lead.

It is also obvious that the use of the plug is not limited to pumps, but can be applied to steam-boilers to indicate over-pressure.

It will be observed that the opening through the screw-cap B is of a diameter somewhat less than the diameter of the orifice of the plug A, so that said cap has an inward-projecting shoulder, and the lower inner edge of this shoulder is formed into the sharp cutting-edge heretofore set forth.

Having described my invention, what I claim is—

The safety-disk C, in combination with the hollow plug A and the screw-cap B, having the inward-projecting shoulder provided with the cutting-edge, substantially as described, and for the purpose set forth.

In testimony whereof I have hereunto set my hand this 27th day of November, 1878.

FREDERICK LUNKENHEIMER.

Witnesses:

JOHN W. HILL,

J. E. STEVENSON.