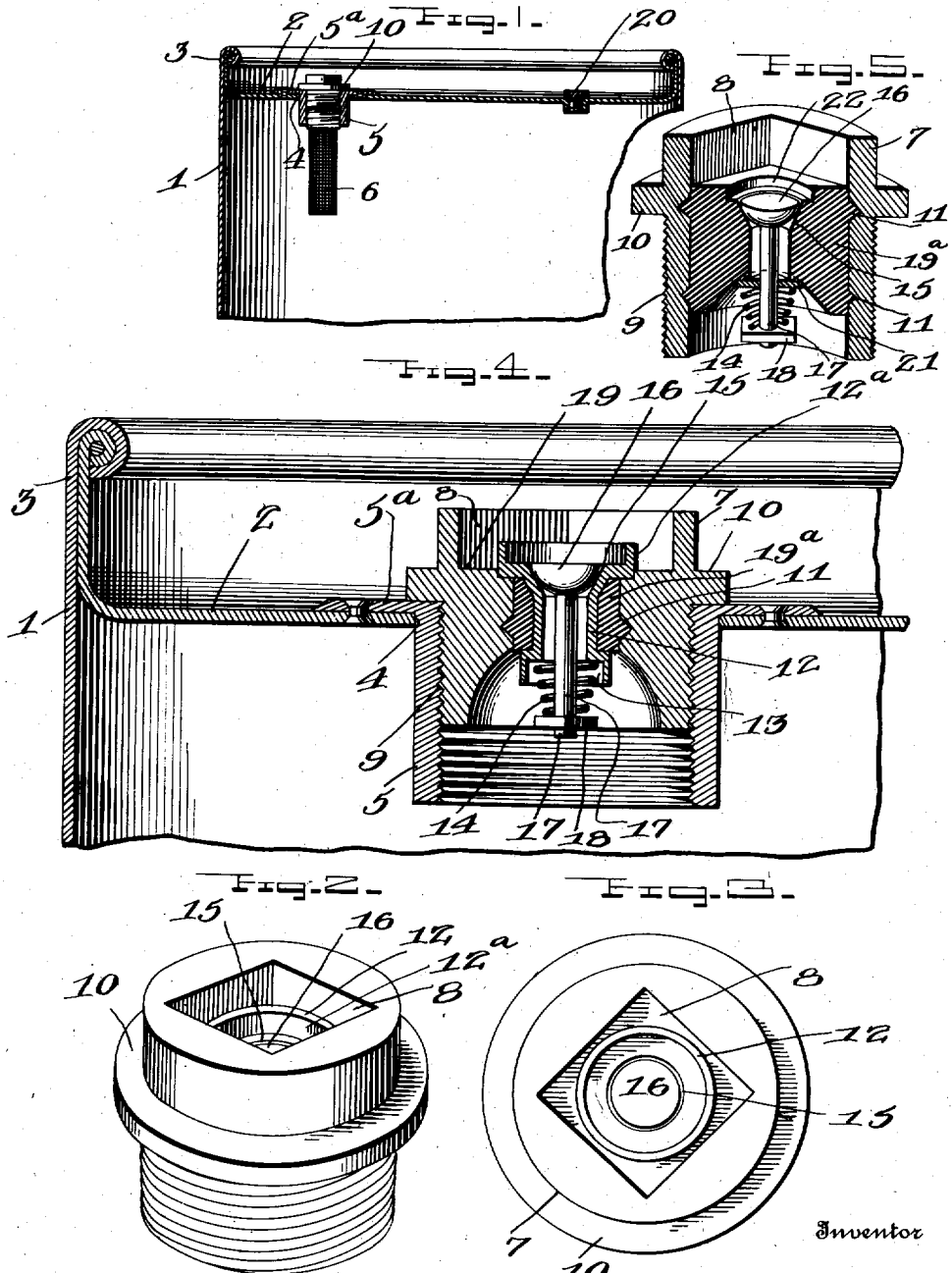


W. H. McNUTT.
SAFETY BUNG.
APPLICATION FILED DEC. 1, 1910.

999,829.

Patented Aug. 8, 1911.



Witnesses
W. H. McNutt
R. F. Steward

By

William H. McNutt,
W. P. McElroy
Attorney

UNITED STATES PATENT OFFICE.

WILLIAM H. McNUTT, OF NEW YORK, N. Y.

SAFETY-BUNG.

999,829.

Specification of Letters Patent.

Patented Aug. 8, 1911.

Application filed December 1, 1910. Serial No. 595,103.

To all whom it may concern:

Be it known that I, WILLIAM H. McNUTT, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Safety-Bungs, of which the following is a specification.

This invention relates to safety bungs; and it comprises a safety bung for barrels, drums, cans, etc., said bung comprising a safety valve portion and a fusible venting device; all as more fully hereinafter described and as claimed.

Volatile inflammable liquids, such as alcohol, benzin, gasolene and petroleum products in general, and the like are frequently kept in metal drums or barrels. Other combustible liquids, as for example linseed and cotton seed oil, which are non-volatile at ordinary temperatures, but which give off inflammable vapors readily at somewhat elevated temperatures are often similarly packaged. Ordinarily these drums are of double seamed iron or steel and the closure is an iron or steel plug in a threaded, or welded-on bung hole. The barrel or drum is usually of such strength as to resist ordinary variations of pressure caused by the daily fluctuations in temperature, but it is not ordinarily made of heavy enough material to resist the greater pressures caused by high heat, as in fires and the like. With a number of barrels of gasolene or alcohol in storage in case of a fire, the bursting of one barrel from internal pressure is very apt to smash or cause the bursting of the remaining barrels, allowing the inflammable contents to escape and burn. Furthermore, in the bursting of a barrel, its inflammable contents are scattered over surrounding objects in all directions, thus spreading the fire almost instantaneously over a very large area.

It is the object of the present invention to provide a safety device for barrels containing dangerous liquids of this character, for preventing this type of casualty. To this end, I provide the barrels with a special type of bung carrying both a relatively small spring-seated safety valve and a

larger plug or bushing of fusible material inclosing and securing said safety valve within the bung. On heating a metal barrel provided with this type of bung and containing a volatile liquid, the internal pressure first operates to unseat the safety valve with enough escape of vapors for ordinary relief. Against this escape of vapors, there can, of course, be no entry of air, so that there is no danger of forming an explosive mixture within the barrel. The escape of vapor through the safety valve allows some evaporation to take place with a concomitant absorption of heat within the barrel. Evolution of vapors is of course attended with absorption of heat. And with any moderate accidental heating, the formation and escape of vapors will prevent dangerous temperatures occurring within the barrel. Should, however, the temperature in the neighborhood of any one barrel rise to a high degree, sufficient to cause dangerous pressures within it, the fusible plug will melt, thus releasing the safety valve and permitting it to be blown bodily out of the bung. This gives at once a larger vent for vapor with consequent relief of excess pressure, precluding any bursting of the barrel and thereby any shock to the remaining barrels, as well as preventing widespread scattering of the barrel contents. Various materials are suitable for use in forming the fusible plug. Commonly a readily fusible metal, such as lead, or a low melting alloy, such as "fusible metal", offers the greatest advantages all things considered. In many instances however ordinary sealing wax is perfectly satisfactory and, on account of its low cost, is a very desirable material to employ. Sealing wax, is usually largely resinat of lime mixed with a filler, and is not attacked to any extent by petroleum products or by most inflammable liquids. If sealing wax is used, care should be taken in designing the bung to protect the body of wax from direct blows, stresses or shocks; for sealing wax is rather brittle and easily shattered. It is also possible with many liquids to use a hard paraffin or like substance in the fusible plug. If fusible metal is used, its composition may be

such for many purposes, as to give it a melting point of about 500° F. Considering several barrels provided with the device of the present invention and in a row in a store house, should flame impinge on the first barrel in the row, the safety valve will first relieve the pressure and operate to maintain the contents of the barrel comparatively cool as long as any liquid is left, provided the flame or heat be not too great. The vent controlled by the valve is large enough to permit the excess of vapor generated under these conditions to escape quietly. If, however, the flame or heat be great, then the fusible metal plug next operates and releases the pressure, quiet evolution of vapor then continuing until the barrel is empty. The evolved vapor, of course, burns, but it does not explode under ordinary circumstances, its velocity of exit preventing back-drafting. The remaining barrels in the row may need only the relief given by the safety valve. Possibly, should the fire continue, successive barrels may get hot enough to melt the fusible plug and allow relief, but there would be no bursting of any one barrel, to cause bursting of the other barrels.

In the accompanying illustrations I have shown, more or less diagrammatically, certain embodiments of my invention.

In this showing, Figure 1 is a fragmentary vertical section of a barrel carrying the new bung; Fig. 2 is a view in perspective, showing the top of the bung; Fig. 3 is a plan view looking down; Fig. 4 is a fragmentary vertical section on a larger scale, showing one type of bung construction; and Fig. 5 is a section of a modified type.

In Fig. 1, element 1 is a barrel provided with a head 2 and chime 3. At 4, an internally threaded collar or spud 5 is set in the barrel head to form a bung hole. Flange 5^a is provided by means of which the spud is riveted or welded to the head. The threaded portion of the spud may extend some distance beyond the end of the bung, should it be desired to attach a safety tube 6 operated on the principle of the Davy lamp, as for example where inflammable liquid is to be dispensed from the container. But a safety tube is ordinarily, however, not necessary where the container is kept full of liquid as in storing and shipping.

Referring now to Fig. 4 for the particular structure, the bung casing is provided with an upward extension 7 having a square or polygonal opening 8 wherein a wrench tool may be seated. Obviously, instead of thus providing the bung head with an inside squared recess, the bung head may be squared outside to engage a wrench. The lower extension of the bung casing is threaded at 9 to fit in the head of the barrel. Annular lug 10 allows the use of a gasket, should it

be needed. If the lower extension of the bung be tapered, instead of straight as shown, the lugs 10 may be dispensed with. The inner chamber of the bung casing is shaped to fit the safety device and has a recess 11 for a purpose later described. Within this chamber is a tubular member or valve casing 12 extending upward within the polygonal opening and having a lateral vertical annular extension 12^a. This valve casing may advantageously be of brass or similar material. The lateral annular extension 12^a of the valve casing prevents injury to the fusible material or to the valve proper when a wrench is inserted into the opening 8. At the base, the valve casing is provided with recess 13 wherein the base of a spiral spring 14 is adapted to seat. At its upper end it is provided with a coned valve seat 15 upon which seats the rounded head 16 of valve stem 17. This arrangement of a rounded valve seating upon a coned valve seat gives a tight joint for any position of the valve upon the seat. The other end of the valve stem is provided with a threaded nut 18. The spiral spring is located between this nut and the recess at the bottom of the valve casing and is adapted to keep the rounded head of the valve stem in its seat against moderate degrees of pressure, the requisite degree of pressure in seating being obtained by adjusting the nut. The body and lower portion of the valve casing as just described is of smaller diameter than the inner chamber of the metal bung, though its upper lateral extension rests on shoulder 19. Into the space between the valve casing and the bung casing is cast fusible material 19^a, forming a securing bushing or lining which is retained and locked in place by the provision of recess 11. Shoulder 19 may be recessed slightly as shown to receive extension 12^a, which is thus secured against accidental lateral displacement with consequent injury to the fusible bushing. The barrel may be also provided with ordinary bungs as at 20.

In assembling the parts, the bung casing may be inverted over a piece of metal at the correct height to retain the valve casing in position and fusible material may then be poured in the chamber between the valve casing and the bung casing.

In Fig. 5 a modification is shown in which the valve casing 12, considered as a distinct element, is omitted altogether. Valve head 16 seats directly upon fusible metal 19^a. The square opening 8 extends entirely through the bung, with annular locking recesses 11 in the bung casing as before. This type of bung is very simple to construct as it is only necessary to fill up the whole interior of the bung with fusible metal and then drill out the beveled valve seat and the pas-

sage for the valve stem. The other details of construction are practically the same as for the bung shown in Fig. 4, and its mode of operation is identical. Where the brass valve casing is omitted however, it is well to provide hard metal washer 21 to take the thrust of spring 14, and to seat valve 16 within a tooled recess 22 to protect the valve and seat from injury.

Whatever form of valve device is employed, whether the valve proper seats directly upon the fusible bushing or upon an intervening valve casing, the valve device is most advantageously separated by the fusible bushing more or less completely from contact with the body of the bung. When two metallic surfaces are in contact and are exposed to conditions favorable to corrosion, the surfaces are apt to become securely cemented together by reason of such corrosion. The same thing would tend more or less to occur. In the present structure however the vent were not separated wholly or for the most part from the body of the bung by the fusible sleeve or plug. Without such separation the valve device might become so firmly set in the bung that at temperatures at which the valve device should be blown bodily from the bung, this would fail to occur. In the present structure however the possibility of the valve thus sticking in the bung is successfully obviated. The term "valve" as herein employed is to be understood as referring either to the valve proper alone, or to the combination of the valve proper with its casing.

The purpose of the present device is apparent from the foregoing. Should a rise in pressure occur within the barrel, the valve head 16 is unseated, allowing a release of pressure. Should the temperature rise further, then the fusible material 19^a melts and the whole safety valve is simply blown out of the bung, giving a large vent for the escape of vapors.

With alcohol barrels, the bung and accessory parts may be dipped in hot paraffin before assembling with the barrel, the paraffin serving to seal the closure and rendering a gasket unnecessary. This treatment is also advantageous even where the barrel is to contain gasoline, as cold gasoline will not attack the paraffin sufficiently to obviate its sealing action.

What I claim is:—

1. In a closure for barrels adapted to hold combustible liquids, a removable safety bung having a centrally disposed orifice, a valve casing extending through said orifice having a body portion smaller than the orifice, a spring seated safety valve positioned within said casing, means for adjustably controlling the seating pressure of said valve, and a fusible metal bushing surrounding the body

of said valve casing and securing the same within said orifice.

2. A barrel closure, comprising a threaded safety bung having a relief orifice, a fusible metal bushing within said orifice, a tubular member extending through said bushing and having a cupped flange at one end protecting said fusible metal bushing, and seating on the edge of said relief orifice, a cupped flange at the opposite end of said tubular member somewhat smaller than said relief orifice, a valve seated within the larger cupped flange and having a threaded stem, a spring seated against said smaller cupped flange, and an adjusting nut on said threaded stem cooperating with the said spring to adjust its pressure.

3. A safety closure for containers, comprising a threaded bung having an exterior recessed portion adapted to receive a wrench, a relief orifice in said bung opening into said recessed portion, a fusible lining within said orifice, a tubular vent member secured thereby within said orifice, a valve seated on said vent member, and a flange on said vent member extending laterally and upwardly to protect said fusible lining and said valve.

4. In a safety bung, a threaded bung having a relief orifice, a plug of fusible material within such orifice, a tubular flanged member extending through said plug and having a countersunk portion at its outer end to form a valve seat, and a safety valve held within said tubular flanged member and seating on the countersunk portion thereof.

5. A barrel closure, comprising a bung, valved pressure-relieving means within said bung operative at ordinary temperatures, further pressure-relieving means within said bung operative only at higher temperatures and securing said valved pressure-relieving means within said bung, and means carried by such high temperature pressure-relieving means for locking the same within the body of said bung.

6. In a safety bung, a threaded bung having a relief orifice, a valve positioned within said orifice, fusible means extending through the body of said bung and holding said valve in place within said orifice, and protecting means covering an exposed end portion of said fusible means.

7. A safety bung comprising a bung casing, an adjustable safety valve located therein and adapted to open and close a bushing of fusible metal surrounding said valve and held in said casing, and a seat for said valve covering the outer end of said bushing.

8. A safety closure for containers, comprising a bung having a vent opening extending therethrough, a fusible sleeve lining said opening, means carried by said sleeve for locking the same within the body of said

bung, and a valve positioned within and held by said sleeve.

9. A safety closure for containers, comprising a threaded bung provided with a vent opening having a recess in its wall, a fusible plug positioned within said vent opening and having a projection engaging the recess in the wall of said vent opening,

and a valve extending through said bung and held by said sleeve.

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

WILLIAM H. McNUTT.

Witnesses:

LOUIS LEAVITT,
GEO. H. MORGAN.

10

Corrections in Letters Patent No. 999,829.

It is hereby certified that in Letters Patent No. 999,829, granted August 8, 1911, upon the application of William H. McNutt, of New York, N. Y., for an improvement in "Safety-Bungs," errors appear in the printed specification requiring correction as follows: Page 3, line 22, the period and the words "In the present structure however the" should be stricken out and the words and syllable *if the valve device of the present in-* be inserted instead; and same page, line 120, after the word "close" a comma should be inserted; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 29th day of August, A. D., 1911.

[SEAL.]

F. A. TENNANT,

Acting Commissioner of Patents.

bung, and a valve positioned within and held by said sleeve.

9. A safety closure for containers, comprising a threaded bung provided with a vent opening having a recess in its wall, a fusible plug positioned within said vent opening and having a projection engaging the recess in the wall of said vent opening,

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