

Sept. 16, 1958

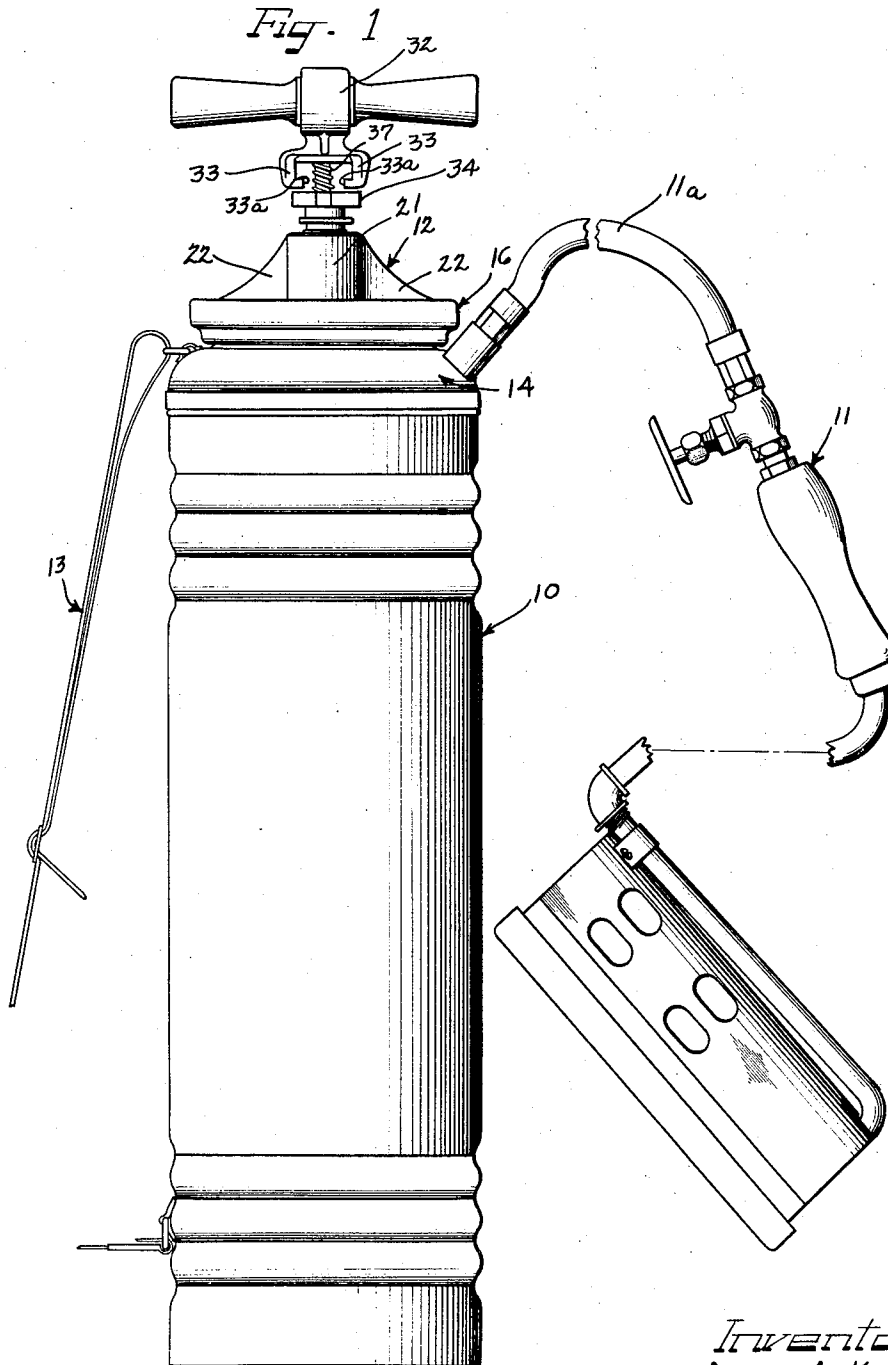
D. A. KIFFER ET AL

2,852,169

SAFETY RELEASE DEVICE FOR TANKS

Filed Sept. 26, 1955

2 Sheets-Sheet 1



Inventors
DESIRE A. KIFFER
LAWRENCE D. ORSER

By *Hill, Sherman, Meroni, Cross & Simpson* Attys.

Sept. 16, 1958

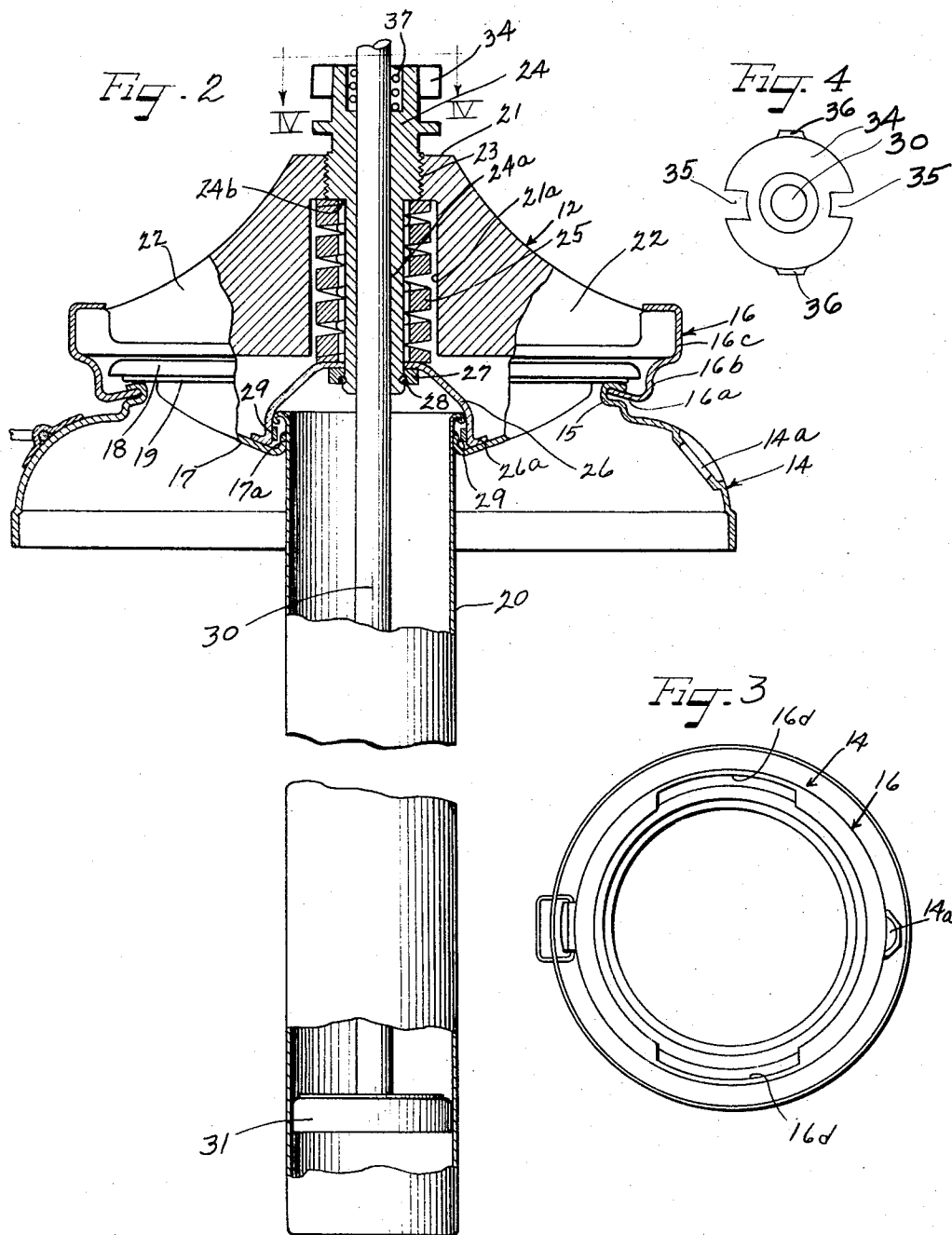
D. A. KIFFER ET AL

2,852,169

SAFETY RELEASE DEVICE FOR TANKS

Filed Sept. 26, 1955

2 Sheets-Sheet 2



Inventors
 DESIRE A. KIFFER
 LAWRENCE D. ORSER

By *Still, Sherman, Meroni, Gross & Simpson* Attys

1

2,852,169

SAFETY RELEASE DEVICE FOR TANKS

Desire A. Kiffer, Waterloo, and Lawrence D. Orser, Cedar Falls, Iowa, assignors to Chamberlain Corporation, Waterloo, Iowa, a corporation of Iowa

Application September 26, 1955, Serial No. 536,423

8 Claims. (Cl. 222-396)

This invention relates to a safety release device, and more particularly to a safety release device for use in association with spray tanks wherein it is desired to prevent the pressure in the tank from rising above a predetermined amount, although other uses and purposes will be apparent to one skilled in the art.

While the present invention is highly desirable for use on a flame sprayer or weed burner, it obviously can be used on other spray tanks and on many other types of pressure tanks.

Heretofore, in the use of flame sprayers having a spray tank, it was sometimes a hazardous operation inasmuch as a lackadaisical user, instead of building up the pressure in the spray tank containing the inflammable liquid by use of the usual hand pump, directed the flame from the burner against the side of the tank to increase the pressure by raising the temperature of the inflammable liquid. Such a method of raising the tank pressure is dangerous in that extreme pressure is built up in a short period of time which cannot be withstood by the tank thereby causing the spray tank to blow up, and in the past this has caused grave injury and sometimes death to a user.

In the present invention, a safety release device is associated with a spray tank which permits the top or cover of the spray tank to raise up when a predetermined pressure is developed in the tank and allow the excess of that pressure to escape. Under actual tests, it was found impossible to blow-up a spray tank equipped with this device.

Accordingly, it is an object of this invention to provide an improved spray tank for handling inflammable liquids that will not blow up under any circumstances.

Another object of this invention is to provide a safety release device for pressure tanks that is effective to relieve against extremely sudden variations in pressure as well as steady pressure rises.

A further object of this invention resides in the provision of a spray tank having means to permit the top or cover of the tank to raise up when a predetermined pressure is developed in the tank and allow the excess of that pressure to escape.

A further feature of this invention is to provide a safety release device for use on spray tanks and to be mounted in the top lock assembly that does not occupy any noticeable additional space over and above the space required for conventional top lock assemblies heretofore.

While some of the more salient features, characteristics and advantages of the instant invention have been above pointed out, others will become apparent from the following disclosures, taken in conjunction with the accompanying drawings, in which:

Figure 1 is a broken elevational view of a flame sprayer equipped with the present invention;

Figure 2 is an elevational view, partly in section and partly broken of a portion of the spray tank in Figure 1 illustrating the instant invention;

2

Figure 3 is a top plan view of the spray tank with the cover assembly and burner assembly removed therefrom; and

Figure 4 is a top plan view of the pump handle locking means, taken substantially along line IV-IV in Figure 2 and looking in the direction of the arrows.

As shown on the drawings:

Referring generally to Figure 1, a flame sprayer equipped with the present invention is illustrated comprising generally a conventional cylindrical tank 10, a conventional burner assembly 11 connected to the tank 10 by a flexible tubing 11a, and a cover assembly 12 in which is mounted the safety release mechanism of the instant invention.

A strap assembly 13 is connected at one end near the top of the tank 10 and at the other end near the bottom thereof for facilitating transporting of the sprayer from place to place.

The tank 10 is closed at one end and initially open at the other end before final assembly. A head 14 is sealingly secured, such as by welding or other equivalent means to the open end of the tank 10.

As seen most clearly in Figure 2, the head 14 is in the general form of an annulus having a radially inwardly extending flange 15. Before the flange 15 is rolled, a cam ring 16 having an annular flange portion 16a is spot welded to the head. Then the flange 15 is rolled over the upper surface and marginal edge of the flange portion 16a. As seen in Figure 2, an opening 14a is provided in the head 14 for connection to the burner assembly.

Connecting with the annular portion 16a of the cam ring 16 is a substantially vertical cylindrical portion 16b which, in turn, merges with a channel-shaped cover locking section 16c. The upper leg of the channel-shaped section 16c is bayonet slotted at 16d as seen in Figure 3, and the sections of the leg between the slots are slightly inclined from one end of the section to the other end to provide a conventional camming arrangement.

The cover assembly 12 includes a dish-shaped lid 17 having an annular lip 18 connected to the upper marginal edge and sized to be substantially diametrically larger than the flange 15. A ring-shaped gasket or seal 19 of any suitable resilient material is fitted on the underside of the lip 18 to accommodate sealing engagement between the lid 17 and the flanged opening of the tank.

The dish-shaped lid 17 is centrally apertured and provided with an upturned annular flange 17a for receiving a pumping cylinder 20. The pumping cylinder 20 extends downwardly into the tank and is provided at its bottom end with a uni-directional valve (not shown) to allow airflow into the tank. The upper end of the pumping cylinder 20 extends slightly above the flange opening in the lid 17 and terminates in a rolled edge, and cylinder 20 is sealingly secured to the flange 17a of the lid 17 in a suitable manner, such as by welding.

To secure the lid in position, a lid locking assembly or yoke includes a sleeve 21 having a pair of diametrically opposed arms 22, 22, the ends of which are received by the cam ring 16.

As seen in Figure 2, the sleeve 21 is centrally bored and receives in threaded engagement at 23 a pump lock and sealing screw 24. The sleeve bore is diametrically enlarged at 21a and the sealing screw 24 is diametrically reduced at the lower portion as indicated at 24a to define an annular chamber or socket for receiving a heavy metal helical spring 25.

The spring 25 surrounds the reduced portion 24a of the sealing screw 24 and is bottomed on an annular shoulder of the sealing screw 24 provided by the diametrically reduced section and indicated at 24b. The

3

other end of the spring 25 is bottomed on a centrally apertured dome-shaped member 26 that is received over the extreme end of the sealing screw 24. The dome-shaped member 26 functions as a pump cap and is maintained on the end of the sealing screw 24 by a washer 27 abutting against the underside of the cap, and which is held in place on the reduced end of the sealing screw 24 by a retaining ring 28.

The force of the spring 25 is transmitted to the lid 17 through an annular flange 26a on the dome-shaped pump cap 26, and the force of the spring urges the lid 17 into sealing engagement with the flanged opening of the tank 10.

To maintain the lid 17 and pump cylinder 20 connected to the sleeve 21 and locking arms 22, a series of lugs 29 are annularly arranged and carried on the inner face of the pump cap 26 and near the lower marginal edge thereof to coact with the upper rolled edge of the pump cylinder 20 when removing the entire assembly from the tank 10.

To initially build the pressure up within the tank a hand pump is provided having a pump rod or shaft 30 slidably received in a central bore of the sealing screw 24. A plunger 31 is connected to one end of the shaft 30 and operable within the pump cylinder 20, and a pump handle 32 is connected to the other end, as seen in Figure 1.

To lock the pump handle in place on the cover assembly 12, a pair of diametrically opposed pump locking arms 33, 33 are suitably secured to the pump handle 32 and coact with a pump locking ring 34 on the sealing screw member 24. As seen most clearly in Figure 4, the pump locking ring 34 is provided with a pair of diametrically opposed slots 35, 35 for receiving the locking arms 33. The handle is locked in position by pushing down the locking arms 33 through the slots 35 and turning the handle so that the inwardly extending lugs 33a on the locking arms are positioned away from the slot 35. A pair of diametrically opposed lugs 36, 36 extend outwardly from the locking ring 34 and are in arcuately spaced relationship to the slots 35. These lugs provide abutments or stops for the locking arms 33 on the pump handle 32. To maintain the locking arm 33 on the handle 32 in tight engagement with a locking ring 34, a spring 37 surrounds the pump shaft 30 and is received in a shallow groove formed around the shaft in the sealing screw 24. The spring is bottomed in the groove at one end and engages the handle at the other end.

In the initial assembly of the cover arrangement 12, the spring 25 is preloaded to a predetermined amount to urge the lid 17 in sealing engagement with the tank flange 15. Additional loading of the spring 25 may be accomplished by turning the sealing screw member 24 down into the sleeve 21.

In operation, after the cover assembly 12 has been placed in locking engagement with the head 14 of the tank 10, pressure is initially built up within the tank against the inflammable or other liquid therein by the hand pump. If the user, in order to raise the pressure in the tank, directs the flame of the burner against the side of the tank, and the pressure rises above a predetermined amount, the lid 17 will raise against the force of the spring 25 and break the seal with the flange 15 to allow the excess pressure to escape from the tank. When the pressure falls to the predetermined amount, the spring 25 will again urge the cover of the tank into closed position and prevent the escape of all the pressure in the tank.

In view of the foregoing, it is seen that the instant invention provides a safety release device for use with spray tanks which precludes the possibility of an extreme or gradual pressure above a predetermined amount from being built up within the tank that may cause the tank to blow up and injure the user or a bystander.

It will be understood that modifications and variations

4

may be effected without departing from the scope of the novel concepts of the present invention, but it is understood that this application is to be limited only by the scope of the appended claims.

We claim as our invention:

1. In a spray tank closed at one end and open at the other end, a centrally open head member secured to the open end of said tank and having an inwardly extending radial flange, a cam ring attached to said flange, a cover assembly including a lid bearing on said flange, a sleeve member having a pair of arms removably received by said cam ring, a pressure-movable dome-shaped member positioned between said sleeve and said lid, a tensioned spring means located interiorly of said sleeve biasing said dome-shaped member against said lid causing said lid to sealingly engage said flange, and screw means carried by said sleeve for adjusting the tension of said spring means, whereby pressure within said tank above a predetermined amount breaks the sealing engagement of the lid and flange and allows the excess pressure to escape.

2. In a spray tank closed at one end and open at the other end, a centrally open head member secured to the open end of said tank and having an inwardly extending radial flange, a cam ring attached to said flange, a cover assembly including a lid bearing on said flange, a sleeve member having a pair of arms removably received by said cam ring, a dome-shaped member positioned between said sleeve and said lid, a tensioned spring means in said sleeve biasing said dome-shaped member against said lid causing said lid to sealingly engage said flange, a sealing screw carried by said sleeve for adjusting the tension of said spring means, said screw having a longitudinal bore therethrough, a hand pump mounted on said cover assembly having a plunger rod slidable in said screw bore, whereby pressure within said tank above a predetermined amount breaks the sealing engagement of the lid and flange and allows the excess pressure to escape.

3. A safety release device for a pressure tank having a flanged opening and a cam ring secured thereto, which comprises a cover bearing against said flanged opening, a sleeve member overlying said cover, a pair of diametrically opposed arms integral with said sleeve and removably engaging said cam ring, a pressure-movable dome-shaped member disposed between said cover and said sleeve, and a preloaded spring means located interiorly of said sleeve biasing said dome-shaped member against said cover causing said cover to sealingly engage said flanged opening, and screw means carried by said sleeve for adjusting the preload of said spring means.

4. In a spray tank closed at one end and having an opening in the other end, a retaining ring around said opening, a cover for said opening, a pump cylinder carried by said cover to extend into said tank, a cover locking member engageable with said ring, resilient means carried interiorly of said locking member, pressure-movable closure means for the cylinder in contact with the cover and resilient means to urge said cover tightly over said opening, and a pump rod extending through said member.

5. In a spray tank closed at one end and having an opening in the other end, a retaining ring around said opening, a cover for said opening, a pump cylinder carried by said cover to extend into said tank, a cover locking member engageable with said ring, resilient means carried interiorly of said locking member, pressure-movable closure means for the cylinder in contact with the cover and resilient means to urge said cover tightly over said opening, a pump rod extending through said member, and locking means on said member for securing the outer end of said pump rod when not in use.

6. In a spray tank closed at one end and having an opening in the other end, a retaining ring around said opening, a cover for said opening, a pump cylinder carried by said cover to extend into said tank, a cover

5

locking member engageable with said ring, resilient means carried interiorly of said locking member to urge said cover tightly over said opening, a pressure-movable cap member disposed between said resilient means and said cover in contact therewith to function as a closure for said cylinder and transfer the spring pressure to said cover, and a pump rod extending through both said members.

7. In a spray tank closed at one end and having an opening in the other end, a retaining ring around said opening, a cover for said opening, a pump cylinder fixedly secured to said cover, a cover locking member in the form of a sleeve with projecting means to engage said ring, a sealing screw in said member having a reduced inner portion, a spring around said portion inside the sleeve, a pressure-movable closure surrounding said pump cylinder and engaging the spring and cover to transfer spring pressure to said cover, and a pump rod extending through said closure and sealing screw.

8. In a spray tank closed at one end and having an opening in the other end, a retaining ring around said opening, a cover for said opening, a pump cylinder carried by said cover, a cover locking member in the form of a

6

sleeve with projecting means to engage said ring, a sealing screw in said member having a reduced inner portion, a spring around said portion inside the sleeve, a dome-shaped pressure-movable closure for said pump cylinder engageable at its upper end with the spring and at its lower end with the cover to transfer spring pressure to said cover, and a pump rod extending through said closure and sealing screw, said sealing screw being adjustable to vary the pressure of said spring on said cover, and holding means on the outer end of said screw to temporarily lock the outer end of said pump rod when the pump is not in use.

References Cited in the file of this patent

UNITED STATES PATENTS

655,954	Brooks	Aug. 14, 1900
1,327,564	McDougall	Jan. 6, 1920
2,188,682	Goetz	Jan. 30, 1940
2,194,112	Chapin	Mar. 19, 1940
2,596,070	Friend et al.	May 6, 1952
2,665,326	Knight	Jan. 5, 1954
2,679,946	Friend	June 1, 1954