

No. 875,481.

PATENTED DEC. 31, 1907.

L. A. WILSON.
SAFETY CLOSURE FOR RECEPTACLES.
APPLICATION FILED FEB. 20, 1907.

Fig. 1

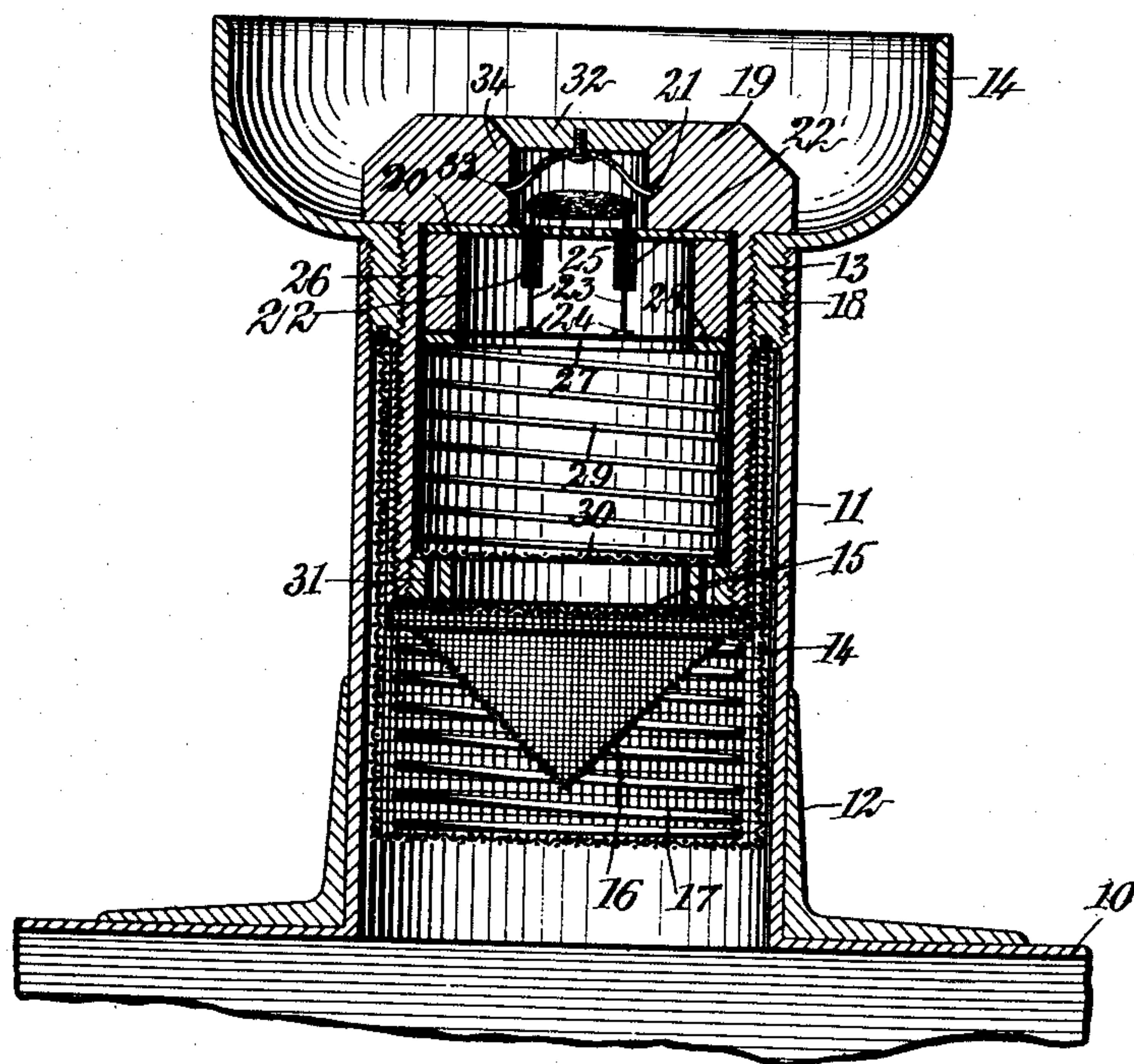
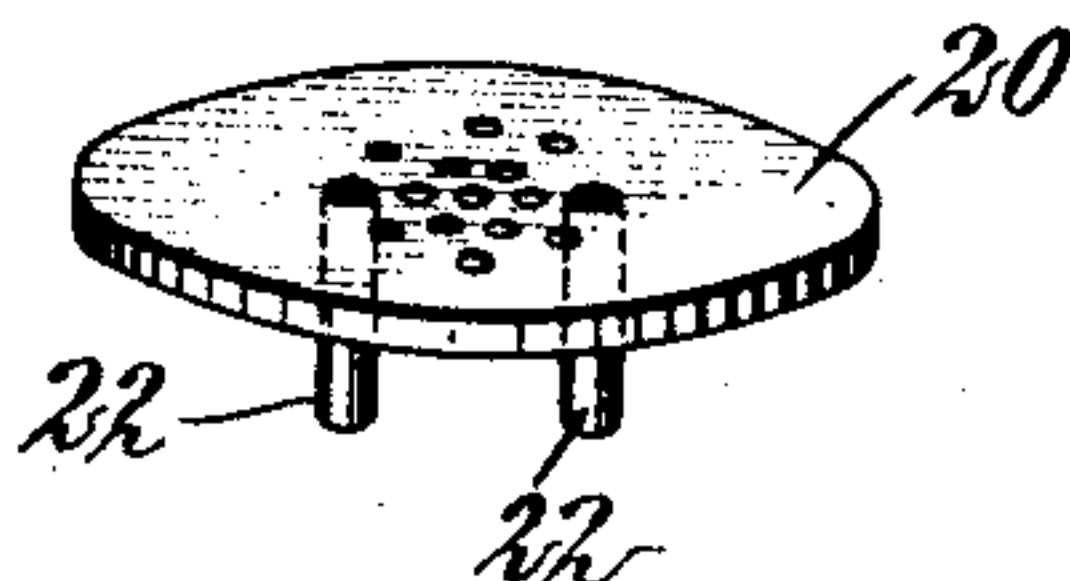


Fig. 2



WITNESSES

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SAFETY-CLOSURE FOR RECEPTACLES.

No. 875,481.

Specification of Letters Patent.

Patented Dec. 31, 1907.

Application filed February 20, 1907. Serial No. 358,364.

To all whom it may concern:

Be it known that I, LYMAN A. WILSON, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Safety-Closure for Receptacles, of which the following is a full, clear, and exact description.

This invention relates to certain improvements in closures for receptacles adapted to contain combustible liquids, such as liquid hydrocarbons, alcohol, and the like, and relates more particularly to means whereby the rupturing of the receptacle or ignition of the contents thereof is positively prevented.

The object of the invention is to provide an improved form of closure which will normally prevent the escape of vapors from the receptacle, but which will be opened upon the application of excessive pressure from within and the escaping vapors automatically ignited to prevent the formation of an explosive mixture in the room or space surrounding the receptacle.

A further object of the invention is to provide means whereby the solid impurities are prevented from entering the receptacle, and, at the same time, the ignition of the contents due to back firing, prevented.

The invention consists in certain features of construction and combination of parts, all of which will be fully set forth hereinafter and particularly pointed out in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in both the figures, in which

Figure 1 is a central longitudinal section through a closure embodying my improvement; and Fig. 2 is a perspective view of one of the diaphragms constituting a part of said closure.

My improved closure may be used in connection with a tank or receptacle of any suitable character and applied to any portion thereof desired, but it is preferably utilized in connection with the filling opening, which opening may be a mere threaded passage through the upper wall of the receptacle or may embody my specific improvements illustrated in the drawings.

As shown, I provide the tank or receptacle 10 with a short upwardly extending tube 11 opening into the tank at its lower end and rigidly secured thereto by means of an annu-

lar collar 12, L-shaped in cross section. Within the outer end of the tube I secure an annular collar 13 supporting an annular flange 14 serving as a funnel to facilitate the pouring of liquid into the tube. The collar 13 preferably carries at its inner end a cylindrical gauze basket 14 fitting the inner wall of the tube 11 and terminating adjacent the inner end of said tube. Within this basket I provide a flat, movable wire gauze diaphragm 15 supporting a conical gauze diaphragm 16. These diaphragms are secured together and fit closely within the wire basket and are normally pressed toward the outer end thereof by a coil spring 17 within the lower portion of said basket and engaging with the lower surface of the diaphragms. The collar 13 is provided with screw threads upon its inner surface and serves to support my improved plug, the inner end of which normally engages with the movable diaphragm 15 above referred to, and upon the insertion of the plug forces said diaphragm toward the lower portion of the basket against the action of the coil spring 17. All of the parts above described, save the plug, constitute a permanent part of the tank or receptacle 10, and serve to effectively prevent the entrance of any foreign objects, and, at the same time, prevent the contents of the receptacle from being accidentally ignited while the receptacle is being filled.

My improved plug preferably comprises a threaded cylindrical body 18 adapted to be secured within the collar 13 above referred to, and having its inner end adapted to engage with the wire gauze diaphragm 15 and force the latter inward against the action of the spring 17. The cylindrical body portion 18 carries at its outer end an enlarged head 19 of any suitable form in cross section, serving to close the end of said body and to afford means whereby the latter may be rotated. This head is provided with an axial passage, preferably of smaller cross sectional area than the interior of the cylindrical body portion 18, and within this cylindrical portion and held against the head are a plurality of members going to make up the major features of my invention. Supported adjacent the head 19 and of a diameter substantially equal to the interior diameter of the body portion 18 is a perforated diaphragm 20, illustrated in detail in Fig. 2. This diaphragm serves to close the inner end of the axial passage 21 through the enlarged head,

and the perforations through said diaphragm afford means of communication from the interior of the body portion to the interior of said head. The diaphragm supports two inwardly extending tubes 22—22 serving as guides for the supports of my automatic igniter. These supports preferably comprise small rods or wires 23—23, each having an enlarged inner end 24, whereby its displacement is prevented. Secured to the outer ends of these supporting rods or wires 23, I provide a pad 25 of a diameter slightly less than the diameter of the passage 21 and composed of such a material that the passage of the gases in contact with said pad will cause the automatic ignition of the former. This pad may, if desired, be formed of very thin wire gauze inclosing platinum sponge, or may be formed of extremely thin platinum or any other suitable agent for accomplishing the desired result.

Within the body 18 and normally holding the diaphragm 20 in place, I provide a suitable collar 26 of a length somewhat greater than the length of the tubes 22, whereby a free space is provided about the inner ends of said tubes. Adjacent the inner end of the collar 26 I provide a very thin diaphragm 27, preferably of soft copper and having the portion adjacent its periphery soldered to a washer 28 closely fitting the inner wall of the body 18. The thickness and strength of the diaphragm 27 are so proportioned that this diaphragm may be ruptured upon the application of a predetermined pressure against one side thereof. The diaphragm would preferably be constructed to rupture and permit the escape of the gases from the interior of the tank upon the application of a pressure materially less than that required to open any of the seams of the tank, or strain or distort the same, whereby any leak might be formed.

Below the washer 28 I provide a coil spring 29 serving to hold the washer, imperforate diaphragm 27, collar 26, and perforated diaphragm 20 in place. Adjacent the lower end of the coil spring I provide a gauze diaphragm 30, which latter is held in place by a threaded collar 31 serving as an abutment for the inner end of the coil spring 29, and holding all of the above mentioned parts in place.

The axial passage 21 through the head 19 is countersunk at its outer end and receives a beveled plate 32 lying flush with the top of the head 19 and normally closing said passage. This plate is normally held in place by a spring clip 33 frictionally engaging with an annular recess 34 in the wall of the passage.

My improved device is especially adapted for use in connection with gasoline tanks carried by automobiles or used in connection therewith. In filling the tank the closure is removed and the oil may be readily poured

through the gauze basket and diaphragm, the latter serving to support all solid impurities. After the tank has been filled the closure is screwed in place and a practically airtight seal thus secured. Should the tank become heated externally or if for any other reason the pressure within the tank should rise to such an extent that there is liability of the tank being ruptured or the seam strained so as to form a leak, my improved closure serves to relieve this pressure and preserve the tank from injury. The imperforate diaphragm 27 is constructed of such a material and of such a thickness that when the pressure within the tank rises above a predetermined limit, this diaphragm becomes ruptured and the gases may pass through the perforated diaphragm 20 and in contact with the under surface of the plate 32. The internal pressure displaces this plate and the gas or vapor escapes to the atmosphere. The upward current of the escaping gas or vapor raises the pad 25 to a position adjacent the upper surface of the head 19, and the action of these gases or vapors upon the catalytic substances constituting or enclosed within the pad, raises the temperature of the latter to a point at which the gas or vapor is spontaneously ignited. The flame not only serves to indicate the fact that the diaphragm 30 has been ruptured, but also prevents the accumulation of an explosive gas in the presence of the tank and thus prevents any damage which would be caused by the ignition of a quantity of this gas after it had escaped.

By so supporting the pad 25 that it may be automatically raised by the pressure of the gas, I cause the ignition to take place at a point adjacent the outlet from the passage rather than at a point within the same, and thus more effectively prevent back firing into the tank. The plurality of gauze diaphragms between the igniting means and the interior of the tank also serve to prevent any possibility of the liquid or gas within the tank from becoming ignited. The plate 32 is normally held in place by the means shown, and prevents the admission of any foreign matter to the interior of the plug, but is so supported that it may be readily displaced by the application of pressure from the interior. By means of the groove or recess 34 I prevent the plate 32 from becoming accidentally displaced except upon the application of excessive pressure.

As previously stated, it is evident that the improved closure above described may be used in connection with any suitable filling opening of a tank rather than in connection with the specific tube 11 and the parts supported therein, and it is also evident that various changes may be made within the scope of the appended claims without departing from the spirit of my invention.

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

1. In combination with a tank having a filling opening therein, a safety closure for said opening, comprising a plug, a frangible diaphragm carried thereby, and an automatic igniter supported adjacent the outer side of said diaphragm.

2. In combination with a tank having a filling opening therein, a safety closure for said opening, comprising a plug having an axial passage therethrough, a diaphragm normally closing said passage, and an automatic igniter adjacent the outer end of said passage.

3. In combination with a tank having a filling opening therein, a safety closure for said opening, comprising a plug having a passage therethrough, a diaphragm normally closing said passage, an automatic igniter adjacent the outer end of said passage, and means adjacent the inner end of said passage for preventing back firing.

4. A safety closure for tanks and the like, comprising a plug having an axial passage therethrough, a frangible diaphragm normally closing said passage, a removable closure for the outer end of said passage, and an automatic igniter intermediate said closure and said diaphragm.

5. A safety closure for tanks and the like, comprising a plug having an axial passage therethrough, a frangible diaphragm normally closing said passage, and an automatic igniter adjacent the outer end of said passage, said igniter comprising a catalytic agent.

6. A safety closure for tanks and the like, comprising a plug having an axial passage therethrough, a removable closure for the outer end of said passage, an automatic igniter comprising a catalytic agent supported within said passage adjacent said closure, a frangible diaphragm normally closing said passage, and means whereby the igniter may be moved to a position adjacent the outlet of the passage upon the rupturing of the diaphragm and the displacement of the removable closure.

7. A safety closure for tanks and the like, comprising a plug having an axial passage therethrough, a removable plate normally closing the outer end of said passage, a spring clip for normally holding said plate in position, a catalytic agent adapted to act as an automatic igniter supported within said passage adjacent said plate and movable to a position adjacent the outlet of the passage upon the removal of said plate, a frangible

diaphragm normally closing said passage, means for resiliently holding said diaphragm in place, and a wire gauze adjacent the inner end of said passage.

8. A safety closure for tanks and the like, comprising a plug having an axial passage therethrough, a frangible diaphragm normally closing said passage, a perforated plate adjacent said diaphragm, a movable automatic igniter comprising a pad including a catalytic agent, and means secured to said pad and extending through said perforated plate for supporting the former and limiting its outward movement.

9. In combination, a receptacle having a filling opening, a wire gauze basket supported within said opening, a gauze partition movable within said basket, means intermediate the bottom of said basket and said partition for normally forcing said partition outward, and a safety closure for said opening comprising a plug adapted to contact with said partition and force the same inward, said plug having an axial passage throughout, a frangible diaphragm for closing said passage, and an automatic igniter adjacent the outer end of said passage.

10. A safety device for use in connection with the storage of combustible fluids, including a frangible diaphragm, and an igniter mounted adjacent thereto.

11. A safety device for use in connection with the storage of combustible fluids, including a closure adapted to permit the passage of fluid upon the application of a fluid pressure in excess of a predetermined limit, and an igniter adjacent the outer surface of said closure.

12. A safety device for use in connection with the storage of combustible fluids, including a closure adapted to permit the passage of fluid upon the application of a fluid pressure in excess of a predetermined limit, an igniter adjacent the outer surface of said closure, and means adjacent the opposite side of said closure for preventing back firing.

13. A safety device for use in connection with the storage of combustible fluids, including a frangible diaphragm an igniter mounted adjacent thereto, and means for preventing back firing.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LYMAN A. WILSON.

Witnesses:

E. C. KALISHER,

R. H. CUNNINGHAM.