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SAFETY TRIP DEVICE FOR VALVES ON MOBILE TANKS

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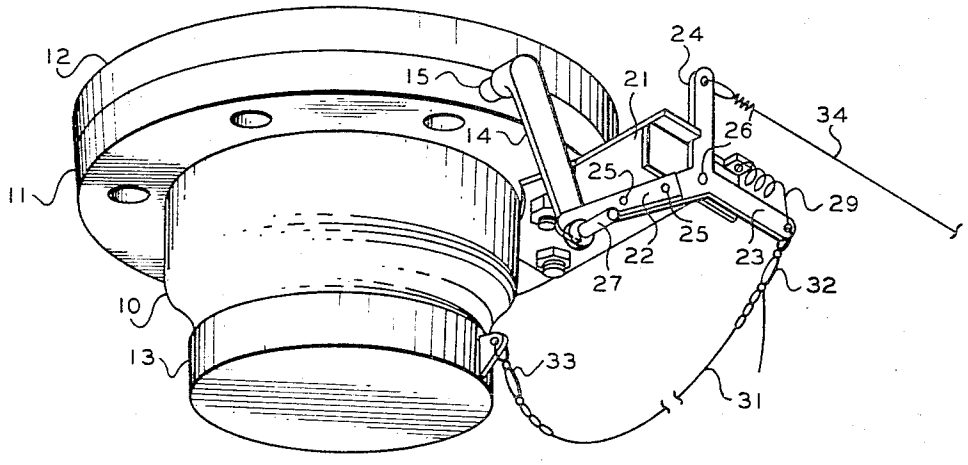


FIG. 1

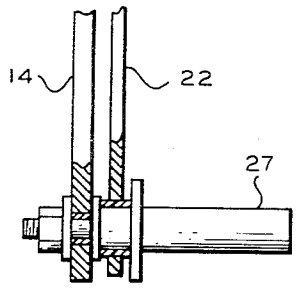


FIG. 2

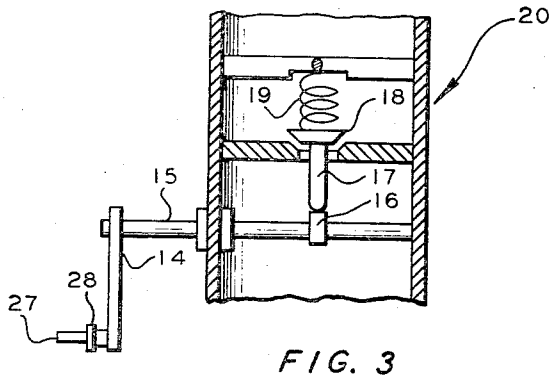


FIG. 3

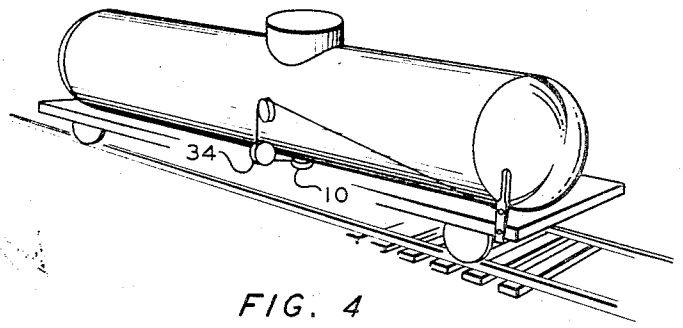


FIG. 4

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SAFETY TRIP DEVICE FOR VALVES ON MOBILE TANKS

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This invention relates to a means for shutting off the valve of mobile tanks such as vehicle-mounted storage tanks. In one aspect it relates to a safety trip device for automatically closing the valve of a vehicle-mounted tank in case of emergency, such as movement of the tank or in case of fire. In another aspect it relates to a safety trip device for manually closing the valve of a vehicle-mounted tank from a locus remote from the valve.

In the handling of volatile fluids, such as liquefied petroleum gas and liquid ammonia, many safety requirements must be met. For example, such materials must be stored in specifically constructed tanks which are capable of withstanding relatively high vapor pressures. When introducing such material into a vehicle-mounted storage tank or removing material from such tank, it is necessary that the valve structure employed in such systems be provided with certain safety features.

In accordance with the present invention there is provided a means for positive closure of such valve in case of appreciable movement by the vehicle-mounted tank, in addition to features for closing the valve in case of fire and for manually closing the valve at a position remote from the valve.

It is an object of this invention to provide a safety trip device for automatically closing the valve of a vehicle-mounted storage tank in case of emergency. A further object of the invention is to provide a means for closing the valve of a vehicle-mounted tank upon appreciable movement by the tank. Still another object of the invention is the combination of a trip device wherein the valve of a vehicle-mounted tank is closed automatically in case of fire or in case of movement of the tank and also a means for manually closing the valve at a position remote from the valve. Other objects and advantages of this invention will be apparent upon reading the following detailed description of the invention and the appended drawing wherein:

FIGURE 1 is a perspective view of one embodiment of the trip device of the invention;

FIGURE 2 is a detail view, partly in section, of the latch and valve arm of the trip device;

FIGURE 3 illustrates, in diagrammatic form, an elevational view, partly in section, of a valve suitable for use with the trip device; and

FIGURE 4 illustrates the trip device being utilized on a railroad tank car.

Referring now to the drawing and FIGURE 1 in particular, valve outlet passageway **10** is secured to a vehicle-mounted storage tank (such as in FIGURE 4) by means of flange connections **11** and **12**. Passageway **10** is closed by threaded cap or cover **13**. Crank **14** is secured to shaft **15** having secured thereon a lever or cam **16**, see FIGURE 3, which raises valve stem **17** of valve **20** to unseat valve seat **18** against the compression of spring **19**.

Mounting bracket **21** is secured to flange **11**. Latch **22** is secured to extension arms **23** and **24** by fusible rivets **25**. Extension arms **23** and **24** and latch **22** are pivotally mounted on mounting bracket **21** by pivot pin **26**. The latch **22** is held firmly against handle **27** by means of spring **29** and is prevented from sidewise movement by ring **28** on handle **27** of crank **14**.

Cable or chain or other flexible linkage **31** secures cover **13** to arm extension **23** and is of sufficient length to allow cover **13** to rest upon the ground when cover **13** is removed from passageway **10**. The length of cable or chain **31** can be adjusted by means of hook **32**, or equivalent means, so that the cable or chain **31** is substantially taut. Thus any appreciable movement of the tank, see FIGURE 4, will trip the latch **22**, releasing crank **14** so as to close the valve **20**. Swivel **33** prevents twisting cable **31**.

The valve **20** can be any valve suitable for use with a fluid storage tank. The spring biased poppet type valve illustrated in the drawing is representative of valves commercially available for this purpose.

Valve **20** can also be closed manually by means of cable **34** attached to extension arm **24**. Often a vehicle-mounted tank such as a tank truck or railroad tank car will have more than one valve for removing fluid from the tank or for filling the tank. In such case the cable **34** can be attached to the trip device on each valve so that all of the valves can be closed simultaneously from a locus remote from the valves.

In the operation of the safety device of the invention, for example the unloading of a tank car of gasoline, the cover **10** is removed and laid on the ground, substantially vertically below the end of the extension arm **23**. A discharge conduit is threaded onto the passageway **10**. When the conduit is secured to the receiving vessel and the unloading operation is ready to be started, the handle **27** is moved to open the valve **20**. The latch **22** has a beveled end so that the latch rides up and over the handle **27** against the bias of spring **29** as the handle **27** is moved to valve-open position.

The chain or cable **31** is then adjusted so that it is taut, or nearly so. When the tank car is emptied or filled, as the case may be, the valve, or valves, are closed manually.

If the tank car is moved during the loading or unloading operation the cover **13** remains stationary on the ground and by means of the flexible linkage **31** trips the latch **22**, releasing crank **14** so as to close the valve **20**. In case of fire in the vicinity of the open valve **20** the fusible rivets **25** are melted, releasing crank **14** and closing valve **20**.

The emergency valve-closing device is simple in construction and positive in action.

That which is claimed is:

1. In a fluid dispensing apparatus comprising a vehicle-mounted storage tank having a dispensing valve connecting the interior of the tank with a passageway leading from the tank, a biasing means urging the valve into closed position, and means connected to a crank extending from the valve to open the valve in opposition to the biasing means, the combination therewith of:

(1) a latch supported by the tank at a pivot point and biased to bear against the crank and to restrain the crank when the valve is in open position;

(2) an arm extension of said latch opposite the pivot point from the latch;

(3) a removable cover, for the passageway leading from the tank, of sufficient mass to overcome the bias of the latch; and

(4) a flexible linkage secured at one end to said cover and at the other end to said arm extension so that when the cover is removed from the passageway and placed upon the ground the linkage is substantially taut whereby movement of the tank moves the extension arm and trips the latch so as to release the crank and close the valve.

2. The apparatus of claim **1** wherein at least a portion of said latch is made of a low-temperature, heat-fusible material so that the crank is released upon fusion of said material and the valve is closed by the biasing means.

3. The apparatus of claim **1** wherein a linkage is attached to said arm extension so that the latch can be

tripped manually to release the crank from a remote distance.

4. The apparatus of claim 1 wherein the flexible linkage connecting the removable cover and the extension arm is a metal cable.

5. The apparatus of claim 1 wherein the flexible linkage connecting the removable cover and the extension arm is a metal chain.

6. The apparatus of claim 1 wherein the passageway is threaded; the removable cover is threaded to mate with the threads of the passageway; and the linkage contains a swivel to prevent twisting of the linkage when the cover is threaded onto and off of the passageway.

References Cited

UNITED STATES PATENTS

2,591,889	4/1952	Sundstrom	137—38
2,965,116	12/1960	Boone et al.	137—39
3,165,236	1/1965	Beazer et al.	137—39 XR

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