

Sept. 25, 1928.

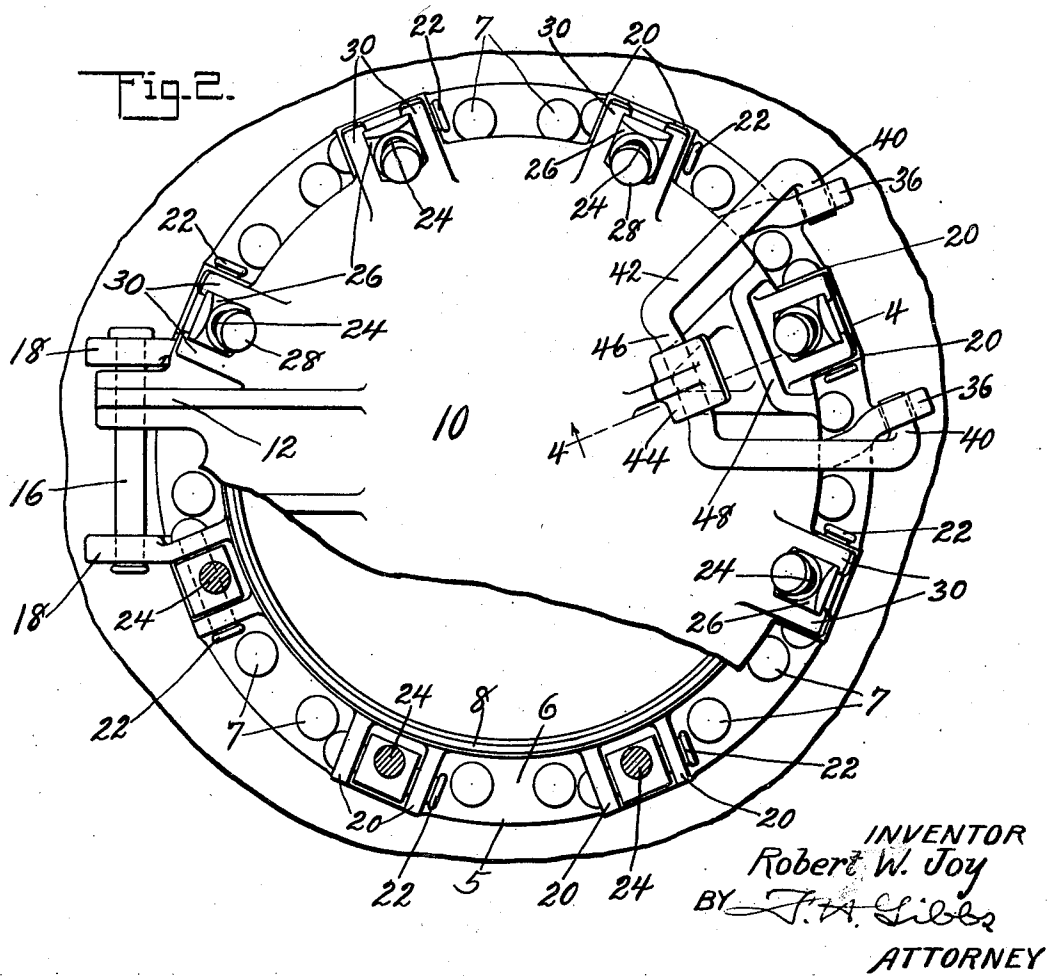
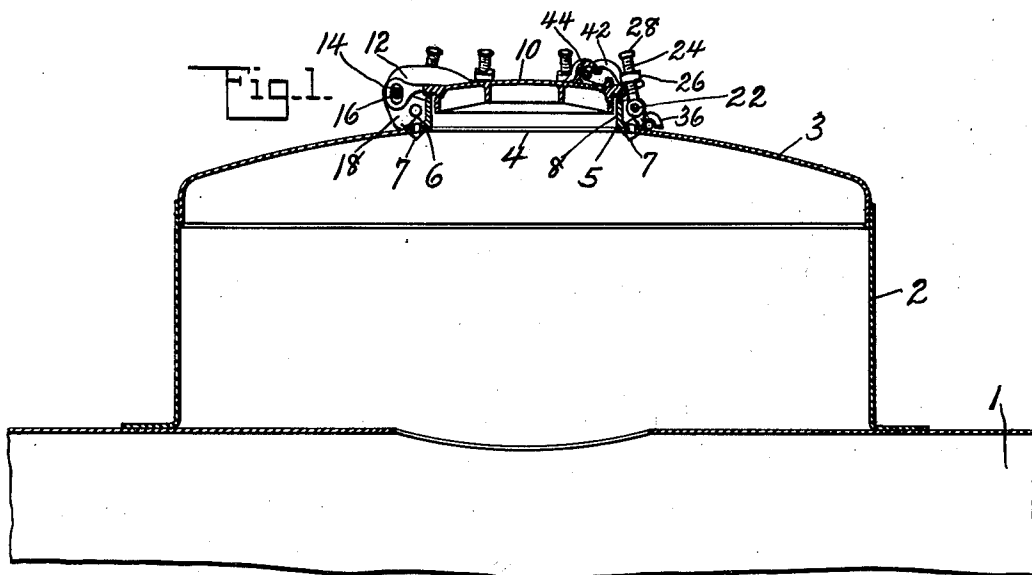
1,685,132

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CAR TANK DOME CLOSURE

Filed Sept. 12, 1925

3 Sheets-Sheet 1



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Fig. 3.

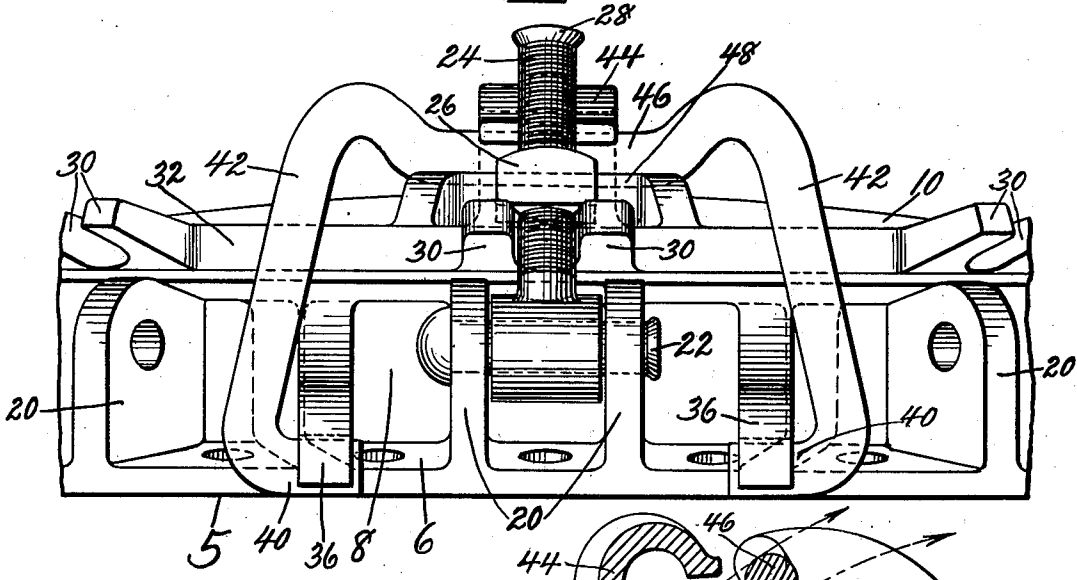


Fig. 6.

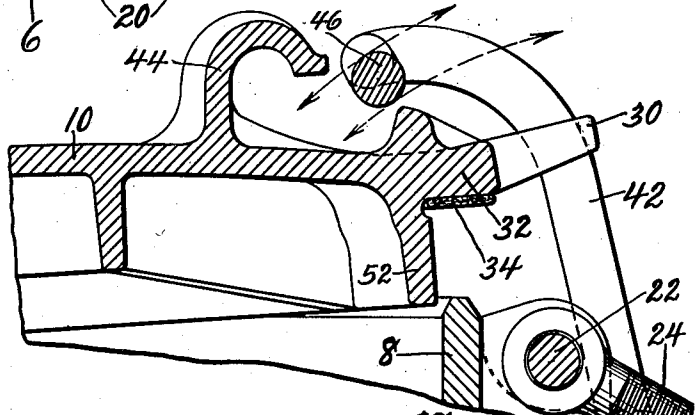


Fig. 5.

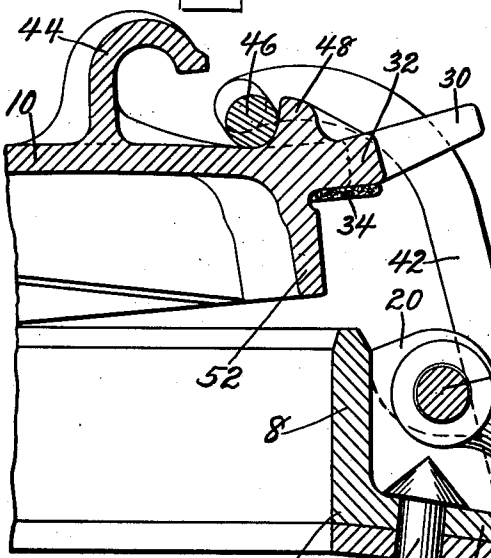
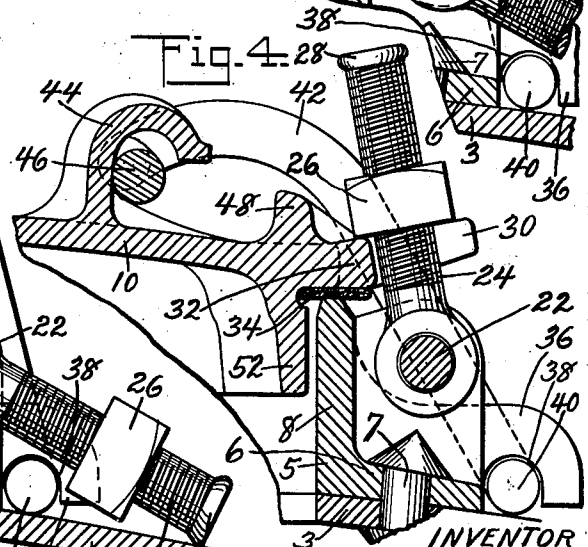


Fig. 4.



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3 Sheets-Sheet 3

Fig. 7.

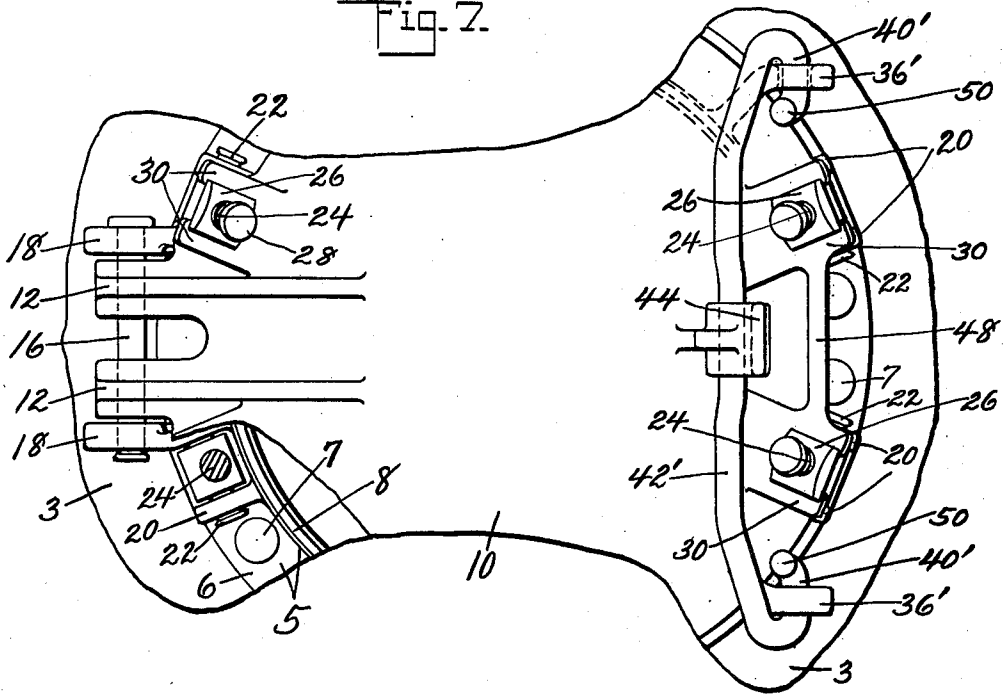
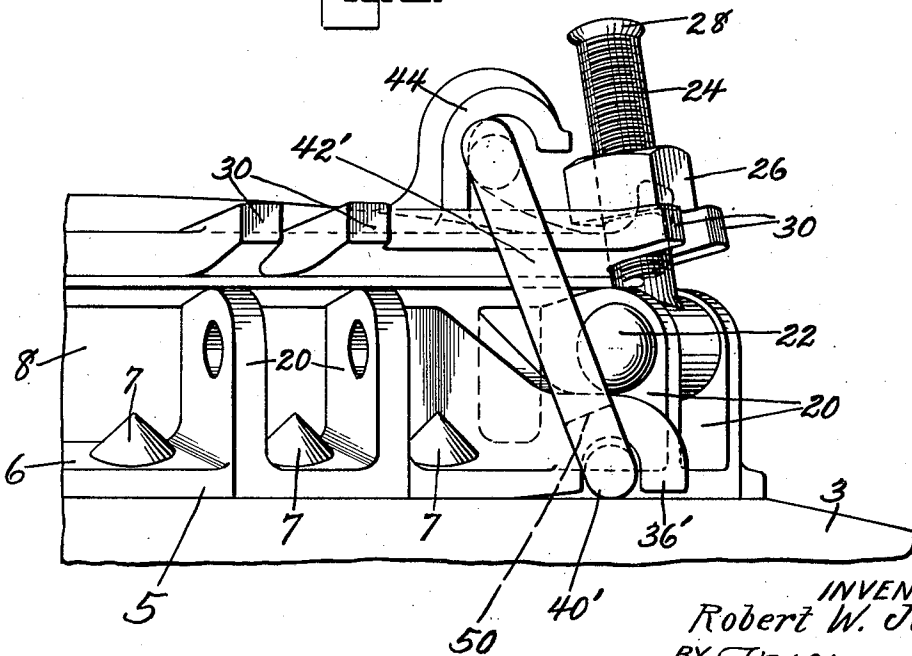


Fig. 8.



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UNITED STATES PATENT OFFICE.

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CAR-TANK-DOME CLOSURE.

Application filed September 12, 1925. Serial No. 56,004.

Reference is had to the accompanying drawings, which illustrate the preferred form of the invention, though it is to be understood that the invention is not limited to the exact details of construction shown and described, as it is obvious that various modifications thereof within the scope of the claims will occur to persons skilled in the art.

In said drawings:

Fig. 1 is a vertical section of a car tank dome equipped with a dome closure constructed in accordance with this invention;

Fig. 2 is a top plan view of the dome closure shown in Fig. 1, part of the closure being broken away to show other parts more clearly;

Fig. 3 is a partial view in elevation of the closure shown in Figs. 1 and 2;

Fig. 4 is a fragmentary section of the closure shown in Figs. 1 and 2 taken on the line 4-4 of Fig. 2 and showing the closure secured in closed position;

Fig. 5 is a section similar to Fig. 4 showing the closure in the position in which it is held when raised by pressure in the tank;

Fig. 6 is a section similar to Fig. 4 showing the closure lowered from the position shown in Fig. 5 in order to release the means which holds the closure in the position shown in Fig. 5;

Fig. 7 is a partial top plan view of a dome closure having a means of modified construction for limiting the opening of the closure, and

Fig. 8 is a partial view in elevation of the closure shown in Fig. 7.

In the transporting of volatile liquids in tank cars it frequently happens that during the time of transporting sufficient of the liquid is evaporated to raise the pressure in the tank to such a degree that it is unsafe to release the dome closure until the pressure has been vented from the tank. This invention relates to dome closures for use on tanks used in transporting volatile liquids and it is an object of this invention to provide a dome closure which cannot be completely released while there is sufficient pressure in the tank to raise the closure. It is also an object of this invention to provide a closure for car tank domes which comprises a means which is engaged with the closure to limit the opening movement of the

closure and which can be disconnected from the closure only upon moving the closure to a predetermined partially opened position, the position to which the closure may be opened while so limited being one in which the pressure in the tank is vented without unnecessary delay and without spilling of the tank contents.

In the drawings, the invention is shown applied to a car tank 1 having the usual dome 2 provided with a dome head 3 in which is the usual manhole opening 4 surrounded by a flanged dome ring 5 having a flange 6 which is secured to the dome head 3 by rivets 7. The dome ring 5 is formed with an upwardly projecting flange 8 upon which is seated a cover or closure 10 having outwardly projecting hinge lugs 12 provided with elongated openings 14 to receive a pin 16 mounted in lugs 18 formed integral with the dome ring 5. The dome ring 5 also has integrally formed therewith pairs of lugs 20 which are spaced uniformly about the dome ring 5 and receive pins 22 upon which are pivotally mounted securing bolts 24 having nuts 26 secured thereon by the enlarged heads 28 of the bolts. The bolts 24 are received in the openings in bifurcated lugs 30 formed integral with the cover 10 and spaced to correspond with the pairs of lugs 20, the lugs 30 projecting upwardly slightly and being engaged by the nuts 26 to force flange 32 of the cover to its seat on the upper edge of the flange 8 of the dome ring 5 and hold the cover tight on the opening. A suitable packing 34 is provided to insure a tight joint between the cover 10 and the dome ring 5.

Formed integral with the dome ring 5 are the outwardly projecting lugs 36 having semi-circular recesses 38 in their bottom surfaces which receive the inwardly projecting ends 40 of the open link 42, the ends 40 being held in position between the lugs 36 and the dome head 3. Formed integral with the cover 10 is a lug 44 which projects upwardly and then curves outwardly and downwardly forming a recess to receive the outer portion 46 of the link 42. The cover 10 is also provided with a lug 48 which is placed outwardly from the lug 44 and is of less height than the lug 44, the lugs 44 and 48 forming a means which keeps the link 42 in engagement with the cover 10.

In the construction shown in Figs. 1 to 6 the lugs 36 are placed so that the link 42 spans but one pair of lugs 20 and bolt 24 and the link 42 is not placed diametrically opposite the cover hinge, but it may be so placed by changing the arrangement of the pairs of lugs 20 and bolts 24. In the modified construction shown in Figs. 7 and 8 the lugs 36' are placed so that the link 42' spans more than one pair of lugs 20 and bolt 24 and the link 42' is placed diametrically opposite the cover hinge. In this construction, in order to prevent the end portions 40' of the link 42' being removed from beneath the lugs 36', the ends 40' are turned up as at 50. In all other respects this construction is identical with the construction shown in Figs. 1 to 6. The link 42 or 42' is placed beneath the lugs 36 or 36', respectively, as the ring 5 is secured to the dome head.

Considering the cover 10 secured in closed position, the nuts 26 on the bolts 24 are in engagement with the upper surfaces of the lugs 30 and hold the cover 10 in engagement with the upper edge of the flange 8 of the dome ring 5 preventing leakage between the dome ring 5 and the cover 10. In the closed position of the cover the link 42 or 42' is in engagement with the lug 44 on the cover as shown in Figs. 4 and 8. It will be noted that so long as the cover 10 is in its closed position the downwardly projecting portion of the lug 44 prevents disengagement of the link 42 or 42' from the cover. To open the cover 10 the nuts 26 are released sufficiently to permit the bolts 24 to be removed from the slots in the lugs 30. With the bolts 24 disengaged from the lugs 30 the cover 10 is raised to the position shown in Fig. 6 in which the link 42 or 42' is disengaged from the lug 44 and can be raised over the lug 48 to disengage the link 42 or 42' from the cover 10. Should there be pressure in the tank, however, then upon releasing the bolts 24, the pressure in the tank would force the cover upwardly bringing the link 42 or 42' into engagement with the lug 48, as shown in Fig. 5, which prevents the forcing of the cover 10 to the fully opened position by the pressure in the tank. With the cover held in this position against the pressure in the tank there is an opening between the flange 8 of the dome ring 5 and the downwardly projecting flange 52 on the cover sufficient to rapidly vent the pressure from the tank, the opening being designed to limit venting of the pressure to a rate which does not cause spilling of the tank contents. Upon the venting of the pressure from the tank the cover 10 falls back to closed position, and can then be raised to the position shown in Fig. 6 in which the link 42 or 42' can be moved past the lug 48 to disengage the link from the cover.

Thus, it will be seen, the links 42 or 42' restrain or limit the rise of the cover 10, with

which they are normally engaged and interlocked (at 44 or 48); and the links 42 or 42' are releasable for disengagement from the cover 10 only when the latter is actually partly raised.

In closing the cover it is necessary that the cover be returned to the position shown in Fig. 6 in order that the link 42 or 42' can be moved past the lug 48 whereupon the cover is moved to the fully closed position and the link 42 and 42' brought into engagement with the lug 44, thereafter the bolts 24 are introduced into the slots in the lugs 30 and the nuts 26 brought into engagement with the lugs 30 to secure the cover in closed position.

What is claimed is:

1. In combination, a closure, means for securing the same in closed position on a receptacle, and restraining means for limiting the rise of the closure from the receptacle, releasable only when the cover is actually partly raised.

2. In combination, a cover for a container in which there may be internal gas pressure, means for securing the cover in closed position, and restraining means for engaging said cover to limit its rise from the tank normally interlocked with the cover against disengagement therefrom, and releasable for disengagement only when the cover is actually partly raised.

3. In combination, a cover for a container in which there may be internal gas pressure, means to secure said cover in closed position, means secured to said tank and engaging said cover to limit the opening of said cover, and means insuring against the release of said limiting means unless said cover is raised a predetermined amount.

4. In combination, a cover for a container in which there may be internal gas pressure, means to secure said cover in closed position and means pivotally connected to said tank and interlocking with said cover to limit the opening of said cover, said connecting means being releasable from the cover only when the cover is raised a predetermined amount.

5. In combination, a cover for a container, means to secure said cover in closed position, a member pivotally mounted on said tank and engaging the cover, and means on said cover for preventing the releasing of the cover from said member whenever the cover is moved in closing direction or in an opening direction beyond a predetermined point.

6. In combination, a cover for a container, means to secure said cover in closed position, a member pivotally mounted on said tank and means on said cover engaging said member when said cover is in closed position to hold said member in position to engage said cover until the cover is raised a predetermined amount.

7. In combination, a cover for a container, means to secure said cover in closed position,

a member pivotally mounted on said tank and means on said cover engaging said member when said cover is in closed position to hold said member in position to engage said cover when said cover is raised and means engaging said member to hold said member in engagement with said cover when said cover is raised.

8. In combination, a cover for a container, means to secure said cover in closed position, a member pivotally mounted on said tank and means on said cover engaging said member when said cover is in closed position to hold said member in position to engage said cover when said cover is raised and means engaging said member to hold said member in engagement with said cover when said cover is raised, said member being disengageable from said cover in a predetermined venting position of said cover.

9. In combination, a cover for a container in which there may be internal gas pressure, means to secure said cover in closed position, a member pivotally mounted on said tank and means comprising projections on said cover for engaging said member to limit the raising of said cover and to insure against releasing the member from the cover except when the cover is raised a predetermined amount.

10. In combination, a cover for a container in which there may be internal gas pressure, means to secure said cover in closed position, a member pivotally mounted on said tank to limit the opening of said cover and means on said cover for engaging said member to insure against the release thereof until the cover is raised a predetermined amount.

11. In combination, a cover for a container in which there may be internal gas pressure,

means for securing said cover in closed position, means pivotally mounted on the tank and engaging said cover to limit the raising of the cover, means on said cover for preventing the release of said pivotal means until the cover is raised a predetermined amount to a release position, and means for preventing the release of said pivotal means when the cover is raised above said release position.

12. In combination, a cover for a container, in which there may be internal gas pressure, securing means for holding said cover in closed position, means pivotally mounted on the tank and engaging said cover to limit the raising of the cover upon release of said securing means, a projection on said cover for preventing the release of said pivotal means until the cover is raised a predetermined amount, and a lug for preventing the release of said pivotal means when the cover is raised beyond said predetermined amount.

13. In combination, a cover for a container in which there may be internal gas pressure, means pivotally connected to said container for interlocking with the cover to limit the opening of the cover, said means being releasable only when the cover is actually partly raised; and means for securing said cover in closed position.

14. In combination, a closure for normally closing a receptacle, and restraining means normally in the path of the closure to limit the opening movement thereof and arranged to be moved out of the path of the closure only when the closure is in a predetermined open position.

In witness whereof I have hereunto set my hand.

ROBERT W. JOY.