Sept. 11, 1934. G. SCHOTT 1,973,228

DOME COVER FOR TANK CARS

Filed April 7, 1932

Fig. 1.

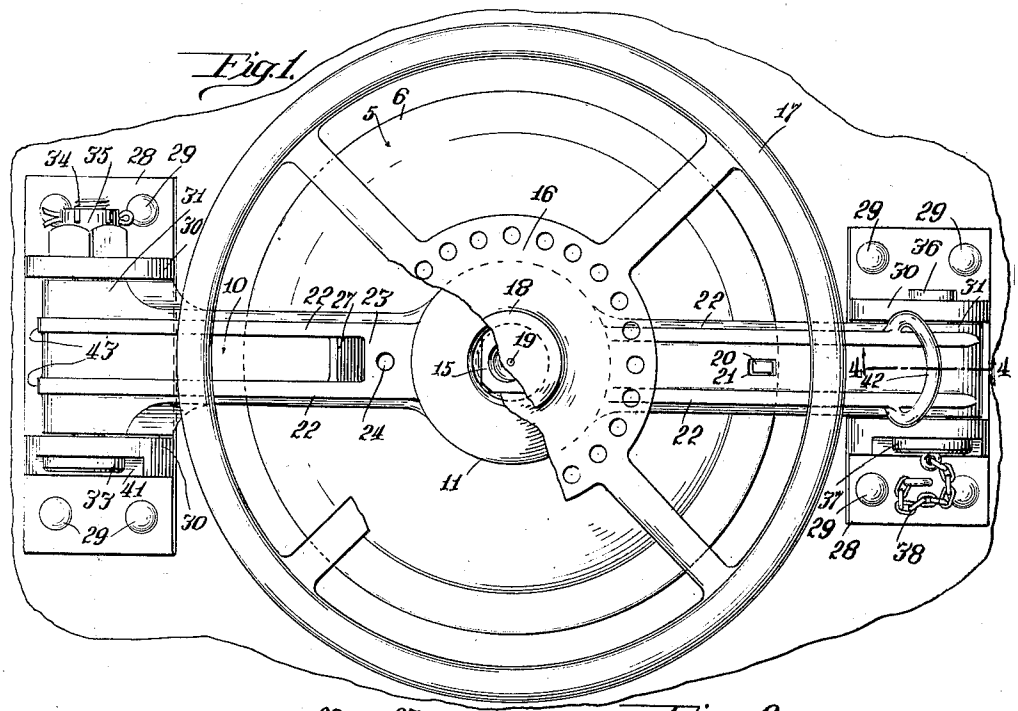


Fig. 2.

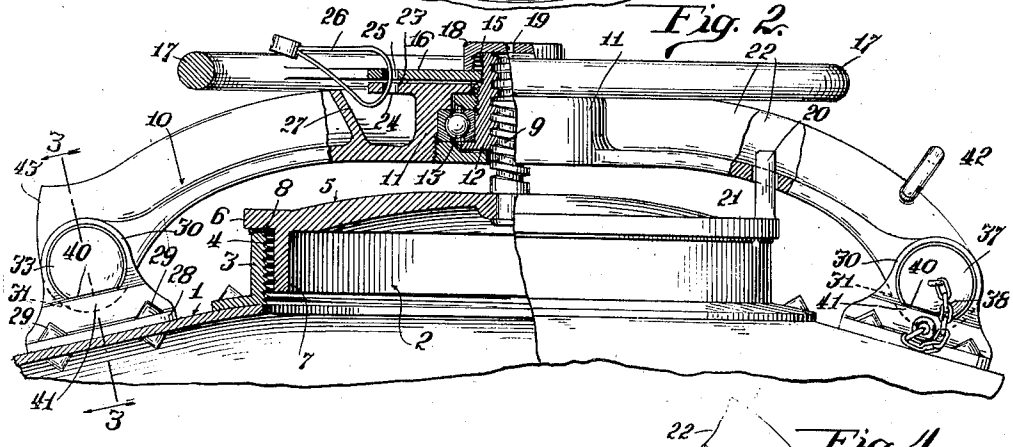


Fig. 3.

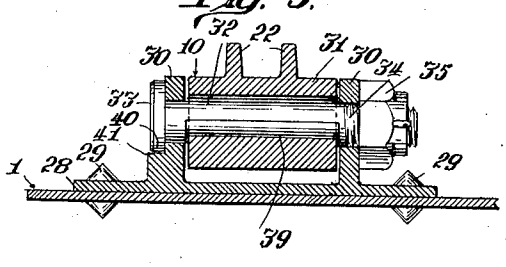
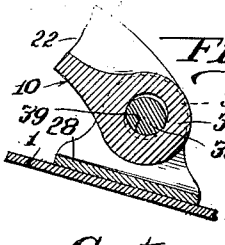


Fig. 4.



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DOME COVER FOR TANK CARS

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14 Claims. (Cl. 220—57)

This invention relates to a new and improved dome cover for tank cars.

The ordinary tank car is provided with a centrally located upwardly projecting dome in the top of which is an opening, usually circular, for permitting access to the interior of the tank. A removable closure is provided for this opening. Usually the cover or closure is adapted to screw into an internally threaded collar surrounding the opening. Other forms of closures are removably bolted in position.

The present invention relates to an improved form of cover and means for holding same firmly in sealing position and locking the parts against unauthorized removal. Briefly described, the closure assembly comprises a cover member which is non-rotary and simply fits in or over the opening, being provided with suitable gasket means for sealing the joint. An arched yoke member projects over the opening and cover, and a screw and nut assembly operated by a hand wheel suspends the cover from the yoke so that the cover may be forced quickly into sealing position, and will be carried by the yoke when removed from the opening. The respective ends of the yoke member are removably anchored to the top of the dome at the opposite sides of the opening by means of removable pins passing through mating openings in the end portions of the yoke and bracket members secured to the dome. One of these pins ordinarily remains permanently in position and serves as a hinge-pin about which the assembly may be swung to one side when the other pin is removed. The pins are so formed that they are locked irremovably in position when the cover is forced to sealing position by the screw and nut mechanism.

The principal object of the invention is to provide an improved dome closure assembly such as briefly described hereinabove and disclosed more in detail in the specifications which follow.

Another object is to provide an improved dome cover which may be substituted for the covers now used on tank cars.

Another object is to provide improved means for locking the cover in sealing position.

Another object is to provide an improved cover which may be quickly moved from open to closed position or vice versa with a minimum of effort.

Other objects and advantages of the invention will be more apparent from the following detailed description of one approved form of apparatus constructed and operating according to the principles of this invention.

In the accompanying drawing:

Fig. 1 is a plan view of the closure assembly, partly broken away.

Fig. 2 is a partial side elevation and partial central vertical section through the cover assembly.

Fig. 3 is a detail vertical section taken substantially on the line 3—3 of Fig. 2.

Fig. 4 is a detail vertical section taken substantially on the line 4—4 of Fig. 1.

At 1 is indicated a portion of the top or roof of the dome of a tank car, in which is a circular opening 2 about which is secured the upwardly projecting collar or ring 3. This ring is shown internally threaded at 4 to receive the ordinary form of screw cover. In connection with the improved closure member hereinafter described, these threads 4 are not used, and of course in new installations can be omitted. The cover member comprises a closure plate 5 having an outer horizontal annular flange 6 which fits over the upper edge of ring or collar 3, and a downwardly projecting annular flange 7 adapted to project loosely within the collar 3 so as to center the cover. An annular gasket 8 surrounds the flange 7 beneath the flange 6 to seal the joint between flange 6 and the top of collar 3. An upwardly projecting exteriorly threaded post or screw 9 is anchored at its lower end in the central portion of cover plate 5.

An arched yoke member 10 is formed to extend diametrically over the cover 5 so that its end portions may be anchored to the top 1 of the dome. The yoke is formed with a central hub portion 11 in which a nut 12 in which the screw 9 is threaded is rotatably supported by means of the anti-friction thrust bearing 13. The upwardly projecting end portion 15 of nut 12 is threaded, and is cut away at intervals to provide a non-circular portion adapted to project through a corresponding non-circular opening in the hub 16 of a hand wheel 17. An internally threaded cap member 18 is screwed onto the top of the threaded member 15 to hold the hand wheel in position. A lubricant port 19 may be provided centrally within the cap member 18.

It will now be apparent that, assuming the yoke 10 to be anchored at its ends to the top 1 of the dome, rotation of hand wheel 17 will rotate the nut 12 and thus move the screw 9 up or down to lift the cover 5 or force it into sealing position against the collar 3. A guide pin 20 projects upwardly from one edge portion of collar 5 through an opening 21 in yoke 10 to prevent rotation of the cover 5 and screw 9.

Spaced apart strengthening ribs 22 project upwardly from yoke 10 and extend from the central hub 11 substantially to the ends of the yoke. At

one side of hub 11 a horizontally projecting flange 23 connects the upper portion of ribs 22 and is formed with an opening 24. The opening 24 is adapted to align with any one of a circular series of similar openings 25 formed in the hub plate 16 of hand wheel 17. A wire seal 26 can be passed through the mating openings 24 and 25 to lock the hand wheel against rotation when the cover has been moved to seating position over opening 2. Preferably a transverse rib 27 is provided between the ribs 22 to hold the seal in the position shown in Fig. 2.

A pair of similar bracket plates 28 are riveted as at 29 to the roof 1 of the dome at diametrically opposite sides of opening 2. Each bracket plate 28 is formed with a pair of spaced apart upwardly projecting lugs 30 between which is received the hub portion 31 at one of the ends of yoke member 10. Mating, preferably cylindrical openings of similar diameter are formed in the lugs 30 and hubs 31 to receive the pins or bolts by means of which the yoke is anchored in position. As shown in Fig. 3, and at the left of Figs. 1 and 2, one of these pins 32 is formed at one end with an enlarged head 33, and the other end is threaded at 34 to receive a nut 35. This pin 32 normally remains permanently in the position shown and serves as a hinge pin. The other pin 36 (see Fig. 4 and at the right of Figs. 1 and 2) is removable, being formed at one end only with an enlarged head 37 similar to the head 33 of hinge pin 32. A chain 38 secured at one end to head 37 and anchored at its other end to the bracket plate 28 prevents loss of the pin 36 when the cover is opened. Each of the pins 32 and 36 is partially cut away on its lower side as indicated at 39 (Figs. 3 and 4), and when the yoke 10 is forced upwardly the hub portions 31 at the ends of the yoke will move upwardly into the recessed portions 39 of the pin making it impossible to remove the pins. Each of the heads 33 and 37 on the pins is cut away at one side 40 to engage a suitably positioned ledge 41 formed on the bracket member so that the respective pin can only be inserted in such a position that the recessed portion 39 will face downwardly in position to receive the end of the yoke member as it is moved upward in reaction to the closing movement of cover 5.

A suitable handle 42 for lifting the closure assembly and swinging it to open position is formed on that end of yoke 10 adjacent the locking pin 36, and at the opposite end of the yoke adjacent the pivot pin 32 the ribs 22 are extended to form abutments 43 which will engage the top 1 of the dome to support the closure assembly when it has been swung to a position just beyond the vertical.

Assuming that the closure assembly is in the open position just referred to, in order to close the opening 2 the yoke is first swung down to the position shown in Figs. 1 and 2 and the locking pin 36 is slipped through the aligned openings in the bracket lugs 30 and end portion 31 of the yoke. The hand wheel 17 is then turned in the proper direction to force cover 5 downwardly into firm sealing engagement with the collar 3. At the same time the yoke 10 will be forced upwardly so as to move the lower portions of hubs 31 at the ends of the yoke into the recessed portions 39 in the bottom of the pins 32 and 36 and lock these pins against removal. The nearest opening 25 in the hub 16 of the hand wheel is aligned with opening 24 in the yoke 10 and the seal 26 is inserted thus preventing rotation of the hand wheel in such a direction as to lift the cover 5. The locking pin 36 cannot be removed so long as the upward pressure on the yoke member 10 continues. The same is true of the hinge pin 32 which might be removed by unscrewing the nut 35 if it were not for the locking engagement with the yoke provided by the recessed portion 39.

In order to open the closure, it is merely necessary to break the seal 26, spin the hand wheel 17 in the proper direction to lift the cover 5 out of sealing engagement with collar 3 which will also relieve the upward pressure on yoke 10 so that locking pin 36 may be slipped out, whereupon the entire assembly can be swung about the pivot pin 32 to the open position.

It will now be seen that this improved cover can be applied to a dome opening of the type now in use, and that the cover will seat evenly and firmly and may be opened or closed quickly and with a minimum of labor. There are no bolts or nuts to remove or tighten, and no wrenches are required in the normal operation of the cover. The turning of the hand wheel to force the cover into seating engagement with the dome opening automatically locks the yoke member in position, and when the hand wheel is sealed against rotation the cover cannot be removed or loosened and all parts of the assembly are securely locked.

I claim:

1. A closure for the dome opening of a tank car comprising a cover for the opening, a yoke arm shaped to span the opening and cover, a nut rotatably mounted in the central portion of the yoke, a screw non-rotatably anchored in the cover and projecting upwardly therefrom and threaded in the nut, means for preventing rotation of the cover and screw, a handwheel secured to the nut for rotating the nut, the handwheel being rotatable in a fixed plane relative to the yoke and adjacent one face thereof, means for locking the handwheel to the yoke, means for pivotally mounting one end of the yoke on the dome, and removable means for anchoring the other end of the yoke to the dome.

2. A closure for the dome opening of a tank car comprising a cover for the opening, a yoke arm shaped to span the opening and cover, a nut rotatably mounted in the central portion of the yoke, a screw projecting upwardly from the cover and threaded in the nut, means for preventing rotation of the screw, a handwheel for rotating the nut, and pins for removably anchoring the two ends of the yoke to the dome at the sides of the opening, the pins and end portions of the yoke being formed to interlock so that the pins cannot be removed when the yoke and cover are forced apart by rotation of the handwheel to move the cover to closed position.

3. A closure for the dome opening of a tank car comprising a cover for the opening, a yoke arm shaped to span the opening and cover, means for adjustably supporting the cover from the intermediate portion of the yoke and forcing the cover to closed position over the opening, bracket members anchored to the dome at two opposite sides of the opening, each bracket comprising a pair of upwardly extending lugs between which an end portion of the yoke is received, the lugs and ends of the yoke being formed with mating openings, a pivot pin inserted through the aligned openings at one end of the yoke, and a removable locking pin inserted through the openings at the other end of the yoke, the lower portion of each pin being recessed so that the lower end portion of the yoke will be forced up into the recess when the cover is moved to closed position thus preventing removal of the pins.

4. A closure for the dome opening of a tank car comprising a cover for the opening, a yoke arm shaped to span the opening and cover, means for adjustably supporting the cover from the intermediate portion of the yoke and forcing the cover to closed position over the opening, bracket members anchored to the dome at two opposite sides of the opening, each bracket comprising a pair of upwardly extending lugs between which an end portion of the yoke is received, the lugs and ends of the yoke being formed with mating openings, removable pins inserted through the respective sets of mating openings at the two ends of the yoke, the lower portion of each pin being recessed so that the lower end portion of the yoke will be forced up into the recess when the cover is moved to closed position thus preventing removal of the pins.

5. A closure for the dome opening of a tank car comprising a cover for the opening, a yoke arm shaped to span the opening and cover, means for adjustably supporting the cover from the intermediate portion of the yoke and forcing the cover to closed position over the opening, bracket members anchored to the dome at two opposite sides of the opening, each bracket comprising a pair of upwardly extending lugs between which an end portion of the yoke is received, the lugs and ends of the yoke being formed with mating openings, removable pins inserted through the respective sets of mating openings at the two ends of the yoke, the lower portion of each pin being recessed so that the lower end portion of the yoke will be forced up into the recess when the cover is moved to closed position thus preventing removal of the pins, each pin having on one end a head one side of which is cut away and the bracket being formed with a ledge to engage the cutaway portion of the head so that the pin can only be inserted with the recessed side downward.

6. A closure for the dome opening of a tank car comprising a cover for the opening, a yoke arm shaped to span the opening and cover, a nut rotatably mounted in the central portion of the yoke, a screw projecting upwardly from the cover and threaded in the nut, means for preventing rotation of the screw, a handwheel for rotating the nut, bracket members anchored to the dome at the two sides of the opening, each bracket comprising a pair of upwardly extending lugs between which an end portion of the yoke is received, the lugs and ends of the yoke being formed with mating openings, and removable pins inserted through the respective sets of mating openings at the two ends of the yoke, the pins and end portions of the yoke being formed to interlock so that the pins cannot be removed when the yoke and cover are forced apart by rotation of the handwheel to move the cover to closed position over the opening.

7. A closure for the dome opening of a tank car comprising a cover for the opening, a yoke arm shaped to span the opening and cover, a nut rotatably mounted in the central portion of the yoke, a screw non-rotatably anchored in the cover and projecting upwardly therefrom and threaded in the nut, means for preventing rotation of the cover and screw, a handwheel for rotating the nut, means for locking the handwheel to the yoke, bracket members anchored to the dome at the two sides of the opening, each bracket comprising a pair of upwardly extending lugs between which an end portion of the yoke is received, the lugs and ends of the yoke being formed with mating openings, a pivot pin inserted through the aligned openings at one end of the yoke, and a removable locking pin inserted through the openings at the other end of the yoke.

8. A closure for the dome opening of a tank car comprising a cover for the opening, a yoke arm shaped to span the opening and cover, a nut rotatably mounted in the central portion of the yoke, a screw projecting upwardly from the cover and threaded in the nut, means for preventing rotation of the screw, a handwheel for rotating the nut, bracket members anchored to the dome at the two sides of the opening, each bracket comprising a pair of upwardly extending lugs between which an end portion of the yoke is received, the lugs and ends of the yoke being formed with mating openings, a pivot pin inserted through the aligned openings at one end of the yoke, a removable locking pin inserted through the openings at the other end of the yoke, the pins and end portions of the yoke being formed to interlock so that the pins cannot be removed when the yoke and cover are forced apart by rotation of the handwheel to move the cover to closed position over the opening.

9. A closure for the dome opening of a tank car comprising a cover for the opening, a yoke arm shaped to span the opening and cover, a nut rotatably mounted in the central portion of the yoke, a screw projecting upwardly from the cover and threaded in the nut, means for preventing rotation of the screw, a handwheel for rotating the nut, bracket members anchored to the dome at the two sides of the opening, each bracket comprising a pair of upwardly extending lugs between which an end portion of the yoke is received, the lugs and ends of the yoke being formed with mating openings, and removable pins inserted through the respective sets of mating openings at the two ends of the yoke, the lower portion of each pin being recessed so that the lower end portion of the yoke will be forced up into the recess when the cover is moved to closed position by rotation of the handwheel thus preventing removal of the pins.

10. A closure for the dome opening of a tank car comprising a cover for the opening, a yoke arm shaped to span the opening and cover, a nut rotatably mounted in the central portion of the yoke, a screw projecting upwardly from the cover and threaded in the nut, means for preventing rotation of the screw, a handwheel for rotating the nut, bracket members anchored to the dome at the two sides of the opening, each bracket comprising a pair of upwardly extending lugs between which an end portion of the yoke is received, the lugs and ends of the yoke being formed with mating openings, a pivot pin inserted through the aligned openings at one end of the yoke, and a removable locking pin inserted through the openings at the other end of the yoke, the lower portion of each pin being recessed so that the lower end portion of the yoke will be forced up into the recess when the cover is moved to closed position by rotation of the handwheel thus preventing removal of the pins.

11. A closure for the dome opening of a tank car comprising a cover for the opening, a yoke arm shaped to span the opening and cover, a nut rotatably mounted in the central portion of the yoke, a screw projecting upwardly from the cover and threaded in the nut, means for preventing rotation of the screw, a handwheel for rotating the nut, bracket members anchored to the dome at the two sides of the opening, each bracket comprising a pair of upwardly extend-

ing lugs between which an end portion of the yoke is received, the lugs and ends of the yoke being formed with mating openings, a pivot pin inserted through the aligned openings at one end of the yoke, and a removable locking pin inserted through the openings at the other end of the yoke, the lower portion of each pin being recessed so that the lower end portion of the yoke will be forced up into the recess when the cover is moved to closed position by rotation of the handwheel thus preventing removal of the pins, each pin having on one end a head, one side of which is cut away and the bracket being formed with a ledge to engage the cut away portion of the head so that the pin can only be inserted with the recessed side downward.

12. A closure for the dome opening of a tank car comprising a cover for the opening, a yoke arm shaped to span the opening and cover, means for anchoring the ends of the arm to the dome at the sides of the opening, a nut rotatably mounted in the central portion of the yoke, a screw non-rotatably anchored in the cover and projecting upwardly therefrom and threaded in the nut, means for preventing rotation of the cover and screw, and a handwheel secured to the nut for rotating the same, the handwheel having a hub provided with an annular series of openings, there being a flange on the yoke arm underlying the hub and provided with an opening adapted to mate with any one of the openings in the hub, whereby a seal may be passed through the aligned openings to lock the handwheel against rotation.

13. A closure for the dome opening of a tank car comprising a cover for the opening, a yoke arm shaped to span the opening and cover, means for anchoring the ends of the arm to the dome at the sides of the opening, a nut rotatably mounted in the central portion of the yoke, a screw non-rotatably anchored at its lower end in the central portion of the cover and projecting upwardly and threaded in the nut, a guide-pin projecting upwardly from the cover, there being an opening in the yoke arm in which the guide-pin is vertically slidable, and a handwheel secured to the nut for rotating the same.

14. In combination with the dome of a tank car having a circular opening in its top with an annular collar extending upwardly about the opening, a cover adapted to fit upon the collar and having an annular flange adapted to project down within the collar and center the cover, a screw non-rotatably anchored at its lower end in the central portion of the cover, a guide-pin projecting upwardly from one side portion of the cover, a yoke-arm shaped to span the opening and cover, a nut rotatably mounted in the central portion of the yoke, the screw being threaded in the nut, a handwheel secured to the upper end of the nut, means for locking the handwheel to the yoke arm to prevent unauthorized rotation of the handwheel, there being an opening in the yoke-arm in which the guide-pin is vertically slidable, a pair of brackets secured to the dome at diametrically opposite sides of the opening, each bracket comprising a pair of upwardly projecting lugs between which one end of the yoke-arm is interposed, the lugs and end of the yoke arm being formed with aligned openings, a pair of pins, one adapted to be inserted through the aligned openings in each pair of bracket lugs and the corresponding end portion of the yoke, the underside of each pin being centrally recessed to permit the yoke to be forced upwardly into the recessed portion, and means for holding the pins with the recessed side of each facing downward.

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