Oct. 20, 1942. H. OBERGFELL 2,299,249

LOCK STRUCTURE

Filed Nov. 10, 1941

Fig. 2

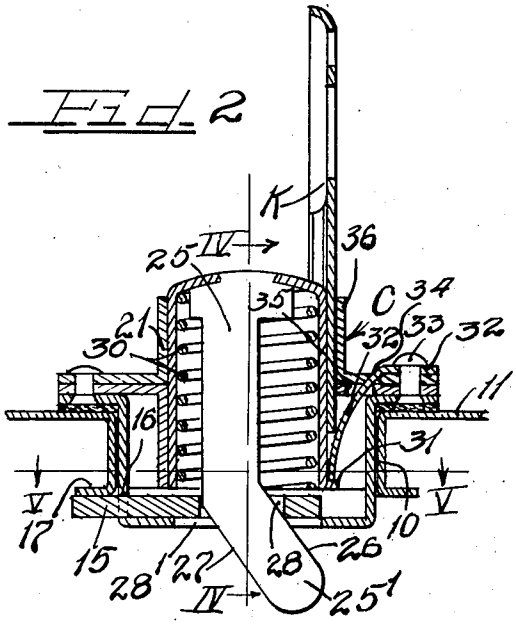


Fig. 3

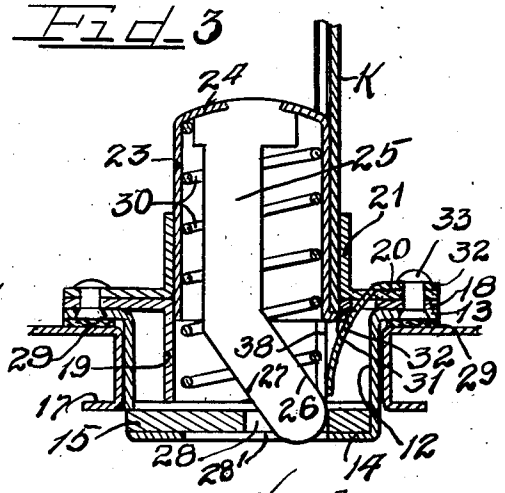


Fig. 4

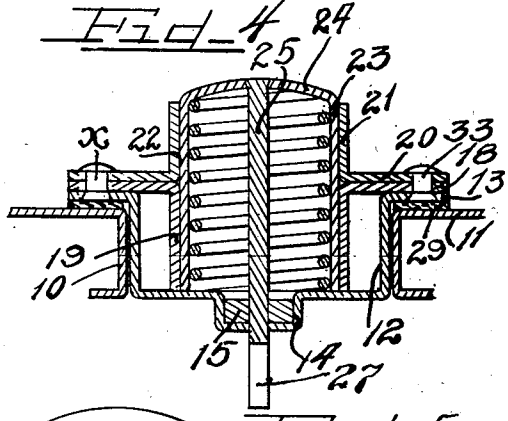


Fig. 1

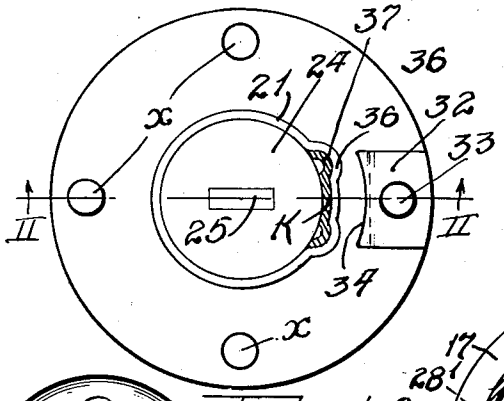


Fig. 5

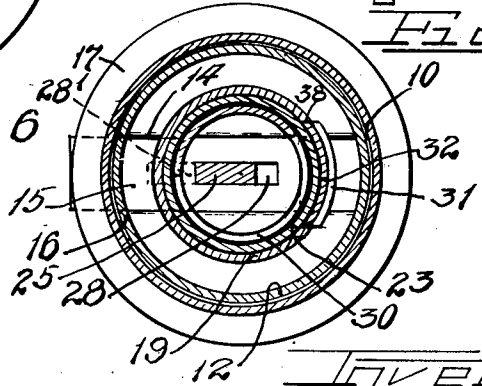
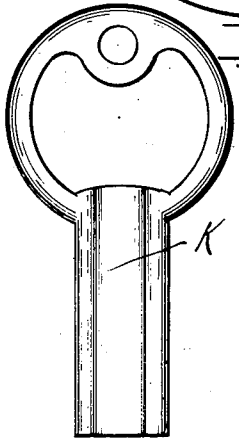


Fig. 6



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UNITED STATES PATENT OFFICE

2,299,249

LOCK STRUCTURE

Hermann Obergfell, Chicago, Ill., assignor of one-half to Hugo G. Tomich, Chicago, Ill.

Application November 10, 1941, Serial No. 418,533

7 Claims. (Cl. 70—169)

My invention relates to locking structure, particularly to locking structure for the closure plugs or caps of containers such as the gasoline tank on automotive vehicles.

An important object of the invention is to produce a closure locking structure comprising a minimum number of parts all of which are in the form of simple sheet metal stampings requiring no finishing, so that the structure may be economically manufactured.

Another important object is to produce a locking structure in which a laterally extending lock bolt is shifted to locking or unlocking position by a vertically extending cam member with spring means tending to shift the locking structure to unlocking position and with detent means normally holding it in locking position and with the detent means releasable by the longitudinal movement of a suitable key in a keyhole.

My invention also embodies other features of improvement, and all these features are embodied in the structure shown on the drawing, in which drawing:

Figure 1 is a plan view of the locking structure;

Figure 2 is a section on plane II—II Figure 1 showing the locking structure in locking position within the inlet of a container and showing the unlocking key about to be applied to effect unlocking;

Figure 3 is a section similar to Figure 2 showing the locking structure unlocked;

Figure 4 is a section on plane IV—IV Figure 2;

Figure 5 is a section on plane V—V Figure 2; and

Figure 6 is a side elevation of a key.

On the drawing I have shown a closure structure C for the filling opening 10 of a container 11 which may be the gasoline tank of an automotive vehicle, the locking parts being included in this structure. The structure comprises a cylindrical cup 12 having the outwardly directed flange 13 at its upper end, the cup forming a plug for extending through the container opening 10. The bottom of the cup is deflected to provide a diametrally extending guide channel 14 for the locking bolt or bar 15 which is adapted to be projected outwardly through the opening 16 in the side of the cup for engagement behind the flange 17 at the inner end of the container passageway 11.

Engaging on the cup flange 13 is a circular plate 18 whose middle portion is deflected downwardly to form the annular guide wall or flange 19 concentric with the cup 12 and extending to the bottom thereof, as clearly shown on Figure 4. Engaging the plate 18 is an upper plate 20 whose middle portion is deflected upwardly to form the guide wall or flange 21 concentric with and in alignment with the guide flange 19 so as to provide a cylindrical guideway 22 for the locking bolt actuating element. This element comprises a cylindrical sleeve 23 of sheet metal whose upper end is closed by a wall 24 integral therewith. Secured at its upper end to this top wall 24, as by riveting, is a cam bar 25 whose body extends longitudinally in the sleeve 23 and whose lower end 25' extends at an angle to form upper and lower cam surfaces 26 and 27 respectively. The locking bolt or bar 15 has a rectangular slot 28 in alignment with the slot 28' in the cup bottom through which the end of the cam bar extends for cooperation of its cam edges 26 and 27 with the inner and outer ends respectively of the slot 28 so that when the actuating member with the cam bar is shifted inwardly, the cam surface 27 will engage with the outer end of the slot 28 in the latch bolt and shift the latch bolt to its outer or locking position as shown on Figure 2, and when the actuating member with the cam bar is shifted outwardly, the cam surface 26 will engage with the inner end of the slot 28 in the bolt and shift the bolt to its inner or unlocking position as shown on Figure 3.

The cup flange 13 and the plates 18 and 20 are rigidly secured together in concentric relationship as by means of rivets x, or by welding, and to afford a closure seal, a gasket 29 may be secured to the under side of the cup flange 13 for engaging against the top of the container around the filling opening 10 thereof.

A compression spring 30 within the actuating member 23 abuts the bottom of the cup and the top 24 of the actuating member and tends to hold the actuating member in its outer position for unlocking of the locking bolt 15, as shown on Figure 3. At its inner end the actuating member 23 has an abutment ledge 31 extending therefrom for engagement by a detent member 32 for holding the actuating member in its inner or locking position. The detent member shown is in the form of a spring plate anchored at its outer end to the top of the plate 20, as by welding or, as shown, by a rivet 33 which may also extend through the plate 18 and the cup flange 13 to assist the rivets x in holding the respective frame parts together. The detent spring deflects downwardly through a slot 34 in the plate 20

and through a slot 35 in the plate 18. The detent spring fully closes the slot 34 so as to prevent access to the inner end of the detent spring, but the slot 35 affords sufficient clearance for flexure of the spring end. When the actuating member 23 is in its inner or locking position, the inner end of the detent spring is above the abutment 31 on the actuating member to hold this member in its inner position, as shown on Figure 2.

The upwardly extending flange 21 of the plate 20 has a portion 36 deflected outwardly opposite the detent spring 32 to provide a keyway 37 between the deflected part and the sleeve 23 of the actuating member for insertion of a key K. Below this keyway, the guide flange 19 of the plate 18 is cut away to leave the opening 38 through which the detent abutment or ledge 31 on the actuating member 23 extends, the actuating member being thus held against rotational displacement. The opening 38 is in alignment with the keyway 37 and also receives the lower end of the detent spring 32 for detent engagement with the abutment ledge 31. At its lower end the detent spring may be of arcuate cross section concentric with the actuating element 23, as shown on Figure 5.

Figure 2 shows the structure in its locked position, with the key partially inserted and about to engage the detent spring 32. Upon final inward movement of the key, its end engages with and swings out the inner end of the detent spring away from the detent ledge 31 on the actuating member 23 as indicated by dotted lines, the released actuating element 23 being then shifted to its outer position by the spring 30, the key moving outwardly with the actuating member, as shown on Figure 3. This outward movement of the actuating member is limited by the engagement of the abutment ledge 31 with the plate 18 at the upper end of the opening 38 in the flange 19. During this outward movement of the actuating element 23, the upper cam surface 26 of the cam bar 25 is engaged with the inner end of the slot 28 to shift the locking bolt 15 to its inner or unlocking position to release the structure for removal from the filler opening 10 in the container 11. To reclose and lock the filler opening 10, the locking structure is reapplied, and after withdrawal of the key, the actuator member 23 is shifted to its inner position for engagement of the cam surface 27 with the outer end of the locking bolt slot 28 for outward shift of the locking bolt back to its locking position, as shown on Figure 2. During such inward shift of the actuating member 23, its abutment ledge 31 wipes along the detent spring and deflects it outwardly until the abutment ledge is below the spring edge, the spring then deflecting back to its normal position above the ledge to relock the actuating member in its locking position.

I thus produce a simple and efficient locking structure for the purpose described in which all of the parts are simple sheet metal stampings which can be secured together, as by welding, without need of any machining or finishing work. The lock can be used for other purposes than that referred to, as for example, for doors and other types of closures. I have shown a practical embodiment of my invention, but I do not desire to be limited to the exact structure, arrangement and operation shown and described, as changes and modifications may be made without departing from the scope of the invention.

I claim as follows:

1. Locking structure comprising a cylindrical cup-shaped frame having a diametrally extending slot in its bottom wall, a locking bolt shiftable radially on the bottom of said frame into locking or unlocking position and having a slot therethrough in alignment with said slot in said bottom wall, a cylindrical sleeve guided in said frame for inward and outward movement and having an upper wall, a cam bar secured at said upper wall and extending through said sleeve and having an inclined end extending through said slots in the locking bolt and the frame bottom wall and having upper and lower camming surfaces for coopertion with said locking bolt at the ends of the slot therethrough whereby inward movement of said sleeve and cam bar will shift said locking bolt outwardly into locking position and outward movement of said sleeve with said cam bar will cause inward shift of said locking bar to unlocking position, and key releasable means engageable with said sleeve for holding it normally in its inner position with said locking bolt in its locking position.

2. Locking structure comprising a cup-shaped cylindrical frame having a diametrally extending slot in its bottom wall, a locking bolt shiftable radially in said frame and having a slot therethrough in alignment with the slot in said bottom wall, a cylindrical sleeve guided in said frame for inward and outward movement and having an outer wall, a cam member extending from said sleeve outer wall through said sleeve and terminating in an inclined end extending through the slots in said locking bolt and the frame bottom wall and providing upper and lower cam surfaces on said end engageable with said locking bolt at the ends of the slot therethrough whereby inward shift of said sleeve will engage said lower cam surface with said locking bar for outward shift thereof to locking position and outward movement of said sleeve will cause said upper cam surface to engage with said locking bolt to shift it inwardly to unlocking position, spring means within said sleeve tending to shift it to its outer or unlocking position, a detent abutment on said sleeve, a detent member mounted on said frame and extending thereinto for engagement with said detent abutment to hold said sleeve in its inner or locking position, and means providing a keyway for insertion of a key for engagement with said detent to release it from said detent abutment whereby said spring means will be free to shift said sleeve to its outer position for unlocking movement of the locking bolt.

3. Locking structure comprising a cylindrical cup, a locking bolt shiftable radially in said cup to locking or unlocking position and having a slot therethrough, wall structure within said cup forming a guideway, an actuating member shiftable in said guideway, a cam member secured to said sleeve and having an inclined lower end extending through said locking bolt slot and having cam surfaces engageable with the locking bolt at the ends of the slot therethrough with the arrangement such that when said sleeve is shifted to its inner position said cam member will cam said locking bolt to its outer or locking position and when said sleeve moves to its outer position said cam member will cam said locking bolt to its inner or unlocking position, spring means tending to shift said sleeve outwardly to unlocking position, a detent abutment on said sleeve, a detent member mounted on said cup with its end normally in the path of said abutment to prevent out-

ward movement of said sleeve, said guideway forming wall structure having a portion deflected outwardly to provide a keyway between the deflected portion and said sleeve for the insertion of a key for engagement with said detent to disengage the detent from said abutment for release of said sleeve for outward shift thereof by said spring means.

4. Locking structure comprising a sheet metal cup, a locking bolt shiftable radially in said cup to locking or unlocking position and having cam engageable abutments thereon, wall structure extending into said cup and providing a guideway, a sleeve shiftable in said guideway, a cam member on said sleeve engageable with the cam abutments on said locking bolt with the arrangement such that when the sleeve is shifted inwardly said locking bolt will be cammed to its locking position and when the sleeve is shifted outwardly said locking bolt is cammed to its inner or unlocking position, spring means tending to shift said sleeve outwardly, a detent abutment on said sleeve, a detent in the form of a spring anchored at its outer end to said cup and extending thereinto for engagement of its end with said abutment to lock said sleeve in its inner position, said wall structure providing a keyway for the insertion of a key into engagement with said detent spring to release it from said abutment whereby said spring will shift said sleeve outwardly for unlocking movement of said locking bolt.

5. Locking structure comprising a sheet metal cup, a locking bolt shiftable radially along the bottom of said cup into locking or unlocking position and having cam engageable abutments, sheet metal wall structure extending into said cup to form a guideway, an actuator structure movable in said guideway and supporting a cam member engageable with said abutments on said locking bolt to shift said bolt to its outer or locking position when said actuator structure is in its inner position and to shift said bolt inwardly to its unlocking position when said actuator structure is moved outwardly in said guideway, a detent abutment on said actuator structure, a detent mounted on said cup and extending thereinto for engagement with said detent abutment to lock said actuator structure in its inner position, said guideway forming wall structure being formed to provide a keyway for the insertion of a key for engagement with said detent to release it from said detent abutment whereby said actuator structure may then be moved to its outer position for unlocking of the locking bolt.

6. A locking structure comprising a cylindrical cup, a locking bolt shiftable radially at the bottom of said cup into locking or unlocking position and having cam engageable abutments, wall structure supported on said cup and extending thereinto to provide a cylindrical guideway, an actuator structure movable in said guideway and providing cam surfaces engageable with the abutments on said bolt to shift said bolt to locking position when said actuator structure is moved inwardly and to shift said bolt to unlocking position when said actuator structure is moved outwardly, spring means tending to move said actuator structure outwardly, an abutment extending outwardly from the lower end of said actuator structure, a detent in the form of a spring plate anchored at its outer end to said cup and extending thereinto for engagement with said actuator structure abutment to hold said actuator structure in its inner position, said wall structure having a portion thereof deflected away from said actuator structure to provide a keyway for the insertion of a key for engagement with said detent to move it away from said actuator structure abutment to release said actuator structure for outward movement by said spring, said actuator structure abutment being engageable with said guideway forming wall structure to limit the outward movement of said actuator structure.

7. A locking structure comprising a cylindrical cup forming a plug for engaging in the filler opening of a container and having a flange at its outer end engageable with the top of the container around the opening, the bottom of said cup being deflected to form a diametrally extending channel, a locking bolt shiftable outwardly in said channel with its end projected below the container wall or to be shifted inwardly away from the container wall, the cup bottom having a slot and said locking bolt having a slot in alignment therewith, a wall structure secured to the cup flange and extending into the cup to form a cylindrical guideway, an actuating member in the form of an inverted cup movable in said wall structure guideway, a cam member supported within said actuating member and having an inclined inner end extending through the slots in said bolt and the cup bottom and presenting cam surfaces engageable with the bolt at the ends of the slot therethrough for effecting outward shift of the bolt when said actuating member is moved inwardly and inward shift of the bolt when the actuating member is moved outwardly, spring means tending to move said actuating member outwardly, a detent abutment on said actuating member, a detent spring anchored at its outer end to the cup flange and extending into the cup for engagement with said abutment detent to lock said actuating member in its lower position, said wall structure having a portion deflected outwardly to form with said actuating member a keyway for the insertion of a key for engaging said detent spring to disconnect it from said detent abutment for release of said actuating member for outward movement thereof by said spring, said detent abutment being engageable with said wall structure to limit the outward movement of said actuating member.

HERMANN OBERGFELL.