

Nov. 18, 1969

HANS-GEORG SCHALLEHN
LOCK FOR GAS AND WATERTIGHT CLOSING OF
FLAPS, GATES, DOORS AND THE LIKE

3,479,076

Filed June 10, 1968

3 Sheets-Sheet 1

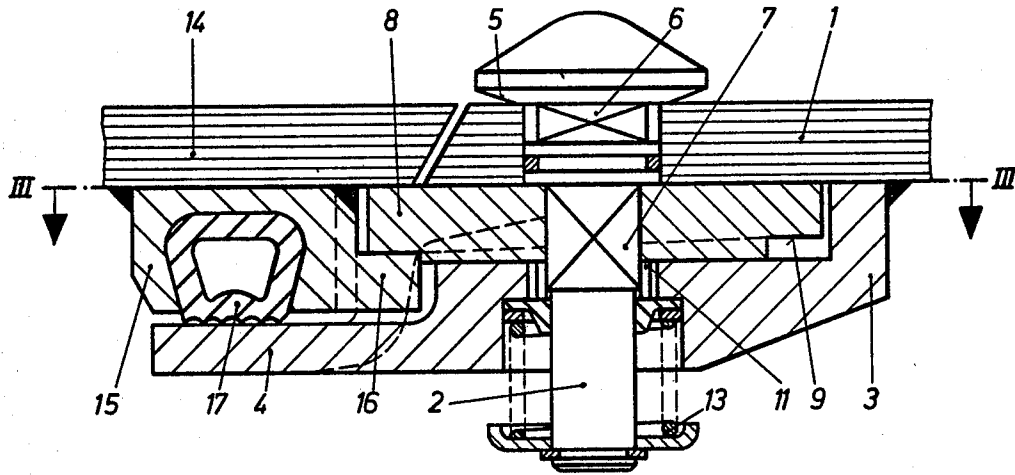


Fig. 1

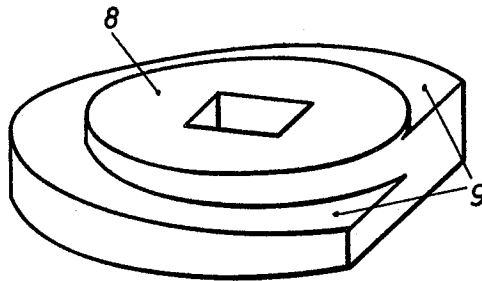


Fig. 5

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3 Sheets-Sheet 2

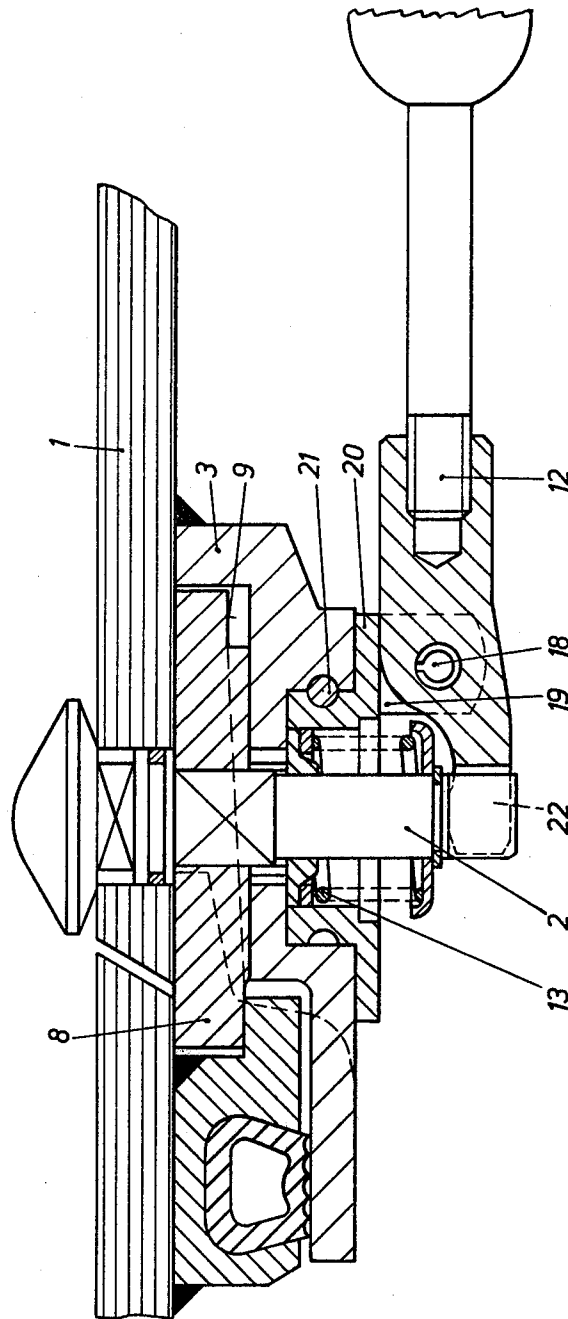


Fig. 2

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3 Sheets-Sheet 3

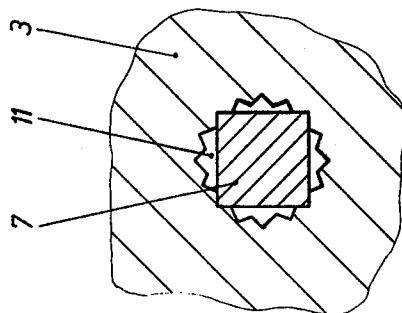


Fig. 4

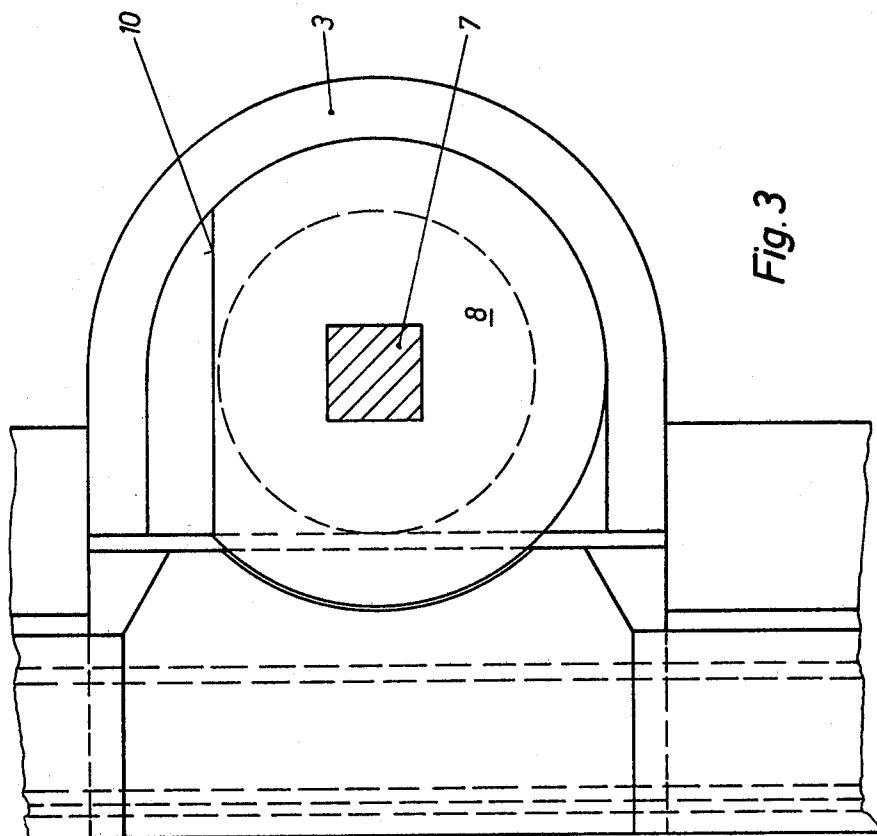


Fig. 3

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3,479,076

LOCK FOR GAS AND WATERTIGHT CLOSING OF FLAPS, GATES, DOORS AND THE LIKE

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U.S. Cl. 292—67

7 Claims

ABSTRACT OF THE DISCLOSURE

Locking device for locking a closure member in closed relation to an aperture and a wall in which a disc is rotatably mounted on the wall and has an inclined surface on the side facing away from the wall for engaging a lip projecting from a rigid member forming a part of the closure member. The disc is non-rotatably mounted on a bolt which is reciprocable against a spring force in the wall. When the bolt is released to the spring force it engages a hole in a support housing therefor which is fixed to the wall and is locked against rotation. When the bolt is pushed toward the wall against the force of the spring, it is released from the hole and can be rotated to rotate the disc between locking and unlocking positions.

The present invention relates to a locking arrangement for closing flaps, gates, doors and the like, in a gas and water-tight manner as they are used, for instance, with armored vehicles. More specifically, the present invention concerns a locking arrangement as set forth above with a mandrel or bolt which is under spring pressure and is axially displaceable and rotatable while carrying a wedge-shaped closing member.

There has become known a locking arrangement for hatches in the roof of armored vehicles according to which the locking bar arranged on the outside on the roof will, in closing position, rest upon pressure members respectively arranged on said roof and on said hatch. Aside from the fact that the locking bar when moving from its open to its closing position, and vice versa, in addition to a pivoting movement also has to carry out a vertical movement, bearing means are arranged on the hatch for the mandrel or bolt on which the pivotal locking bar is connected. The outwardly located locking arrangement may, however, easily be damaged by projectiles or shrapnel or may even be destroyed thereby and made unusable.

With the heretofore known locking arrangement of the type involved which is operable from the interior of the vehicle and from the outside thereof, a wedge-shaped pivotable locking bar when in closing position rests with its inclined plane on the sliding surface of a pressure member which is equipped with a seal and which is connected to the wall of the vehicle.

Furthermore, there has become known a locking arrangement which is operable from the interior of the vehicle and also from the outside thereof. With this locking arrangement, a wedge-shaped pivotable locking bar will in closing position rest on an inclined plane which is connected to the sealing strip located on the wall of the vehicle. If an outer force acts upon the vehicle hatch, for instance, the explosion of a grenade which may press in or, in particular, tear out the hatch, the entire forces act upon the sealing strip and the long locking bar. It is, therefore, an object of the present invention to improve a locking arrangement of the above mentioned type.

It is a further object of the present invention to provide a locking arrangement for closing hatches, doors, and the

like, in a gas and watertight manner which will be resistant to bombardment and will have an increased stability.

These and other objects and advantages of the invention will appear more clearly from the following specification in connection with the accompanying drawings, in which:

FIGURE 1 diagrammatically illustrates a unilaterally operable arrangement according to the present invention.

FIGURE 2 is a diagrammatic illustration of a locking arrangement operable from two sides.

FIGURE 3 is a section taken along the line III—III of FIG. 1.

FIGURE 4 shows a detail of the locking arrangement according to the invention on an enlarged scale.

FIGURE 5 is a perspective top view of a clamping member in the form of a disc having its outer section equipped with a spiral step.

The locking arrangement according to the present invention is characterized primarily in that the closing member is formed by a clamping element or turnbuckle which by means of its base surface rests on the inner surface of a rigid member and is closed by means of a housing provided with a sealing strip, said clamping member being adapted by turning a bolt, to be clamped fast between the inner surface of a movable member and holding means connected to said movable member.

According to a further development of the present invention the said clamping member has the form of a disc provided with a flattened side and has its outer section equipped with a spiral step. The housing receiving said clamping member is advantageously of a U-shaped contour. The closing holding means has a nose pointing toward said bolt and is equipped with an elastic seal.

Referring now to the drawings in detail, and FIG. 1 thereof in particular, the arrangement shown therein comprises a rigid member 1, for instance, a wall or roof. In said rigid member 1 there is rotatably and axially displaceably journaled a mandrel or bolt 2 which has its other end resting in a housing 3 connected to said rigid member 1. This housing has a U-shaped cross section and is provided with a protruding sealing strip 4. The bolt 2 has a mushroom-shaped head and by means of a truncated cone surface 5 on said mushroom-shaped head rests upon the outer surface of said rigid member 1. Adjacent said truncated cone surface there are provided surfaces for engagement with a wrench for turning said bolt from the outside. Furthermore, the said bolt 2 has a section 7 which is rectangular in cross section and which is connected to the clamping member 8. The member 8 has the shape of a disc and by means of its base surface rests against the inner surface of rigid member 1 while the other surface which has a spiral step 9 rests against the housing 3. In order to permit the opening of the hatch or door, the member 8 is, as has been shown particularly clearly in FIG. 3, provided with a flattened side 10. The remaining portion of the section 7 of the bolt 2 is, as shown in FIG. 4, displaceably journaled in a star-shaped opening 11 of the housing 3 and is arrested by this arrangement in its open as well as in its closing position. For purposes of opening or closing the hatch, the bolt 2 is, by means of a wrench engaging the surfaces 6, or as shown in FIG. 2, by means of a manually operable lever 12, axially displaced against the thrust of spring 13 until the section 7 has left the opening 11. Thereupon, by turning the bolt 2, the member 8 is, with its helical surface 9 moved between the inner surface of the movable part 14 and the holding means 15 connected thereto and is clamped fast between the nose 16 on said holding means and the inner surface of the hatch 14. In this position the sealing strip 4 of the housing 3 rests against the elastic seal 16 which is connected to the

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holding means 15 so that a gas and watertight closure will be assured.

With a heretofore known special wrench (not shown), the locking arrangement can be unlocked from the outside by introducing the said wrench between the frusto-conical surface 5 of bolt 2 and the rigid member 1, placing the wrench mouth upon the surface 6 lifted against the thrust of spring 13 and thereby undoing the resting of the bolt. By lifting the bolt 2, the square head 7 is lifted out of the opening 11 and thereby the mechanical interlock is made ineffective. Now the bolt can be turned until the clamping member 8 with its flattened side 10 permits an opening of the movable part 14. The bolt 2 may either be withdrawn by the wrench or by actuation of the hand lever 12 be returned to its starting position in which instance the square head 7 of bolt 2 enters the opening 11, and the clamping member 8 is again arrested. In order visually to indicate the opened and closed position of the locking arrangement, the mushroom-shaped head of the bolt is marked accordingly.

The advantages obtained by the present invention may be summarized as follows:

(a) In view of the very short lever arm of the clamping member 8 and the cam 16 of the closing holding means, only minor bending moments will occur.

(b) The locking mechanism is arranged in a housing 3 and thereby is almost completely protected.

(c) The locking mechanism forms a compact resistant structural element composed of a few parts only.

(d) An automatic adjustment of the closing elements, for instance, during the opening or closing of the hatch or door by means of a hydraulic system which may cause damage to the parts during the closing operation will be avoided.

(e) In view of the specific shape of the clamping member 8, heretofore customary spacer discs for adjusting the closing elements are superfluous; and

(f) The locking action is no longer effected on sealing strips, but between sealing strip 15 and a movable part 14.

For the sake of completeness it may be added that the lever 12 is pivotally connected by means of a bolt 18 to a downwardly extending fork-shaped portion 19 which forms part of a flanged bushing 20 which in its turn is connected to the member 3 by a pivot 21. It will be appreciated that when the lever 12 is pivoted in clockwise direction, its fork-shaped end 22 causes the bolt 2 to move in upward direction. The downward movement of bolt 2 is effected by the spring 13. According to the embodiment of FIG. 1 which does not have the lever 12 it will, of course, be necessary manually to push the bolt 2 upwardly against the thrust of spring 13 whenever it is desired to open the hatch door.

What is claimed is:

1. A locking arrangement for locking a closure member in closing relation to an aperture in a wall member in gas and water tight relation to the wall member, which comprises: a bolt extending rotatably and reciprocally through said wall member adjacent said opening, spring means biasing said bolt axially in closing direction, a disc connected to said bolt to rotate therewith, a rigid member on said closure member engaging that side of said disc which is opposite said wall member, means for drawing the closure member toward the wall member when the disc engages said rigid member, a sealing lip

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fixed to the wall and extending adjacent said rigid member when said closure member is closed, and a resilient strip carried by said rigid member and engaging said sealing lip.

2. A locking arrangement according to claim 1 in which said last mentioned means comprises an incline on the side of said disc which engages said rigid member.

3. A locking arrangement according to claim 2 in which said disc has a flat side thereon circumferentially spaced from the high point of the inclined surface of the disc and of such a radial distance from the axis of said bolt as to clear said rigid member to permit the closure member to be opened when the disc is rotated to dispose said flat side adjacent said rigid member.

4. A locking arrangement according to claim 3 in which said bolt has a head on the side of the wall member opposite said disc, said head being tapered at least on the underside to permit the insertion of a tool therebeneath to lift the bolt head away from the wall member against the bias of said spring, said bolt having a wrench engageable portion immediately beneath said head whereby the bolt can be pried up and rotated by a wrench, said bolt being held against rotation when released to the bias of said spring.

5. A locking arrangement according to claim 4, which includes a housing fixed to said wall member and extending over said disc, the portion of said bolt engaging said disc being polygonal in cross section, the polygonal portion of said bolt extending beyond said disc and into said housing, said housing having a polygonal hole receiving said polygonal portion, said bolt being axially moveable against the bias of said spring means to move said polygonal portion out of the polygonal hole in said housing to permit rotation of said bolt and disc.

6. A locking arrangement according to claim 5, which includes a rotatable member in the side of said housing remote from said wall member, a lever pivotally supported on said rotatable member, said lever having one end part engaging said bolt and its opposite end part provided with hand graspable means for manipulation of said bolt from inside said wall member.

7. A locking arrangement according to claim 5 in which the said polygonal portion of said shaft is square and said disc has a square hole receiving the square portion of said shaft, and the polygonal hole in said housing being adapted for receiving said square portion of said shaft in a plurality of rotated positions of said shaft.

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