Sept. 28, 1948. J. H. ROETHEL 2,450,357

LOCKING MECHANISM

Filed Jan. 25, 1945 2 Sheets-Sheet 1

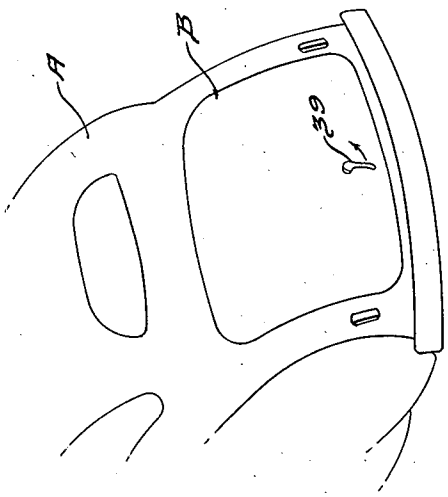
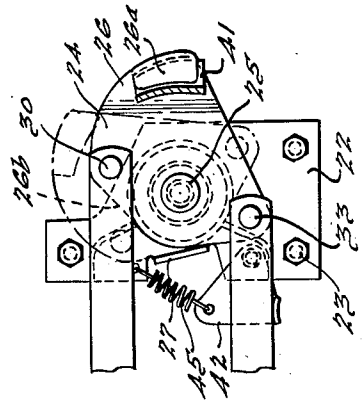
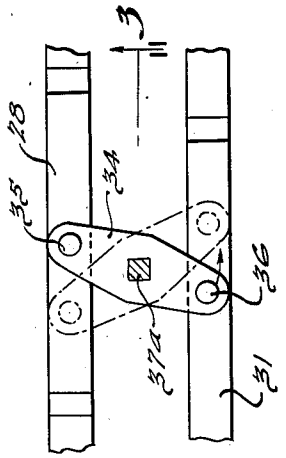


Fig. 1.





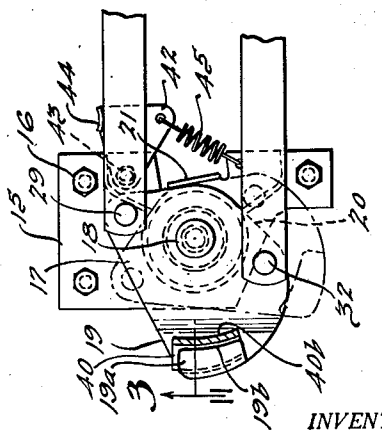


Fig. 2.

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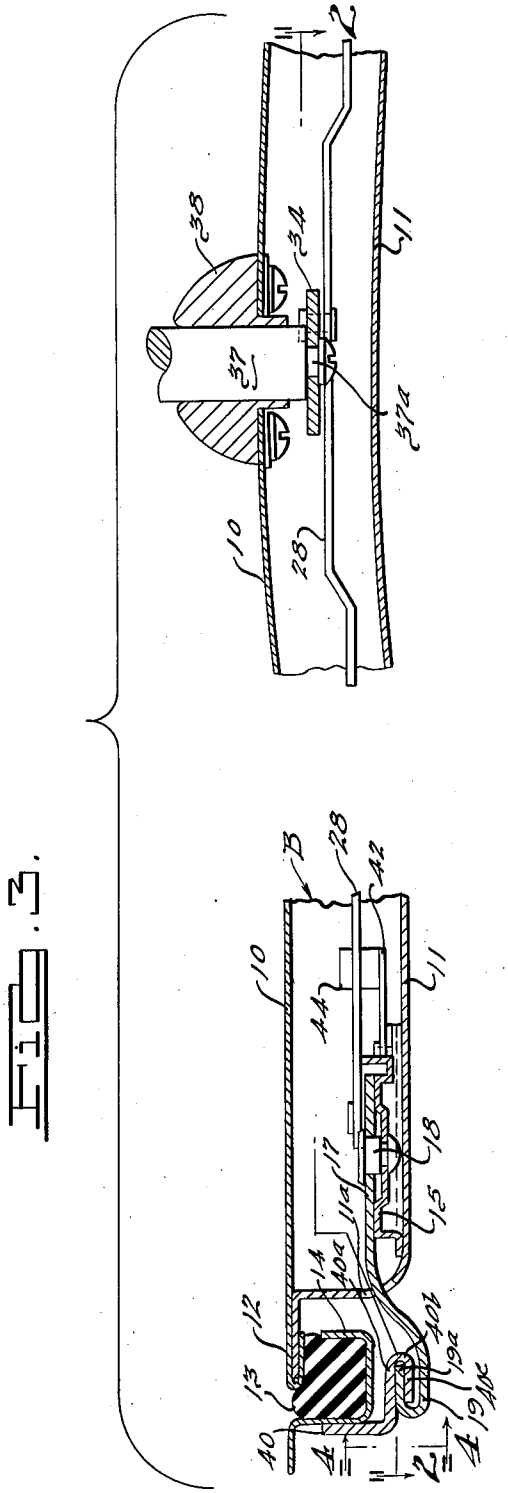


Fig. 2.

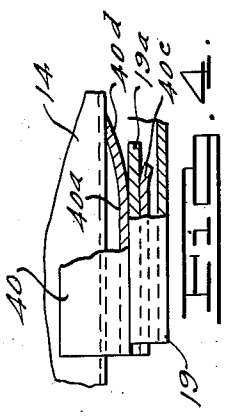


Fig. 4.

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2,450,357

LOCKING MECHANISM

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19 Claims. (Cl. 292—26)

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This invention relates to locking mechanism for swinging lids, doors or other closures and particularly to mechanism useful in connection with the so-called swinging deck lids of automobile bodies and constructed with a locking device or devices operable by means of a single handle control for simultaneously locking the lid or closure in closed position at opposite side edges thereof.

An object of the invention is to provide an improved locking mechanism for a swinging lid, closure or the like having spaced devices for locking the lid at opposite edges thereof and constructed and operable in improved manner to draw the lid tightly into closed position.

A further object of the invention is to provide a locking mechanism for a swinging lid or closure including a locking member pivoted to the lid or closure and having a portion movable into and out of engagement with a keeper member on the body, improved means being provided for actuating the locking device and preferably constructed in improved manner so as to be tamper-proof.

More specifically an object of the invention is to provide a locking device or devices pivoted to a swinging lid or closure and operative in improved manner through the medium of parallel motion linkage controlled as by means of a single handle control.

Still another object of the invention is to provide a pair of spaced locking devices swingable into and out of locking position with respect to keeper portions on the body through the medium of parallel motion links connected at opposite ends to the devices and shiftable endwise in opposite directions to simultaneously actuate the devices, the construction being such that during the simultaneous endwise movement of the links to swing the locking devices one link or the other is placed in tension, thus obviating the possibility of the opposite link when in compression from buckling or bending and hence impairing the efficiency of the mechanism.

Other objects of this invention will appear in the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

Fig. 1 is a fragmentary perspective view of the rear end of an automobile body illustrating a swinging deck lid adapted to be locked by means of locking mechanism constructed in accordance with the present invention.

Fig. 2 is a sectional elevation taken substantially through lines 2—2 of Fig. 3 looking in the direction of the arrows.

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Fig. 3 is a horizontal sectional view taken substantially through lines 3—3 of Fig. 2 looking in the direction of the arrows.

Fig. 4 is a fragmentary view partly in section taken substantially from lines 4—4 of Fig. 3 looking in the direction of the arrows.

Before explaining in detail the present invention it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

In the drawings there is illustrated, by way of example, one embodiment of the invention as applied to the swinging deck lid or closure B of an automobile body A, the deck lid providing access to a compartment within the rear end of the body and being hinged in any conventional manner to the upper edge of the deck lid opening. As illustrated in Fig. 3 the deck lid B comprises outer and inner spaced pressed metal panels 10 and 11 brought together around the margin of the deck lid and rigidly secured, as by spot welding, to provide a projecting marginal overlap flange 12 extending around all four sides of the lid. When the deck lid is closed to overlap flange 12 engages a resilient rubber sealing strip 13 confined within a channel 14 formed in the body and extending continuously around all four sides of the deck lid opening.

The locking mechanism carried by the swinging deck lid is housed within the space between the outer and inner panels 10 and 11 and comprises left and right-hand units, as viewed in the drawings, disposed adjacent opposite side edges of the deck lid.

The lefthand locking unit, as viewed in Figs. 2 and 3, comprises a mounting plate 15 secured by means of screws 16 to the inner side of the panel 11 adjacent the lower edge of the deck lid. A swinging locking device or dog 17 is pivoted to the plate 15 through the medium of a shoulder rivet 18 and has a portion 19 thereof projecting laterally through a slot 11a in the panel 11. The outer end of the portion 19 is formed with a return bent locking flange 19a having its terminal edge 19b arcuate in shape with its center of curvature substantially at the pivotal axis of the locking dog formed by the pivot 18. One edge 20 of the

locking dog is formed so as to engage a stop flange 21 on the mounting plate 15 when the dog is swung into its unlocking position as shown in dotted lines in Fig. 2, thus providing a limit to which the dog may be swung when unlocking the deck lid.

The righthand locking unit shown in Fig. 2 is constructed in substantially the same manner as the lefthand locking unit with the exception that the various corresponding parts are reversed. As illustrated in Fig. 2, the righthand locking unit comprises a mounting plate 22 identical to the plate 15 but reversed and secured to the righthand edge of the inner door panel 11 near the lower end thereof by means of screws 23. A locking dog or element 24 is pivoted on the mounting plate 22 through the medium of a shoulder rivet 25, this dog having a portion 26 projecting through a slot similar to slot 11a in the inner door panel 11 and terminating in a return bent locking flange 26a similar to the locking flange 19a. The construction of the locking dog or element 24 is identical to the locking dog 17, being mounted, however, reversely to the dog 17. The locking dog 24 in like manner has a straight edge 26b adapted to engage a stop flange 27 on the mounting plate 22 so as to limit the swinging movement of the locking dog into unlocking position. From the foregoing it will be seen that the reversely positioned locking dogs or members 17 and 24 swing one oppositely to the other when moved into locking and unlocking positions.

The locking dogs or members 17 and 24 are actuated through the medium of a set of parallel linkage. The upper link or bar 28 of the parallel motion linkage has one end thereof pivoted at 29 to the upper side of the locking member 17 and has its opposite end pivoted at 30 to the upper side of the locking member 24. The lower bar or link 31 of the linkage extends parallel to the link 28 and is of the same length. This bar 31 has one end pivoted at 32 to the lower side of the locking member 17 and has its opposite end pivoted at 33 to the lower side of locking member 24. The distance between the pivots 29 and 32 corresponds to the distance between the pivots 30 and 33 and, as a consequence, the parallel bars or links 28 and 31 form with the locking members 17 and 24 a true parallel motion linkage.

The parallel links or bars 28 and 31 are connected together preferably at a central point between the locking dogs by means of an operating bar 34 pivoted at its upper end at 35 to the link 28 and pivoted at its lower end at 36 to the link 31. The operating bar 34 at a point centrally between the pivots 35 and 36 is provided with a square opening to receive the reduced square end 37a of a handle shaft 37 mounted to turn in an escutcheon member 38 secured to the outer panel 10. An operating handle 39 is fastened to the handle shaft 37 and may be manually turned so as to rotate the shaft and hence, rotate the operating member 34 between the positions shown in full lines and dotted lines in Fig. 2.

The projecting portion 19 of the locking member or dog 17 cooperates with a fixed keeper member on the body in such manner as to draw the deck lid tightly into closed position and also provide a tamper-proof construction when the deck lid is locked. The keeper member 40 is spot welded to the inner side of the channel 14 and is formed with an inwardly directed flange 40a bent at 40b to provide a return bent flange 40c spaced from the flange 40a. It will be noted that the flange 40a of the keeper member has a straight

portion extending for a distance parallel to the base of the channel 14 but spaced therefrom. A rearward continuation 40d of the flange 40a curves inwardly toward the base of the channel 14, as seen in Fig. 4, so as to provide a curved cam surface. The bend 40b of the keeper member, as shown in Fig. 2, is formed on a radius with the center of curvature substantially at the axis of turning of the locking member 17, the curvature of the bend 40b corresponding substantially to the curvature of the edge 19b of the locking flange 19a. The righthand keeper member 41, as viewed in Fig. 2, is constructed in identical fashion as the keeper member 40 and as above described, the parts however being reversed to accommodate the reverse swinging movement of the locking dog 24 as compared with the locking dog 17.

The locking mechanism of the present embodiment preferably includes spring mechanism for yieldingly holding the locking members 17 and 24 in either their locked or unlocked positions. In the present instance a connector piece 42 is pivoted at 43 to the end of the bar 28 adjacent the pivot 29 the piece 42 being provided with a tongue 44 overlying and engaging the upper edge of the bar 28. A tension spring 45 is connected at one end to the piece 42 below the bar 28 and at its opposite end to the mounting plate 15 above the bar 31. A similar construction is provided for the locking unit at the righthand side of Fig. 2. In this instance, however, the connector piece 42 is pivoted to the lower bar 31 with the tension spring 45 interposed between the upper end of this piece and the mounting plate 22. Both springs, however, function in the same manner to yieldingly hold the two locking members 17 and 24 in their full line and dotted line positions shown in Fig. 2. It will be understood that the springs 45 are placed under tension when in assembled condition so as to resist movement of the associated locking member from its locked position to unlocked position, or vice versa. When the locking member 17 is moved from its full line position of Fig. 2 to the dotted line position by endwise movement of the bar 28 to the left, the spring 45 will resist this movement until the pivot 29 has passed beyond a vertical dead center line passing through the pivots 29, 18 and 32 and the spring has passed beyond a corresponding vertical position. Thereupon, the spring will snap over and reverse its action tending to pull the dog into the open position shown in dotted lines in Fig. 2. Conversely, when the bar 28 is shifted to the right to swing the locking dog 17 into its locking position shown in full lines, the spring will resist this movement until the dead center position is reached and thereafter will again reverse its action and urge the dog into the locking position, the spring finally assuming the position shown in Fig. 2. A similar action of the spring 45 occurs in the operation of the locking dog or member 24.

When the handle is turned to rotate the operating member 34 from the dotted line position to the full line position of Fig. 2 in order to lock the deck lid, it will be seen that both of the locking dogs 17 and 24 are partially rotated or swung in the same direction, i. e. in a clockwise direction as viewed from the position of the parts in Fig. 2. During this operation the locking flange 19a of the dog 17 moves upwardly into the space between the flanges 40a and 40c of the keeper member 40 while the opposite locking flange 26a moves downwardly into the space between the corresponding flanges of the keeper member 41. During the movement of the locking dog 17 into

locking position the link or bar 28 is placed in tension since it exerts a pull on the locking dog and the link or bar 31 is placed in compression. Conversely, in the locking operation of the dog 24 the link 31 exerts a pull thereon and is in tension while the link 28 is in compression. Since the links are substantially the same length, it will be apparent that neither the end of the link 31 connected to the dog 17 nor the end of the link 28 connected to the dog 24 can buckle or bend when the dogs are forced into locking positions due to the fact that the opposite ends of these links are in tension and exert an effective pulling effort on the dogs to swing them into locking positions. In like manner, there is no possibility of either link buckling or bending when the operating member 34 is rotated from the full line to the dotted line position of Fig. 2 to force the dogs out of locking positions.

As the locking flange 19*a* is shifted toward locking position between the flanges 40*a* and 40*c*, as shown by the arrow in Fig. 4, it will engage the inclined cam surface 40*d*, thus forcing the locking flange inwardly until it lines up with and enters the space between the keeper flanges 40*a* and 40*c*. The coaction of the locking flange with the cam surface 40*d* thus results in drawing the deck lid inwardly and forcing the overlap flange 12 tightly against the rubber sealing strip 13. A similar wedging action occurs as the locking flange 26*a* at the opposite side of the deck lid is forced into locking engagement with the keeper member 41 which is constructed in the same manner as the keeper member 40. Since in the locked positions of the dogs 17 and 24 the locking flanges 19*a* and 26*a* are confined and housed in the channel portions of the keeper members, it will be seen that the locking mechanism at this time will be thoroughly tamper-proof since it will be impossible for an unauthorized person to pry open the lid with a tool and force the locking dogs out of their locking positions. Although not illustrated in the drawings, it will be understood that suitable key-controlled locking means of any conventional kind is provided for locking the operating member 34 in the position shown in Fig. 2 when the deck lid is closed and locked by means of the dogs 17 and 24.

I claim:

1. Locking mechanism for an up and down swinging lid or closure hinged to a body, comprising a pair of spaced locking members pivoted to the lid adjacent opposite sides thereof and having portions movable into and out of engagement with keeper members on the body, a pair of links pivoted at corresponding ends at vertically spaced points to said locking members, and means for shifting said links endwise in unison and substantially in parallelism to swing said locking members into and out of locking positions.

2. Locking mechanism for an up and down swinging lid or closure hinged to a body, comprising a pair of spaced locking members pivoted to the lid adjacent opposite sides thereof and having portions movable into and out of engagement with keeper members on the body, a pair of links pivoted at corresponding ends at vertically spaced points to said locking members, and means for shifting said links endwise in unison and substantially in parallelism to swing said locking members one upwardly and the other downwardly and vice versa into and out of locking positions.

3. Locking mechanism for an up and down swinging lid or closure hinged to a body, comprising a pair of spaced locking members pivoted to the lid adjecent opposite sides thereof and having portions movable into and out of engagement with keeper members on the body, a pair of links pivoted at corresponding ends at vertically spaced points to said locking members, and means for shifting said links endwise in unison and substantially in parallelism to swing said locking members in the same clockwise or counter-clockwise direction and vice versa into and out of locking positions.

4. Locking mechanism for an up and down swinging lid or closure hinged to a body, comprising a pair of spaced locking members pivoted to the lid adjacent opposite sides thereof and having portions movable into and out of engagement with keeper members on the body, a pair of links pivoted at corresponding ends at vertically spaced points to said locking members, and a rotatable operating member pivoted to said links at a locality intermediate said locking members for swinging the same in the same clockwise or counter-clockwise direction into and out of locking positions.

5. Locking mechanism for an up and down swinging lid or closure hinged to a body, comprising a pair of spaced locking members pivoted to the lid adjacent opposite sides thereof and having portions movable into and out of engagement with keeper members on the body, a pair of links pivoted at corresponding ends at vertically and substantially equally spaced points to said locking members, and means for shifting said links endwise in unison and substantially in parallelism to swing said locking members into and out of locking positions.

6. Locking mechanism for an up and down swinging lid or closure hinged to a body, comprising a pair of spaced locking members pivoted to the lid adjacent opposite sides thereof and having portions movable into and out of engagement with keeper members on the body, a pair of links pivoted at corresponding ends at vertically spaced points to said locking members, and means for shifting said links endwise in unison and substantially in parallelism to swing said locking members into and out of locking positions, each of said locking members terminating in a return bent flange shiftable into interlocking relation to the associated keeper member.

7. Locking mechanism for an up and down swinging lid or closure hinged to a body, comprising a pair of spaced locking members pivoted to the lid adjacent opposite sides thereof and having portions movable into and out of engagement with keeper members on the body, a pair of links pivoted at corresponding ends at vertically spaced points to said locking members, and means for shifting said links endwise in unison and substantially in parallelism to swing said locking members into and out of locking positions, each of said locking members terminating in a hook-like portion adapted to interlock with the associated keeper member.

8. Locking mechanism for a lid or closure hinged to a body for up and down swinging movement, comprising a pair of spaced locking members pivoted at opposite sides of the lid to swing outwardly thereof and in a vertical direction, pairs of endwise shiftable parallel motion links pivoted to said members for swinging the same, and vertically extending channel portions on the body adapted to receive projecting portions on said locking members and having inclined cam

surfaces engaged by said projecting portions to draw the lid tightly against the body when the locking members are swung into their locking positions.

9. Locking mechanism for a lid or closure hinged to a body for up and down swinging movement, comprising a pair of spaced locking members pivoted at opposite sides of the lid to swing outwardly thereof and in a vertical direction, a pair of substantially parallel links pivoted at corresponding ends at vertically and substantially equally spaced points to said locking members, means for shifting said links endwise to swing the locking members vertically in the same clockwise or counter-clockwise direction, and vertically spaced portions on the body engaged by said locking members and cooperable therewith to draw the lid tightly against the body.

10. In a locking mechanism for a swinging lid, a pair of spaced locking members pivoted to the lid, a pair of substantially parallel links extending from one locking member to the other and pivoted at vertically spaced points to each locking member above and below the axis of turning of the member, a rotatable operating member pivoted to said links intermediate the locking members, and a handle for turning said operating member to shift the links endwise in substantial parallelism.

11. Locking mechanism for a swinging lid or closure hinged to a body, comprising a locking member pivoted to the lid and having a portion movable into and out of engagement with a keeper member on the body, a pair of links pivoted at corresponding ends at spaced points to said locking member, and means for shifting said links endwise in unison and substantially in parallelism to swing said locking member into and out of locking position.

12. Locking mechanism for a swinging lid or closure hinged to a body, comprising a locking member pivoted to the lid and having a portion movable into and out of engagement with a keeper member on the body, a pair of links pivoted at corresponding ends at spaced points to said locking member, and a rotatable operating member pivoted to said links for shifting said links endwise in unison and substantially in parallelism to swing said locking member into and out of locking position.

13. Locking mechanism for a swinging lid or closure hinged to a body, comprising a locking member pivoted to the lid and having a portion movable into and out of engagement with a keeper portion on the body, a pair of spaced links pivotally connected at their ends at spaced points to said locking member, and means for shifting said links endwise in unison and in opposite directions to rotate said locking member into and out of locking position.

14. Locking mechanism for a swinging lid or closure hinged to a body, comprising a locking member pivotally mounted on the lid and having a portion movable into and out of operative relation to a keeper portion on the body, a pair of links pivotally connected at their ends at spaced points to said locking member, and means for shifting said links in unison and in opposite directions to impart pivotal motion to said locking member.

15. Locking mechanism for a swinging lid or closure hinged to a body, comprising a locking member pivotally mounted on the lid and having a portion movable into and out of operative relation to a keeper portion on the body, a pair of links pivotally connected at their ends at spaced points to said locking member, and means for shifting said links in unison and in opposite directions in substantial parallelism to impart pivotal motion to said locking member, said means including a manually operable lever connected to both links.

16. Locking mechanism for a swinging lid or closure hinged to a body, comprising a locking member pivotally mounted on the lid and having a portion movable into and out of operative relation to a keeper portion on the body, a pair of links pivotally connected at their ends at spaced points to said locking member, and means for shifting said links in unison and in opposite directions in substantial parallelism to impart pivotal motion to said locking member, said locking member terminating in a return bent flange shiftable into interlocking relation to the keeper portion.

17. Locking mechanism for a swinging lid or closure hinged to a body, comprising a locking member pivotally mounted on the lid, a pair of links pivotally connected at corresponding ends at spaced points to said locking member, and means for shifting said links in opposite directions and in unison to swing said locking member, said locking member and the body having interlocking channel portions.

18. Locking mechanism for a swinging lid or closure hinged to a body, comprising a locking member pivotally mounted on the lid, a pair of links pivotally connected at corresponding ends at spaced points to said locking member, and means for shifting said links in opposite directions and in unison to swing said locking member, said locking member and the body having interfitting hook-like portions.

19. Locking mechanism for a swinging lid or closure hinged to a body, comprising a locking member pivotally mounted on the lid, a pair of links pivotally connected at corresponding ends at spaced points to said locking member, means pivotally connected to said links for shifting said links in unison in opposite directions and substantially in parallelism to impart pivotal motion to the locking member, and spring means for yieldingly holding the locking member in both locked and unlocked positions.

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