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LATCH

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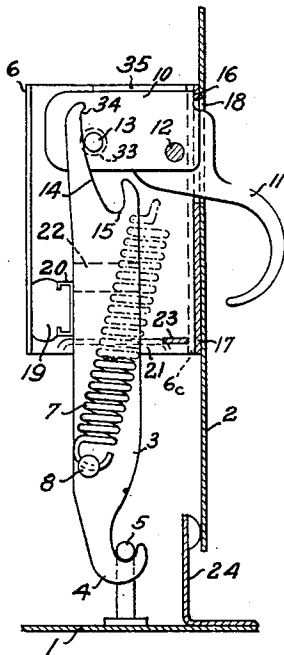


Fig. 1

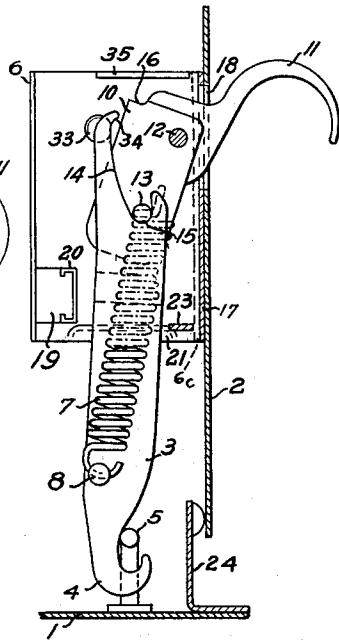


Fig. 2

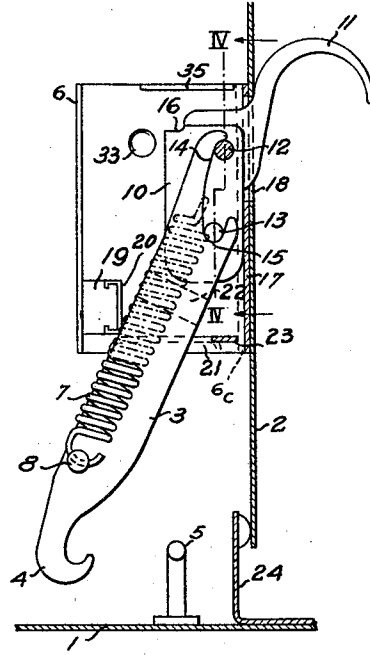


Fig. 3

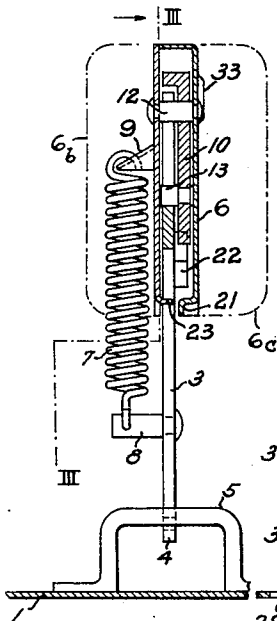


Fig. 4

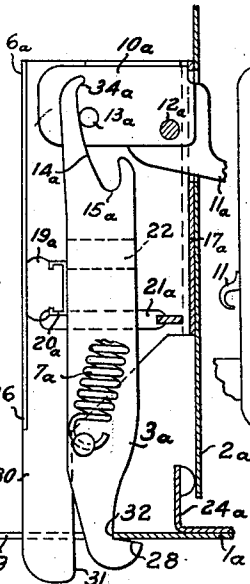


Fig. 5

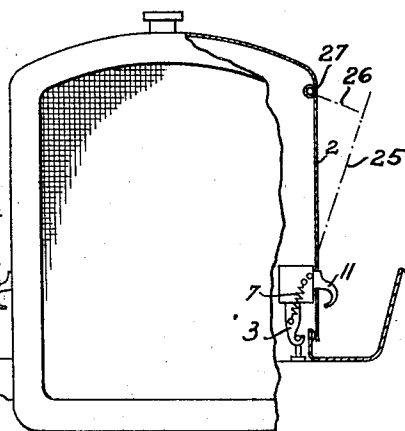


Fig. 6

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LATCH

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This invention relates to latch mechanisms. It may be applied particularly in connection with the hoods of automobiles but is not limited to such use.

One of the objects of the invention is the provision of a latch mechanism which is simple in construction and may be cheaply manufactured. A more specific object is the provision of a latch mechanism which may be manufactured entirely of stamped parts if desired.

A further object is the provision of a latch mechanism which is easily operable, and more particularly in which the closure may be unlatched, opened and closed by a single handle, and, more specifically, unlatched and opened by a single motion.

Another object is the provision of a latch mechanism in which the latch member is caused to engage and disengage its keeper with a snap action.

Still another object is the provision of a latch mechanism in which the bias of a restraining means may be overcome by toggle action.

A still further object is the provision of a latch mechanism in which a continuation of the movement for causing the latch to engage its keeper causes the closure to be clamped to its seat. Other objects will appear hereinafter as the description of the invention proceeds.

The novel features of the invention will appear from this specification and the accompanying drawing forming a part thereof and showing several embodiments of the invention, and all these novel features are intended to be pointed out in the claims.

In the drawing Fig. 1 is a side elevation of one embodiment of the invention, certain parts being in section;

Figs. 2 and 3 show the embodiment of Fig. 1 with the parts in different positions, Fig. 3 being a section of Fig. 4 along the line III—III looking in the direction of the arrows.

Fig. 4 is a section of Fig. 3 along the line IV—IV, looking in the direction of the arrows;

Fig. 5 is a side elevation with parts in section, of a modification, and

Fig. 6 is a fragmentary view of the front of an automobile a part being in section, showing the latch mechanism of Fig. 1 in its relation to the hood of the automobile.

The invention will be described with reference to its use in connection with automobile hoods.

Referring to Fig. 1, a portion of a frame 1 of an automobile is shown. The side 2 of the engine hood (see also Fig. 6) is adapted to be latched in closed position by a latch member 3 which is here shown as having a hooked end 4 adapted to engage a keeper 5. The keeper 5 may be of any suitable form here shown as a rod of inverted U-shape suitably fastened to the frame 1.

The latch member 3 is freely movable but its movements are confined to substantially a single plane by a housing 6 which may be made of sheet metal bent to U-shape and having wings 6_a, 6_b which are suitably fastened (directly if desired) to the inside of the hood-side 2. If desired, a plate 17 may be first suitably fastened to the wings 6_a, 6_b and the combined plate and wings then fastened to the hood-side 2. The latch member 3 is biased to various positions, as will appear more fully hereinafter, by a spring 7 here shown as having one end in engagement with a pin 8 carried by latch member 3, and the other in engagement with an ear 9 struck out from a side of the housing 6. The pin 8 may obviously be omitted and the spring fastened directly to the member 3.

An operating lever 10 is mounted for movement within the housing 6, and is provided with a handle portion 11 which projects through an opening 18 to the outside of the hood-side 2. The lever 10 is swingable about a pivot pin 12 carried by the sides of the housing 6. The pin 12 may be riveted to the housing sides as shown in Fig. 4. The lever 10 carries a pin 13 adapted to engage a cam surface 14 on the latch member 3. The cam surface 14 terminates at its lower end in a hook-like shoulder 15. The lever 10 has a shoulder 16 which in the position shown in Fig. 1 abuts against the plate 17 (on the

hood-side 2, in case no plate 17 is used). Clockwise motion of lever 10 may also be limited by a stop 35 formed by bending over one of the side walls of the housing 6.

5 The housing 6 is shown as carrying at the bend of the U, an abutment 19, which may be made of rubber and provided with a metal cap 20, suitably clinched thereon. In order to better confine sidewise movement of latch member 3, as viewed in Fig. 4, the housing 6 has an inwardly stamped portion 21. The shoulder formed by this portion also serves to limit the downward movement of latch member 3, in conjunction with a lug 22 carried by that member. A portion of the other side of the housing 6 is bent inwardly at 23 for a purpose which will appear hereinafter.

10 A moulding 24 is indicated, against which the hood-side 2 is seated when it is closed, but this need not be present, the mouldings on the radiator and body being usually sufficient.

20 The operation of that form of the invention illustrated in Fig. 1 is as follows. It is of course understood that in the case of an automobile hood, each hood side is preferably provided with two handles and latch mechanisms as hereinbefore described. To release and raise the hood the handles 11 are grasped with preferably a slight inward pressure (to the left as viewed in Fig. 1) while the handles are lifted and turned counterclockwise. The slight inward pressure prevents the immediate lifting of the hood due to any upward pull on the handles 11, by reason of the frictional engagement of the hood with its seat against the radiator shell and the cowl pillar. When the lever 10 is swung in a counterclockwise direction, by the handle 11, the pin 13 at first slightly swings the latch member 3 counterclockwise about the keeper 5 as a fulcrum, due to the shape of the cam 14. This slightly increases the compression of the abutment 19 (which is already under compression). Further counterclockwise motion of lever 10 brings the pin 13 into engagement with the shoulder 15. During the last mentioned portion of the motion no further compression of abutment 19 takes place since at that stage the pin 13 moves along a portion of the cam 14 which, for the then relative position of the parts, is preferably concentric with the pivot 12. When the pin 13 reaches the shoulder 15, the latch member 3 and the lever 10 form a toggle and further movement of lever 10 straightens this toggle against the bias of spring 7. The latch member 3 is thereby moved in a generally downward direction, the hook sliding along the keeper 5, if the hood 2 is held in the position shown, to a position such as shown in Fig. 2. Further counterclockwise movement of lever 10 will cause the latch member 3 to move clockwise about keeper 5 as a fulcrum until the latch

member strikes the projection 23, and further movement of lever 10 will bring the center of pin 13 toward the right of the line of action of the spring 7 and the toggle will collapse, with a positive snap action, to the position shown in Fig. 3. The hood may now be freely lifted by the handle 11.

70 When the hood is to be closed the parts are brought to the position shown in Fig. 3 and the handle 11 depressed. This swings lever 10 in a clockwise direction and as the pin 13 crosses the line of action of the spring 7, the toggle snaps to the position shown in Fig. 2. Further clockwise motion of the lever permits the spring 7 to draw the latch member upwardly into hooked engagement with the keeper 5. Still further movement of lever 10 causes the pin 13 to cam the latch member 3 counterclockwise about the keeper as a fulcrum, the abutment 19 being compressed. This action clamps the hood-side 2 tightly against its seat.

75 The abutment 19 is preferably resilient, but it may be made non-resilient, the inherent resilience of the hood-side 2 being relied on to take its place.

80 When, upon clockwise motion from its position in Fig. 3, the lever 10 reaches the position of Fig. 1 its motion is stopped as hereinbefore set forth. It will be noted that in that position the relation of the latch member 3 to the lever 10 is such that since the spring 7 and also the abutment 19 tend to turn the member 3 clockwise about the keeper 5, said member will tend to turn the lever 10 (by action of the cam surface 14 on pin 13) in like direction about its pivot 12 and thereby keep the lever 10 in the position shown in Fig. 1. This action is assisted by the fact that in that position the pin 13 is somewhat above the pivot 12. If desired the lever 10 may be additionally held in that position by the provision of a depression 33 in a side of the housing 6, into which a projecting portion of the pin 13 snaps. This action is assisted by the spring 7 which tends to swing the upper end of the latch member 3 toward the right as viewed in Fig. 4 and thereby presses the lever 10 in the same direction.

85 It will be noted that in the position shown in Fig. 1, the latch member is supported at three points, two on one side thereof (the pin 13, and keeper 5) and one between these two on the other side (the abutment). The abutment 19 while preferably resilient, is under considerable compression and the hood 2 is consequently held tightly against its seat.

90 It will also be noted that when the hood is in latched position as shown in Fig. 6, the line of action 25 of the spring 7 falls to the right of the hinge 27 of the hood-side 2, as viewed in that figure. Consequently there is a moment arm 26 tending to turn the hood-side inwardly against its seat. The spring

7 of course also pulls the hood-side 2 downwardly.

In case the hood has been lifted from the position shown in Fig. 3 and the handle 11 is then swung clockwise the latch member 3 is prevented from swinging toward the hood-side 2 far enough to catch the lower edge of the hood-side by the projections 23.

Should the latch member 3 be moved downwardly with respect to lever 10 while the parts are in the position of Fig. 1, a slightly hooked portion 34 of the latch member will cause counterclockwise motion of the lever 10 thus preventing disengagement of the pin 13 and cam 14. The latch member is moreover prevented from pulling entirely out of the housing 6 by the lug 22 which limits the downward motion of the latch member 3 with respect to the housing by striking the ledge formed by the portion 21 of the housing.

Referring now to Fig. 5, this shows a somewhat modified embodiment of the invention. The parts corresponding to those in the remaining figures bear corresponding reference characters provided with a sub letter *a*. The latch member 3_a is here shown as provided with a straight engaging surface 28. The member 3_a is adapted to pass into a hole 29 in the frame 1_a, and in the engaged position the latch member is in contact with the edge 32 of the hole 29. The housing 6_a is here shown as having one side wall thereof extended downwardly to form the projection or tongue 30 having an edge 31 spaced from the edge 32. The bend of the U-shaped housing may also be extended downwardly as at 36 to strengthen the tongue 30. A depression 21_a is struck into a side wall of the housing 6_a and serves the same purpose as the portion 21 in Fig. 1. The latch member 3_a is operable by means of a lever 10_a, as described in connection with Fig. 1.

The operation of the embodiment shown in Fig. 5 is as follows. When the operating handle 11_a (shown fragmentarily) is grasped and pulled upwardly, the abutment 19_a is at first compressed and when straightening of the toggle, hereinbefore referred to in connection with Fig. 1, begins, the hood-side 2_a is permitted to move slightly outwardly and upwardly, the latch member 3_a remaining for the time being in engagement with its keeper. The outward movement is however limited when the edge 31 of the tongue 30 strikes the edge 32. When the toggle collapses, the powerful snap action disengages the latch member 3_a from the keeper formed by the edge of the hole in the frame and further upward pull on the handle 11 raises the hood as desired. The distance between the edges 31 and 32 is preferably such that they come into contact before the aforesaid snap action takes place.

Thus the hood may be unlatched and opened by a single motion, that is an upward

pull on the handle, or handles, 11. The closing operation is the same as already described in connection with Figs. 1 to 3.

It should be understood that it is not desired to limit the invention to the exact details of construction shown and described, for various modifications may occur to persons skilled in the art.

It is claimed and desired to secure by Letters Patent:

1. In a latch mechanism, a latch member, a keeper therefor, means for operating said latch member comprising means for causing said latch member to disengage said keeper with a snap action which when initiated is uncontrollable by said operating means.

2. In a latch mechanism, a latch, a keeper therefor, means for operating said latch comprising means for causing said latch to disengage said keeper with a motion substantially in the direction of the normal reaction of said keeper on said latch and then with a snap action at substantially right angles to said direction.

3. In a latch mechanism, a latch member, a keeper therefor, means for operating said latch member comprising means for causing said latch member to disengage said keeper with a motion substantially longitudinal of said latch member and then with a snap action in a direction substantially at right angles to said motion.

4. In combination with a latchable member movable away from its latched position in at least two directions substantially at right angles to each other, a latch member and keeper for restraining said member in both of said directions, means for acting on said latch member to positively clamp said latchable member against movement in one of said directions, and means for resiliently restraining said latch member in the other of said directions.

5. In combination with a latchable member movable away from its latched position in a given direction, a latch member extending substantially at right angles to said direction when said latchable member is in latched position, a keeper for said latch member, and means including a pivoted lever co-operable with said latch member for causing said latch member to swing about said keeper as a fulcrum to thereby clamp said latchable member against movement in said direction.

6. In combination with an automobile hood, a latch and keeper, a spring associated with said latch for restraining said hood against upward and outward movement when said latch is in engagement with said keeper, and means independent of said spring for acting on said latch to positively clamp said hood against movement in an outward direction.

7. In combination with an automobile hood having a side movable outwardly and

also vertically, a latch member extending substantially parallel to the side of said hood when said hood is in latched position, a keeper for said latch member, and means including a pivoted lever cooperable with said latch member for causing said latch member to swing about said keeper as a fulcrum to thereby clamp the side of said hood against outward movement.

8. In a latch mechanism, a latch member, a keeper, means for biasing said latch member against said keeper in the latched position, and means for overcoming said bias including an operating lever adapted to form a toggle with said latch member, said toggle being in a collapsed position when said latch member is in latched position.

9. In a latch mechanism, a latch member freely movable in a plane, a keeper, means for biasing said latch member against said keeper in the latched position, and means for overcoming said bias including an operating lever adapted to form a toggle with said latch member, said toggle being in a collapsed position when said latch member is in latched position.

10. In a latch mechanism, a latch member, a keeper, means for biasing said latch member against said keeper in the latched position, means having a lost motion connection with said latch member for overcoming said bias and for causing said biasing means to bias said latch member away from said keeper.

11. In a latch mechanism, a latch member, a keeper, an operating lever, means whereby said lever may be connected to said latch member to form a toggle therewith, a spring associated with said toggle to bias the same to a collapsed position when said latch member is in engagement with said keeper, and to another collapsed position when said toggle is moved across dead center.

12. In combination with an automobile hood, a latch member associated with the side of said hood, a keeper, an operating lever, means whereby said lever may be connected to said latch member to form a toggle, and a spring associated with said toggle to bias the same to a collapsed position when said latch member is in engagement with said keeper and with the side of said hood for biasing the side of said hood against its seat.

13. In combination with an automobile hood, a latch member, means for mounting said latch member for movement in a plane perpendicular to the side of said hood, a keeper, said latch member extending substantially parallel to the side of said hood when in engagement with said keeper, a lever pivoted for movement in said plane, a pin on said lever, a cam surface on said latch member in cooperative relation with said pin, said cam surface having a shoulder at

one end thereof adapted to form, when said pin is in engagement therewith, the center joint of a toggle.

14. In combination with a latchable member, a latch member extending substantially parallel to said latchable member, a keeper adapted to be engaged by one end of said latch member, a lever pivoted to said latchable member having a pin for engaging the other end of said latch member, and an abutment carried by said latchable member, said abutment being disposed to be engaged by said latch member at a point on said latch member between said first two named points of engagement.

15. In combination with an automobile hood, a latch member associated with the side of said hood, and means having an operating member mounted on said hood for simultaneously raising said hood and releasing said latch member with a snap action which when initiated is uncontrollable by said operating member.

16. In combination with an automobile hood and a latch member movable therewith, a keeper, an operating lever, means whereby said lever may be connected to said latch member to form a toggle, means for snapping said toggle to a collapsed position in which said latch member disengages said keeper, when said lever is operated to a predetermined position, and means for limiting outward motion of said hood until said toggle has snapped to said collapsed position.

17. In a latch mechanism, a latch member having a cam surface, a keeper therefor, a pivoted lever for operating said latch member into either engagement or disengagement with said keeper, said operating lever being mounted for movement in the general plane of movement of said latch member, one end of said lever being operatively associated with said cam surface, and means including a spring for biasing said latch member into engagement with said keeper when said lever is in one position and for biasing said latch member out of engagement with said keeper when said lever is in another position.

18. In combination with an automobile hood, a latch member, means for carrying said latch member on the inside of said hood, a keeper for said latch member, a pivoted operating lever for said latch member disposed through an opening in said hood, and means whereby operation of said lever causes said latch member to disengage said keeper with a snap action which when initiated is uncontrollable by said lever.

19. In combination with an automobile hood, a latch member associated with a side of said hood, a keeper for said latch member, means for operating said latch member, having a lost motion connection with said latch member, comprising means for causing said latch member to engage said keeper

with a snap action which when initiated is uncontrollable by said operating means.

20. In combination with an automobile hood, a latch member associated with a side of said hood, a keeper for said latch member, means for biasing said latch member against said keeper in the latched position, and means having a lost motion connection with said latch member for overcoming said bias and for causing said biasing means to bias said latch member away from said keeper.

21. In a latch mechanism, a latch member having a cam surface formed by two arms, a keeper for said latch member, a pivoted lever for operating said latch member, one end of said lever being operatively associated with said cam surface between said arms, and means for biasing said latch member into engagement with said keeper when said lever is in one position and for biasing said latch member out of engagement with said keeper when said lever is in another position.

22. In combination with an automobile hood, a latch member having a cam surface formed by two arms, means for carrying said latch member on the inside of said hood, a keeper for said latch member, a lever pivoted to said hood side and disposed through an opening in said hood side, one end of said lever being operatively associated with said cam surface between said arms, and means for biasing said latch member into engagement with said keeper when said lever is in one position and for biasing said latch member out of engagement with said keeper when said lever is in another position.

23. In a latch mechanism, a latch member having a cam surface formed by two arms, a keeper for said latch member, a pivoted lever for operating said latch member, one end of said lever being operatively associated with said cam surface between said arms, said lever being mounted for movement in the general plane of movement of said latch member, and means for biasing said latch member into engagement with said keeper when said lever is in one position and for biasing said latch member out of engagement with said keeper when said lever is in another position.

24. In combination with an automobile hood, a latch member having a cam surface formed by two arms, means for carrying said latch member on the inside of said hood, a keeper for said latch member, a lever pivoted to said hood side and disposed through an opening in said hood side, said lever being mounted for movement in the general plane of movement of said latch member, one end of said lever being operatively associated with said cam surface between said arms, and means for biasing said latch member into engagement with said keeper when said lever is in one position and for biasing

said latch member out of engagement with said keeper when said lever is in another position.

In testimony whereof, the signature of the inventor is affixed hereto.

WALLACE E. CHENEY.

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