Jan. 29, 1946. R. MARPLE 2,393,647

LATCH

Filed Aug. 3, 1939 3 Sheets-Sheet 1

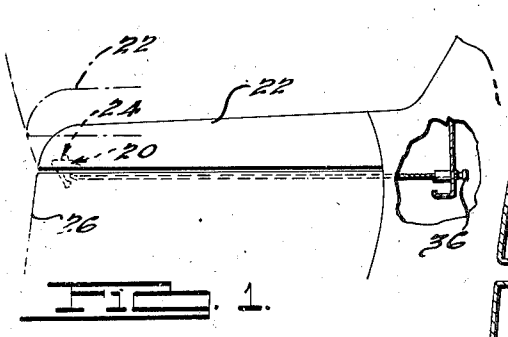


FIG. 1.

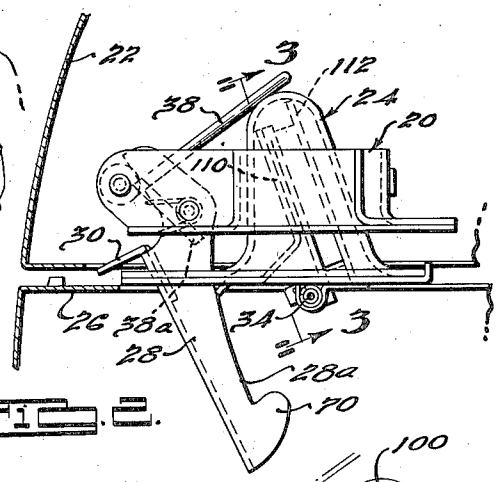


FIG. 2.

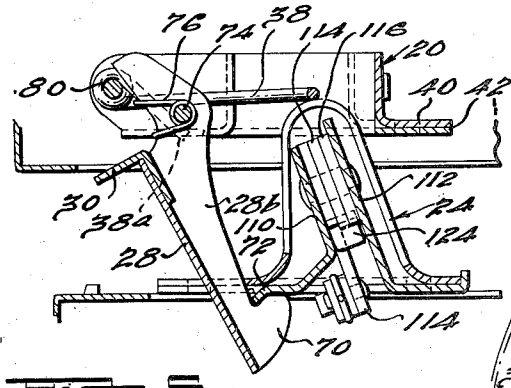


FIG. 3.

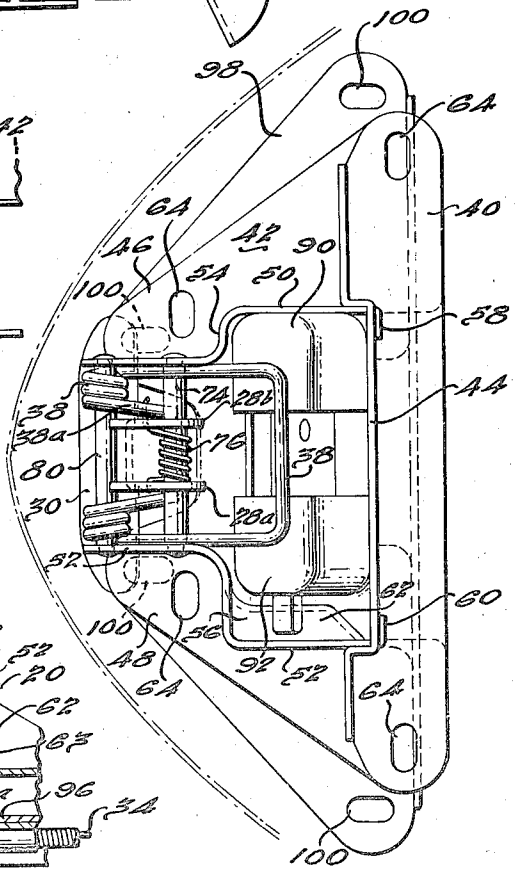


FIG. 4.

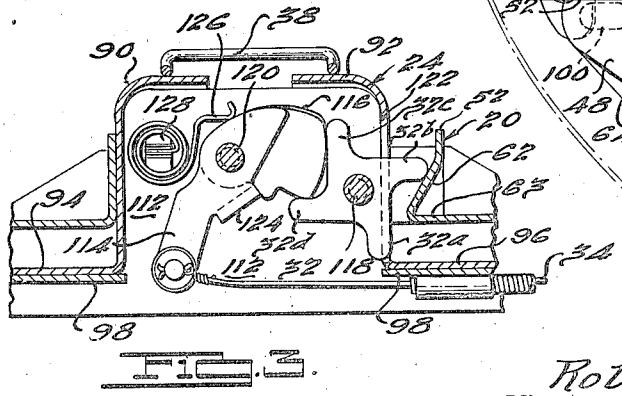


FIG. 5.

INVENTOR
Rollo Marple.
BY
Harness, Dickey & Pierce.
ATTORNEYS.

Jan. 29, 1946. R. MARPLE 2,393,647

LATCH

Filed Aug. 3, 1939 3 Sheets-Sheet 2

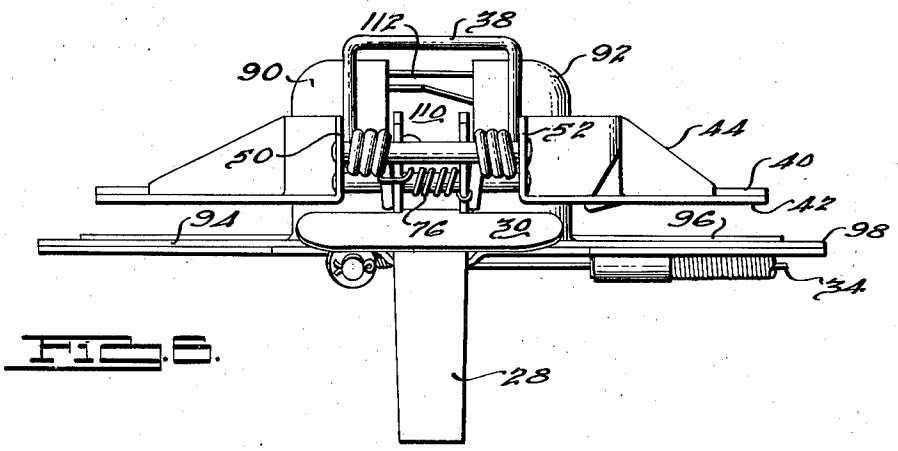
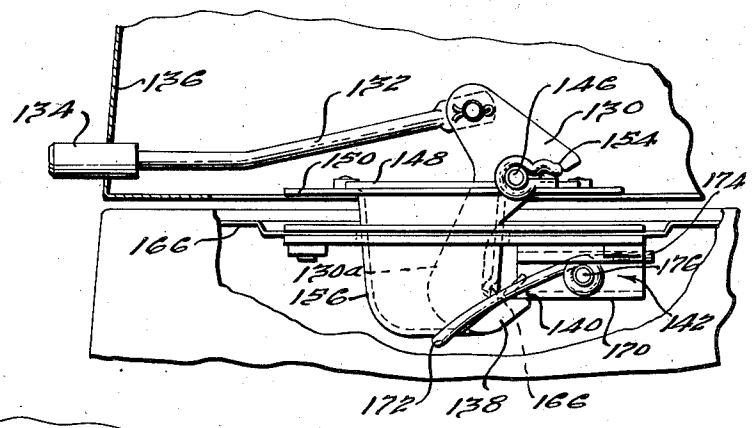


FIG. 6.

FIG. 7.



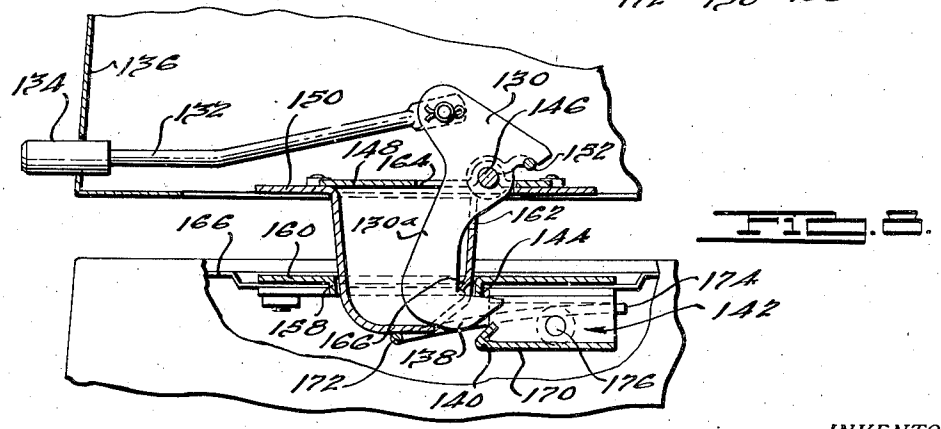


FIG. 8.

INVENTOR
Rollo Marple.
BY
Harness, Dickey & Pierce.
ATTORNEYS.

Jan. 29, 1946. R. MARPLE 2,393,647

LATCH

Filed Aug. 3, 1939 3 Sheets-Sheet 3

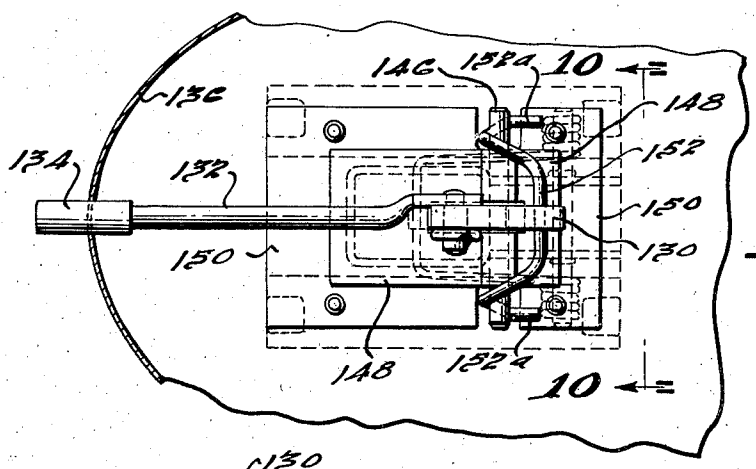


FIG. 9.

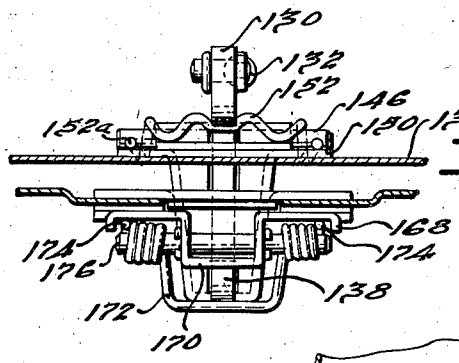
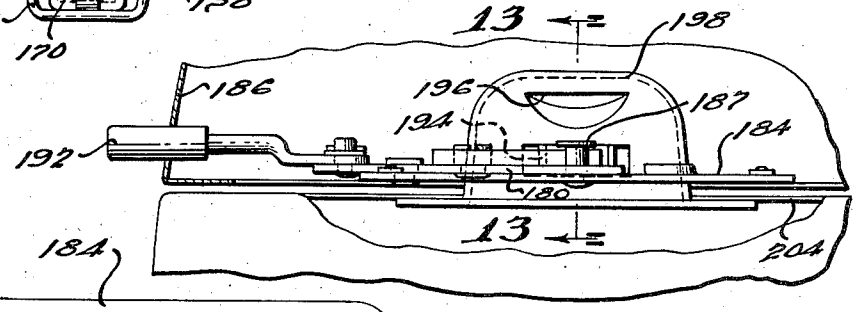


FIG. 10.

FIG. 11.



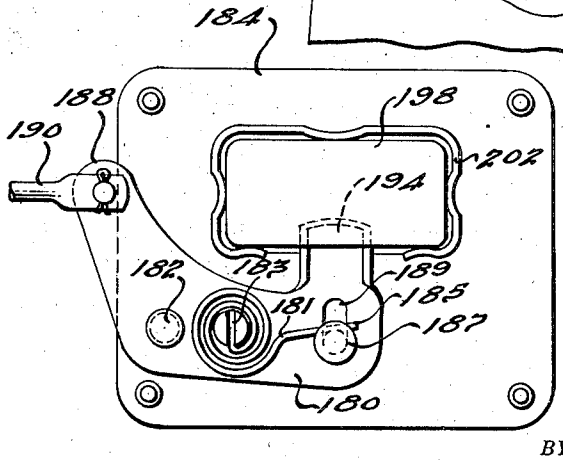


FIG. 12.

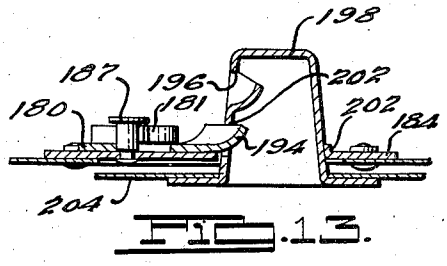


FIG. 13.

INVENTOR
Rollo Marple.
BY
Harness, Dickey & Pierce.
ATTORNEYS.

Patented Jan. 29, 1946 2,393,647

UNITED STATES PATENT OFFICE

2,393,647

LATCH

Rollo Marple, Jackson, Mich., assignor to Hancock Manufacturing Company, Jackson, Mich., a corporation of Michigan

Application August 3, 1939, Serial No. 288,089

2 Claims. (Cl. 292—214)

The present invention relates to latching devices and in particular is directed to improvements in the construction of latches especially designed for automobile hoods.

The principal objects of the present invention are to provide latch constructions of the above generally indicated type, arranged to hold an associated hood in either a fully closed or a safety position; to provide such a construction wherein a pivoted bolt is provided, carried by the hood or by the associated body portion, and which is arranged to releasably cooperate with a keeper or equivalent member carried by the body portion or by the hood; to provide such construction employing bolt and keeper elements, one thereof being formed as part of and carried by a guide member which serves to preliminarily position and guide the hood toward its closed position; to provide such a construction employing spring mechanism which serves to yieldingly bias the hood toward the safety position as soon as the bolt is released; to provide such construction employing a bolt of the rotary type, having means cooperating therewith to yieldingly urge it in a hood closing direction and to positively prevent movement thereof in a hood opening direction; to provide such constructions adapted for control either from the region of the hood latch or by remote control mechanism located, for example, in the driving compartment of the vehicle; and to provide hood latch constructions which are economical of manufacture and assembly, and which are reliable and efficient in operation.

With the above as well as other and more detailed objects in view, which appear in the following description and in the appended claims, preferred but illustrative embodiments of the invention are shown in the accompanying drawings, throughout the several views of which corresponding reference characters are used to designate corresponding parts and in which:

Figure 1 is a view in side elevation of an illustrative embodiment of the invention;

Fig. 2 is a view in side elevation of the hood latch structure employed in Fig. 1;

Fig. 3 is a view in transverse section, taken along the line 3—3 of Fig. 2;

Fig. 4 is a view in top plan of the structure shown in Figs. 2 and 3;

Fig. 5 is a view corresponding generally to Fig. 1, but with certain of the parts shown in sections, and with the parts positioned in the safety position;

Fig. 6 is a view in front elevation of the structure shown in Figs. 2, 3, and 4, with the parts in the fully closed position;

Fig. 7 is a view in side elevation of a modified latch structure;

Fig. 8 is a view corresponding generally to Fig. 7 in longitudinal section, and showing the parts in the unlocked or safety position;

Fig. 9 is a view in top plan of the structure shown in Figs. 7 and 8;

Fig. 10 is a view in rear elevation, taken along the line 10—10 of Fig. 9;

Fig. 11 is a view in side elevation of a further modification of the invention;

Fig. 12 is a view in top plan of the structure shown in Fig. 11; and

Fig. 13 is a view in transverse vertical section, taken along the line 13—13 of Fig. 11;

Referring first to the embodiment of Figs. 1 through 6, the latch structure comprises generally a keeper assembly 20 which is carried by the hood 22, and a bolt structure 24 which is carried by the associated body portion 26. The keeper assembly 20 also carries a pivotally mounted safety catch 28, which cooperates, as hereinafter described, with the bolt assembly to hold the hood in the safety position. The catch 28 is provided with a handle portion 30, which is conveniently accessible when the hood is in the partially closed or safety position, whereby the catch may be released, enabling the hood to be fully opened. The bolt assembly is provided with a bolt 32, which as is described in more detail hereinafter, releasably engages the keeper assembly 20 so as to hold the parts in the fully closed position. The bolt 32 is arranged to be released by means of an operating cable 32 (Fig. 3) which, in the illustrated arrangement, extends into the driving compartment of the car and is conveniently operable by means of a button 36. The general arrangement is therefore one wherein the hood can be released from the fully closed position only by operating the button 36 from within the driving compartment. Such release, as hereinafter described, renders a spring 38 effective to force the hood to the safety position shown in Fig. 5, in which position the handle portion 30 is accessible, enabling the catch 30 to be released, after which the hood may be raised to its fully elevated position.

Considering the above mentioned elements in more detail, the keeper assembly 20 comprises a pair of superposed plates 40 and 42, which are secured together in any suitable manner as by welding. The upper plate 40 is provided along its forward edge with an upwardly directed flange 44, which defines one wall of the guide opening

which receives the bolt assembly 24. The lower plate 42 is of generally U shape, having forwardly extending leg portions 46 and 48, between which the safety catch 28 is pivoted. The inner marginal edges of the legs are formed as upwardly directed flanges 50 and 52, respectively, having offset portions 54 and 56. The rear ends of the flange portions 50 and 52 are passed through openings provided therefor in the flange 44 and terminate in turned over ears 58 and 60, which serve to further reinforce the connection between the two plates 40 and 42. It will be noted that the flange 44, and flanges 50 and 52, and the offset portions 54 and 56, cooperate together to define a generally rectangular guide opening for the bolt assembly 24. It is here noted that the lower portion 62 of the flange 52 is inwardly angled, so as to provide a bolt engaging surface for the respective teeth of the bolt 32 as described hereinafter.

The keeper assembly is provided with a series of openings designated 64 by which it may be secured within the body of the hood 22, as will be understood.

The safety catch 28 is of generally rearwardly presenting channel shape, having the leg portions 28*a* and 28*b*, the lower ends whereof terminate in hooklike portions 70, adapting the safety catch to hook behind the portion 72 of the bold assembly, as described below. The hand hold 30 is constituted by an angle member, one leg whereof is suitably secured, as by welding, to the inner face of the web of the safety catch 28. The safety catch 28 is pivotally supported upon the keeper assembly, by means of a pin 74, the respectively opposite ends whereof are secured to the flanges 50 and 52 in advance of the offsets 52 and 56 therein. A coil spring 76 is wound around the pin 74 between the legs 28*a* and 28*b*, one end thereof being hooked behind the leg 28*b*, and the other end thereof being hooked beneath the heavier biasing spring 38. The spring 76 is, therefore, effective to continuously urge the safety catch in a counter-clockwise direction, as viewed in Figs. 2 and 5, thus conditioning it to lockingly engage the portion 72.

The previously mentioned spring 38 is of generally U shape in plan view, as most clearly appears in Figs. 3 and 4, and the respectively opposite ends thereof are wound around a second pin 80, the ends whereof are secured to the front ends of the flanges 50 and 52. The extreme end portions, such as 38*a* of the spring 38, are disposed beneath the pin 74. When the parts are in the closed position shown in Fig. 2, the bight of spring 38 bears upon the bolt assembly 24 and is thus effective to urge the keeper assembly 20 upwardly relative to the bolt assembly 24, and is preferably of heavy enough construction so as to lift the hood from the locked position of Fig. 2 to the safety position of Fig. 5 upon release of the bolt.

The bolt assembly is constituted by a pair of similar, transversely spaced, hoodlike stampings 90 and 92, the outer marginal portions whereof are laterally flared as indicated at 94 and 96, respectively (Fig. 3), whereby the numbers 90 and 92 are secured to a supporting number 98. The housing portions 90 and 92 together define a generally rectangular guide member which is adapted to be introduced through the previously mentioned guide opening in the keeper assembly. As is described hereinafter, the reaction of the bolt on the keeper assembly tends to urge the keeper assembly downwardly and to the right, as viewed in Fig. 6, so that the outer end of the housing member 90 normally abuts the flange 50 when the hood is fully closed. Also, the relation is such that the rear faces of the housing members 90 and 92 abut the flange 44. The housing members thus constitute a tongue which serves to guide the hood into proper locking position during its final downward movement. In the present instance, the housing thus afforded is slightly forwardly inclined, so as to adapt the structure for use in connection with a hood the hinge structure whereof causes the hood to move slightly forwardly as an incident to a lifting movement, which action is indicated by the dotted lines in Fig. 1.

Within the body of the housing provided by the members 90 and 92, and previously mentioned supporting member 98 also carries a pair of upstanding spaced members 110 and 112, between which the bolt 32 and the bolt holding members 114 and 116 are supported. The bolt 32 is pivotally supported between the members 110 and 112 upon a pin 118, the opposite ends whereof are secured to the just-mentioned members, as will be understood. The bolt holding cams 114 and 116 in turn are secured between the members 110 and 112 by means of a pin 120, which is supported thereby.

The bolt 32 is of the rotary type, and is provided with a series of equi-angularly spaced keeper engaging teeth 32*a*, 32*b*, 32*c* and 32*d*, any one of which, depending upon the rotative position of the bolt, is effective to operate with the keeper surface 62 to hold the hood in the fully closed position. It will be noted that the active tooth, 32*b* in Fig. 3, projects outwardly through an opening 122 provided therefor in the outer face of the housing member 92.

In order to continuously urge the bolt 32 in a clockwise or hood-closing direction, as viewed in Fig. 3, the cams 114 and 116 are provided, these cams being of slightly differing lengths, so as to impose a progressive holding action on the bolt. Cam 114 is the shorter of the two, and one end thereof is adapted for connection to the previously mentioned operating cable 34. In order to enable a counter-clockwise or releasing movement of the cam 114 to effect a corresponding movement of the cam 116, the shorter cam is provided with a laterally turned foot 124, which overlaps one marginal edge of the longer cam 116. In order to continuously urge the cams 114 and 116 in the bolt holding direction, they are provided with springs such as 126, individual thereto, the free ends whereof bear against the backs of the cams, and the other ends whereof are secured between lugs such as 128 struck inwardly from the support plate 112.

Considering the operation as a whole of the just-described structure, it will be appreciated that the parts are shown in Figs. 2, 3, 4 and 6 in the fully closed position of the hood, in which the bolt tooth 32*b* bears against the keeper surface 62. With this positioning of the parts also, the springs such as 126 associated with the cams act to urge them in a clockwise direction, and the cams, in turn, urge the bolt in a clockwise or locking direction, and also serve to positively prevent a counter-clockwise or releasing movement of the bolt. The reaction between the cams and the bolt and consequently between the bolt and the keeper surface 62 also wedges the end of the housing 90 against the flange 50, and the disposition of the rear surfaces of the housing 90 and 92 is such that these members are wedged against

the rear flange 44 constituting the keeper opening. Accordingly, the parts are retained not only against opening movement, but are positively held against rattling movements.

In the vent it is desired to open the hood, it will be appreciated that the button 36 may be pulled inwardly from the instrument panel from within the driving compartment, which action rotates the cams 114 and 116 in a counter-clockwise direction as viewed in Fig. 3, releasing them from holding engagement with the bolt 32. As soon as the cams are released, the bolt 32 is free to rotate in a counter-clockwise direction, rendering the spring 38 effective to lift the hood 22 from the fully closed position of Fig. 2 to the unlocked safety position shown in Fig. 3. During the course of this movement, the inner marginal edges of the legs 28a and 28b of the safety catch 28 ride along the edge of the keepers 72 provided therefor, ultimately bringing the hook portion 70 thereof into holding engagement with such keeper 72. As soon as this condition is reached, the safety catch 28 becomes positively effective to prevent a further opening movement of the hood. At this time, however, the hand hold 30 associated with the safety catch 28 is accessible, and may be operated to turn the safety catch 28 in a clockwise direction, as viewed in Figs. 2 and 5, thereby releasing the catch and enabling the hood to be fully opened. A closing movement involves, of course, a reverse action, the initial closing movement causing the outer curved portion of the catch 70 to ride along the keeper 72, which action cams the safety catch in a clockwise direction, sufficiently to enable the hook 70 to pass behind the keeper portion 72. As soon as this occurs, the safety catch 28 becomes effective to prevent a reopening movement of the hood except upon release of the hand hold 30. A continued downward movement of the hood causes the spring 38 to be stressed. Such continued movement brings the under side 63 of the keeper surface into engagement with the upper surface of a then outwardly projecting bolt tooth, rendering the latter effective to forcibly rotate the bolt 32 in a clockwise direction, bringing the next successive tooth (32b, Fig. 3) into holding engagement with the keeper surface 62. During the clockwise rotation of the bolt, the back of the innermost tooth (Fig. 3) becomes effective to rotate the holding cams 114 and 116 in a counterclockwise direction, sufficiently far to enable such innermost tooth to successively pass beyond the ends of the cams 114 and 116. When the previously mentioned innermost tooth (32c, Fig. 3) passes beyond the shorter cam 114 the latter is enabled to rotate in a clockwise direction to a position behind the tooth 32c, which action assists the continued clockwise rotation of the bolt and prevents a counterclockwise releasing movement thereof. As the rotation of the bolt continues, the longer cam 116 is enabled to move therebehind, thus completing the closing action. It will be understood that if, for any reason, the hood tends to jar to a more tightly closed position during the operation of the vehicle, the longer cam 116 is effective to take up such continued movement and hold it in the tightly closed position.

In the modified embodiment of the invention shown in Figs. 7, 8, 9, and 10, the arrangement is characterized in that the latch bolt is carried by the hood, and is cooperable with a keeper assembly, carried by the vehicle body, to hold the hood in either the fully closed or a partially closed or safety position.

Referring to Figs. 7 through 10, the bolt 130 is of generally bell crank form, one arm thereof being pivotally connected to an operating rod 132 having a handle portion 134 which projects outwardly from the front end of the hood 136 for convenient manual operations, and the other arm 138 is of hooklike formation, and is adapted to hook behind a keeper portion 140 of the keeper assembly 142 to hold the hood in the fully closed position, and is also adapted to hook behind a supplemental keeper portion 144 of the keeper assembly, so as to hold the hood in the partially closed or safety position shown in Fig. 8. The bolt 130 is pivotally supported within the body of the hood for rotation about a horizontal axis, by means of a pin 146, the respectively opposite ends whereof are supported between plates 148 and 150 which are secured together to constitute the supporting structure for the bolt assembly. The bolt 130 is continuously urged in a counterclockwise or locking direction, as viewed in Figs. 7 and 8, by means of a biasing spring 152, which is of generally U shape, the central portion of the bight whereof is hooked behind a notch 154 formed in the bolt nose, and the respectively opposite ends whereof are hooked behind the ends of the pin 146, and bear upon the upper surface of the previously mentioned supporting plate 148.

The central portion of the supporting plate 150 is downwardly formed to define the tapered guiding tongue and housing portion 156, which, when the hood is in the fully closed position, projects into a correspondingly formed guide opening defined by the marginal portions 158 of the keeper supporting plate 160. The just mentioned guide opening conforms rather closely in size to the size of the tongue 156, as will be understood, so that as the hood is moved towards the closed position, the tongue and the guide opening cooperate together to guide the hood towards its proper closed position and also cooperate together when the hood is fully closed, to minimize shifting movements of the hood relative to the body portion. The lower arm 139a of the bolt 130 projects into the housing-like tongue 156, the upper portion of the wall of the latter being provided with an opening 162 to accommodate the bolt. The plate 148 is provided with a corresponding opening 164 for the same purpose. The nose 138 projects through an opening 166 formed in the rear wall of the tongue 156, adjacent the lower end thereof.

The keeper assembly 142 comprises generally the previously mentioned main supporting plate 160, which is secured to the adjacent body portion in any suitable manner, and also comprises a supplemental bracket member 168, the central portion 170 whereof (Fig. 10) is downwardly depressed. The lower surface of the downwardly depressed portion 170 constitutes the previously mentioned bolt engaging keeper portion 140, and the forward wall of such downwardly depressed portion is provided with an opening, so as to define the safety catch 144. In order to yieldingly urge the hood toward the partially closed or safety position shown in Fig. 8, which safety position enables the insertion of the operator's fingers between the lower surface of the hood and the upper surface of the body portion whereby to facilitate the lifting movements of the hood, a generally U-shape spring 172 is provided, the respectively opposite ends 174 whereof are coiled around the ends of a supporting pin 176 and

bear against the under surface of the bracket 168. The bight portion of the spring 172 lies in the path of movement of the lower end of the tongue 156, so that when the hood is lowered, the tongue engages such portion and stresses the spring. The pin 176 is supported in the downwardly depressed portion 170 of the bracket 168, as most clearly appears in Figs. 8 and 10.

Considering the operation of the structure as a whole, it will be appreciated that the hood is shown in the fully closed position in Figs. 7, 9, and 10, in which position the nose 138 of the bolt is hooked behind the keeper portion 140 associated with the vehicle body, and is continuously urged to said holding position by means of the relatively strong biasing springs 152. At such time also, the tongue 156 is received within the guide opening 158, and these elements cooperate together to securely hold the hood against lateral, forward or rearward shifting movements.

Assuming it is desired to open the hood, the handle 134 may be pushed rearwardly as viewed in Figs. 7 and 8, which action rocks the bolt 130 in a clockwise direction, releasing the nose 138 thereof from the keeper assembly 142, and rendering the previously loaded spring 170 effective to force the forward end of the hood upwardly to at least the partially closed safety position shown in Fig. 8. If the handle 134 is released as soon as the nose 138 of the bolt passes the keeper surface 140, the bolt is again rocked in a counterclockwise direction by means of the spring 152, and the nose 138 thereof accordingly hooks behind the safety catch 144 associated with the keeper assembly 142. This latter action prevents movement of the hood past the safety position. If the handle 134 is retained in the released position until after the nose of the bolt passes the entire keeper assembly, it will be appreciated that the hood 136 may be freely moved upwardly to its fully open position.

In the closing movement of the hood, the nose of the bolt 138 initially engages the marginal edge of the keeper opening 158, and such engagement cams the bolt 130 in a clockwise or releasing direction, sufficiently far to enable it to pass along the keeper surfaces, ultimately bringing it past the safety catch surface 144 and the holding surface 140. During such downward movement also, the tongue 156 enters the keeper opening 158, and thus becomes effective to cooperate therewith to guide the hood to the proper fully closed position. As the nose of the bolt passes the keeper portions 144 and 140, respectively, the springs 152 associated therewith become effective to force it in a locking or counterclockwise direction, so as to prevent inadvertent raising of the hood, except upon operation of the handle 134.

The remaining embodiment of the invention shown in Figs. 11, 12, and 13 is characterized in that the bolt is carried by the hood, and that the vehicle body is provided with a member which serves the purpose of the previously described tongue 156 and also serves the purposes of a bolt engaging keeper.

In Figs. 11, 12, and 13, the bolt 180 is pivotally connected by means of a pin 182 to a plate 184, which is secured in any suitable manner within the body of the hood structure 186. The end 188 of the bolt is adapted for connection to an operating rod 190, the end portion whereof is provided with a handle 192 which projects through an opening in the forward end of the hood. The other end 194 of the bolt is formed to cooperate with a keeper surface 196 formed on a guide member 198, to hold the hood to the fully closed position, and to cooperate with a surface 200 formed in the guide member to hold the hood in the partially closed or safety position. The guide member 198 is of generally tapered form, and projects upwardly from the adjacent body portion, the keeper surfaces 196 and 200 being formed therein by piercing one lateral side wall, as clearly appears in Fig. 13. The guide member 198 is dimensioned to be relatively freely but snugly received within a guide opening defined by the marginal edge 202 which projects upwardly slightly from the bolt supporting plate 184. It will be understood that the guide member 198 is suitably secured to a supporting portion such as 204 which may be asociated with the body portion.

In order to continuously urge it in a counterclockwise or locking direction, as viewed in Fig. 12, the bolt 180 is provided with a biasing spring 181, one end 183 whereof is secured to the body of the bolt, and the other end 185 whereof bears against a pin 187 secured to the supporting plate 184. The pin 187 rides in a slot 189, formed in the bolt body, and thus also functions to guide the nose 194 of the bolt.

With respect to the operation of the device, it will be appreciated that the parts are shown in the various figures in the fully closed position, in which the nose 194 of the bolt is in engagement with the keeper surface 200 formed on the guide member 198. The guide member 198, at the same time, is received within the guide opening 202 formed in the bolt assembly, and these portions therefore cooperate to hold the hood securely in place. In the event it is desired to open the hood, the handle 192 may be forced inwardly, thus rotating the bolt 180 in a clockwise direction, as viewed in Fig. 12, and withdrawing the nose 194 thereof from operative engagement with the guide member 198. Upon release of the bolt as just described, the hood 186 may of course be moved upwardly to its fully open position. During a closing movement of the hood, the reverse action occurs, the bolt passing successively beyond the upper end of the guide member 128, the safety catch 196, and finally reaching the closed position shown in Fig. 13. During such action also the guide member cooperates with the opening 202 to guide the hood to its proper fully closed position, and to hold it in such position against lateral, forward or rearward shifting movements.

Although specific embodiments of the invention have been described in detail, it will be appreciated that various further modifications in the form, number, and arrangement of parts may be made within the spirit and scope of the invention.

What is claimed is:

1. In a latch for cooperation between a closure member and a cooperating member, the combination of a first part carried by one of the members and having a guide opening therein, a guide part carried by the other member and having a hollow body portion disposed to be projected into said guide opening during a closing movement of said closure member, a bolt rotatably mounted within the said body of said guide part and having a portion adapted to project therefrom into engaging relation to said first part, holding means acting on the bolt and operable to continuously urge the same into engagement with said first part so as to wedge said closure in the closed position, and means for retracting the holding means so as to release the bolt and relieve said wedging.

2. In a latch for cooperation between a closure member and a cooperating member, the combination of a first part carried by one of the members and having a guide opening therein, a guide part carried by the other member and having a hollow body portion disposed to be projected into said guide opening during a closing movement of said closure member, a bolt rotatably mounted within the said body of said guide part and having a portion adapted to project therefrom into engaging relation to said first part, holding means acting on the bolt and operable to continuously urge the same into engagement with said first part so as to wedge said closure in the closed position, and means operable to retract the holding means so as to release the bolt and relieve said wedging.

ROLLO MARPLE.