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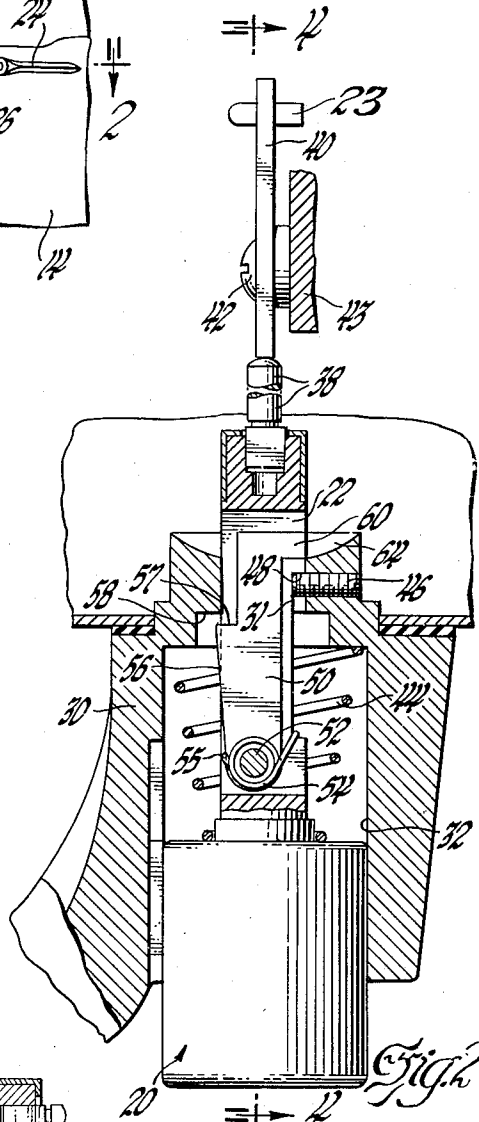
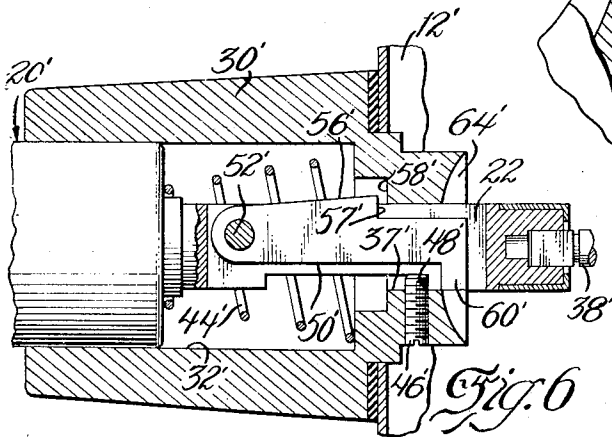
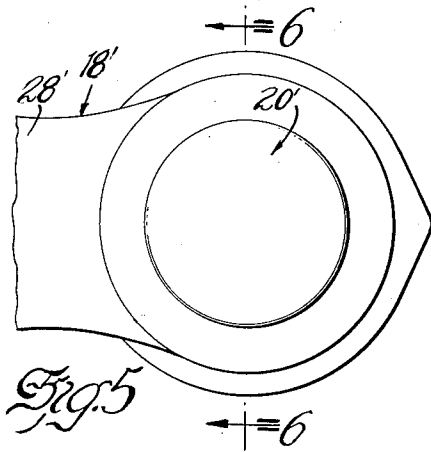
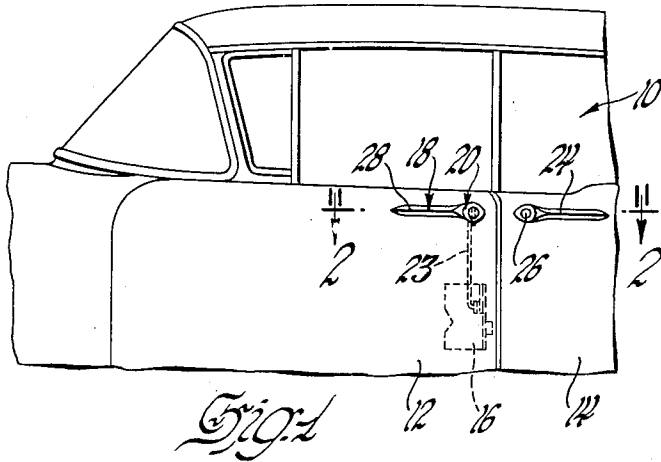
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INERTIA SAFETY DEVICE FOR A DOOR LATCH

Filed April 26, 1956

2 Sheets-Sheet 1



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INERTIA SAFETY DEVICE FOR A DOOR LATCH

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2 Sheets-Sheet 2

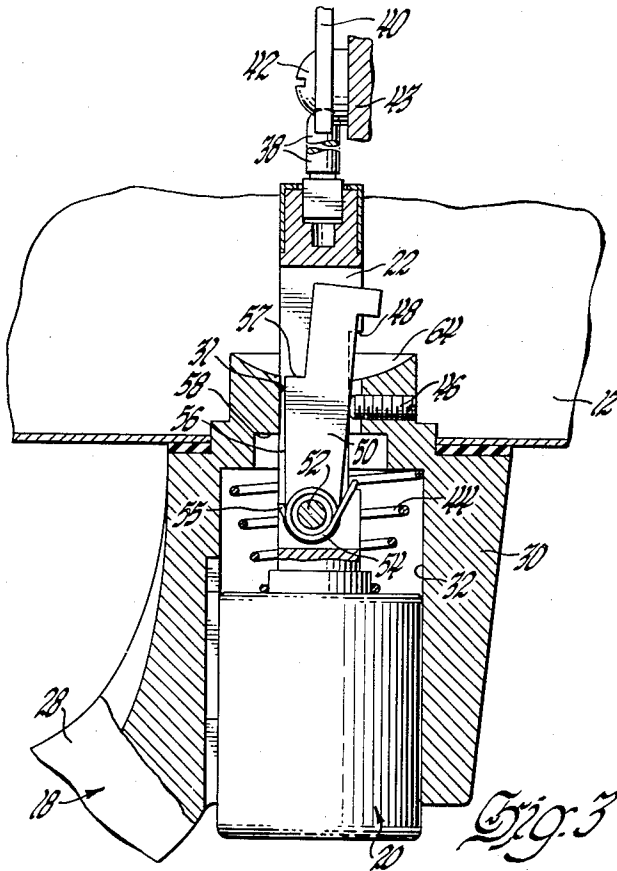


Fig. 3

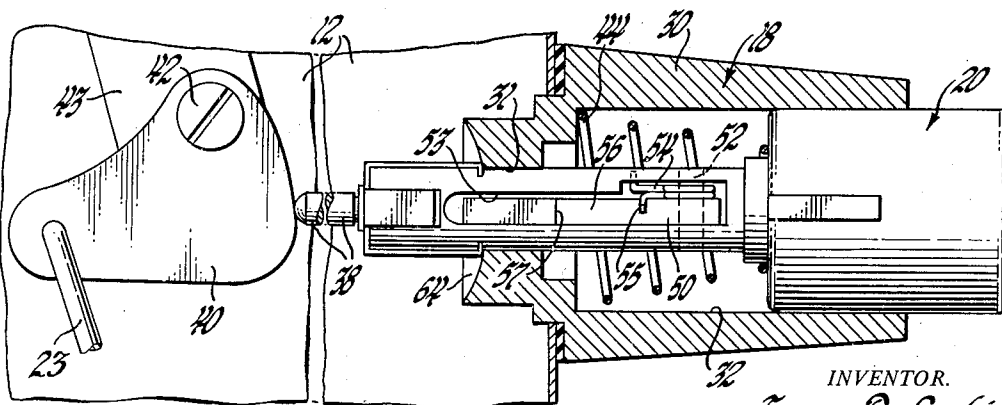


Fig. 4

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**INERTIA SAFETY DEVICE FOR A DOOR LATCH** 5

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Application April 26, 1956, Serial No. 580,949 10

7 Claims. (Cl. 292—336.3)

This invention relates to an inertia safety device for a door latch, and more particularly to an inertia safety device in combination with an automobile door latch actuator.

One feature of the invention is that it provides an improved inertia lock device; another feature of the invention is that it provides an improved door latch actuator; a further feature of the invention is that it prevents door rebound; yet a further feature of the invention is that it provides means for blocking a push button door latch operator from operation in the event the push button is initially moved at an abnormally rapid speed; still another feature of the invention is that it provides improved actuating apparatus for a door latch including a handle device having a stop portion, a latch actuating device mounted on the handle member and including a push button and an actuating rod, and an inertia lock member mounted on one of said devices and engageable with the other of said devices in response to rapid movement of the push button for preventing additional movement of said push button to unlatch the door.

Other features and advantages of the invention will be apparent from the following description and from the drawings, in which:

Fig. 1 is a fragmentary side elevational view of an automobile having actuating apparatus for the door latch according to this invention;

Fig. 2 is an enlarged horizontal fragmentary section taken along the line 2—2 of Fig. 1;

Fig. 3 is a sectional view similar to Fig. 2 but showing the parts in a different position;

Fig. 4 is a vertical section taken along the line 4—4 of Fig. 2;

Fig. 5 is an enlarged fragmentary elevation of a modified form of the invention; and Fig. 6 is a vertical section taken along the line 6—6 of Fig. 5.

In automobiles in which the door latch outside actuator comprises a push button mounted in a stationary handle it often happens that when the door is slammed shut inertia forces acting upon the push button and the actuating rod which it controls cause a rapid movement of the push button relative to the then stationary door when the door reaches its closed position so that the push button assembly momentarily trips the door latch, permitting the door to rebound at least to its safety latch position. This invention provides a novel inertia lock device associated with the push button assembly for preventing movement of the push button in the event of and in response to rapid initial movement thereof. The inertia lock device does not, however, prevent normal relatively slow operation of the push button to open the door. In the event the automobile should roll over on its side so that the push button strikes the ground, the inertia lock will prevent movement of the push button to trip the door latch, thus providing an important safety feature.

In the drawings, an automobile 10 has a front door 12 and a rear door 14. While both doors may have similar latching devices, only the front door latch 16 is illus-

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trated fragmentarily in Fig. 1. The front door has an outer handle 18 mounting a slidable push button assembly 20 including a push rod 22 for operating the door latch 16. Similarly, the rear door has a handle 24 mounting a push button assembly 26 for operation of the rear door latch, which is not illustrated.

Figs. 2, 3 and 4 show the front door handle and the latch actuating means in detail. The apparatus may be similar for the rear door. As is conventional with push button door latch operators, the handle 18 is fixedly mounted on the door and has a gripping portion 28 for swinging the door open and closed and a body portion 30 with a bore 31 including an enlarged chamber 32 in which the push button 20 slides. The actuating push rod 22 projects from the push button through the bore 31 of the door handle into the interior of the door and terminates in a button 38 which, when the push button is depressed as shown in Fig. 3, engages and swings a bell crank 40 pivotally mounted on a stud 42 and support 43 inside the door. Swinging the bell crank 40 lifts up on rod 23 to trip the latch 16. Details of a suitable latch and tripping arrangement of this type are shown in the copending application of Robert M. Hebert entitled, "Rotary Bolt Door Latch," filed January 19, 1955 as S. N. 482,705 and assigned to the assignee of this application.

The push button assembly is urged toward the normal extended operating position of Figs. 2 and 4 by a spring 44 in the chamber 32. Because it is desired not to make the push button difficult to operate, the force exerted by spring 44 is quite light. A stop to hold the push button assembly in the chamber 32 is provided by a screw 46 which is engaged by a shoulder 48 on the actuating rod when the parts are in the position of Fig. 2.

The push button assembly, including the push button 20, the actuating rod 22 and the button 38, embodies substantial mass. When the door is slammed shut, the inertia of this mass may cause the push-button assembly to move relative to the door from the normal operating position of Fig. 2 to the operated position of Fig. 3 to trip the latch 16 momentarily at the instant the door reaches its closed position. When this happens, the door may rebound fully open, or at least to its safety latched position. This rebound action is aided by a resilient sealing weather strip around the periphery of the door, the weather strip being deflected or compressed when the door is closed.

This invention provides a novel inertia device associated with the latch to prevent the push button from moving relative to the door when the door is closed or whenever the push button 20 starts to move with abnormal speed. The inertia device is so arranged that it has no effect upon relatively slow normal finger operating movement of the push button.

An inertia member 50 is swingably mounted on the actuating rod 22 on a pin 52, the inertia member lying in a slot 53 formed in the actuating rod. The pin 52 also mounts a coil spring 54, one end 55 of which bears against the inertia member 50 to urge it to swing in a clockwise direction from the position of Fig. 2 to the position of Fig. 3. The inertia member has an intermediate portion of its left edge (as the parts appear in Figs. 2 and 3) formed as a cam surface 56 which normally projects out of the slot 53 as shown in Fig. 2. The cam surface terminates at its inner end in a stop shoulder 57, and a complementary stop shoulder 58 is formed in the bore 31 of the body portion of the handle. When the push button assembly is in its normal extended position as shown in Fig. 2, the stop shoulder 57 on the inertia member is spaced outwardly away from the complementary stop shoulder 58 on the handle, but if the push button moves inwardly and the inertia member does not swing downwardly out of the way, these shoulders will

abut to block further inward movement of the push button. When the push button is in its normal extended position, a foot 60 on the end of the inertia member 50 rests against the circumferential edge of the bore 31 to hold the inertia member in a position extending in alignment with the push button with the handle stop shoulder 58 in the straight line path of movement of the inertia member stop shoulder 57 as shown in Fig. 2. In the event of rapid initial movement of the push button, the shoulder 57 on the inertia member will move into blocking engagement with the shoulder 58 on the door handle before the spring 54 swings the inertia member to a position where the shoulder 57 moves out of the way of the shoulder 58. Therefore, upon rapid initial movement of the push button, the shoulders 57 and 58 will abut and prevent further inward movement of the push button assembly. However, if the push button is operated relatively slowly as happens in normal opening of the door, the inertia member 50 swings toward the position of Fig. 3 when the foot 60 leaves the peripheral rim of the bore 31. The end face 64 of the handle body 30 is dished as shown in Figs. 2, 3 and 4 to provide clearance for the end foot 60 of the inertia member during the first part of this swinging movement. When finger pressure on the push button is released, it is returned by the spring 44 to the position of Fig. 2, the peripheral rim of the bore 31 camming the inertia member 50 back into alignment with the push button assembly against the force of the spring 54 as soon as the cam surface 56 and stop shoulder 57 pass the stop shoulder 58.

In addition to preventing door rebound when the door is slammed, this device will also prevent the door from opening in the event the automobile rolls over, since sudden inward movement of the push button when it strikes the ground would move the push button assembly rapidly inwardly to bring the shoulders 57 and 58 into abutment before the spring 54 could swing the inertia member out of the way.

Figs. 5 and 6 show a modified form of the invention in which the inertia member is gravity biased. In Figs. 5 and 6, the parts are designated by the same reference characters as in Figs. 2, 3 and 4 with the addition of a prime ('). Referring particularly to Fig. 6, the inertia member 50' is swingably mounted on the actuating rod 22' on a pin 52' which lies in a horizontal plane so that the inertia member 50' is gravity biased to swing downwardly from the position of Fig. 6. When the parts are in the position of Fig. 6, the dished end face 64' of the handle body 30' holds the inertia member 50' up. When the push button is depressed in the normal course of operation, the assembly, including the push rod 22', moves inwardly so that the foot 60' of the inertia member 50' moves away from the dished end face 64' of the handle, permitting the inertia member 50' to swing downwardly under the influence of gravity. The operation is the same as that described above in connection with claims 2, 3 and 4. If the push button is depressed relatively slowly as in normal operation, the inertia member will swing down before the shoulders 57', 58' abut. However, in the event of rapid initial movement of the push button, the shoulder 57' will move into blocking engagement with the shoulder 58' before the force of gravity can swing the inertia member downwardly to a position where the shoulder 57' moves out of the way of the shoulder 58'.

While I have shown and described one embodiment of my invention, it is capable of many modifications. Changes, therefore, in the construction and arrangement may be made without departing from the spirit and scope of the invention as set forward in the appended claims.

I claim:

1. Actuating apparatus for a door latch, comprising: support means including a body chamber portion; latch actuating means slidably mounted in the chamber of said body portion; and an inertia device swingably mounted

on one of said means and engageable with the other of said means in response to rapid initial movement of said latch actuating means for preventing continued movement of said latch actuating means.

2. Actuating apparatus for a door latch, including: a handle member having a body portion; latch actuating means movably mounted in the body portion of said handle member; and an inertia device swingably mounted on said latch actuating means and engageable with the body portion of said handle member in response to rapid initial movement of said latch actuating means for preventing continued movement of said latch actuating means.

3. Actuating apparatus for a door latch, including: a handle member having a body portion; latch actuating means comprising a push button and an actuating rod slidably mounted in the body portion of said handle member; an inertia device swingably mounted on said actuating rod and engageable with the body portion of said handle member in response to rapid initial movement of said latch actuating means for preventing continued movement of said latch actuating means.

4. Actuating apparatus for a door latch, including: a handle member having a body portion with a stop shoulder thereon; latch actuating means comprising a push button and actuating rod slidably mounted in the body portion of said handle member; and an inertia device swingably mounted on said latch actuating means and engageable with said stop shoulder in response to rapid initial movement of said latch actuating means for blocking continued movement of said actuating means, said inertia device being out of engagement with said stop shoulder when the latch actuating means is stationary in its normal position.

5. Actuating apparatus for a door latch, including: a handle member having a body portion with a stop shoulder thereon; latch actuating means comprising a push button and actuating rod slidably mounted in the body portion of said handle member; an inertia device swingably mounted on said latch actuating means and engageable with said stop shoulder in response to rapid initial movement of said latch actuating means for blocking continued movement of said actuating means; means urging said inertia device to swing away from said stop shoulder; and means swinging said inertia device into position to engage said stop shoulder when the latch actuating means is in its normal position.

6. Actuating apparatus for a door latch, including: a handle member having a chambered portion with a first stop shoulder therein; latch actuating means comprising a push button and actuating rod slidably mounted in the chamber of said body portion; spring means urging said latch actuating means to a normal extended position; an inertia device swingably mounted on said latch actuating means and having a second stop shoulder engageable with said first stop shoulder in response to rapid initial movement of said latch actuating means for blocking continued movement of said latch actuating means; a spring urging said inertia device to swing away from said first stop shoulder; and complementary cam portions on said handle and said inertia device for swinging said inertia device into a position to engage said stop shoulder when the latch actuating means is in its normal position wherein said first stop shoulder lies in the straight line path of movement of said second stop shoulder.

7. Actuating apparatus for a door latch, including: a handle member having a body portion with a stop shoulder thereon; latch actuating means comprising a push button and actuating rod slidably mounted in the body portion of said handle member; an inertia device swingably mounted on said latch actuating means and engageable with said stop shoulder in response to rapid initial movement of said latch actuating means for blocking continued movement of said actuating means, said inertia

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device being so mounted on the latch actuating means that it is gravity biased in a direction to swing away from said stop shoulder; and means holding said inertia device into position to engage said stop shoulder when the latch actuating means is its normal position.

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