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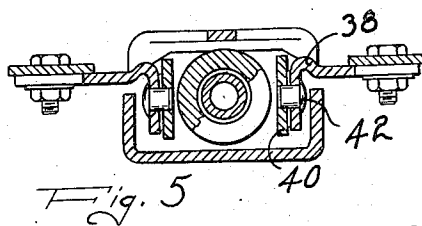
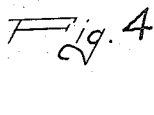
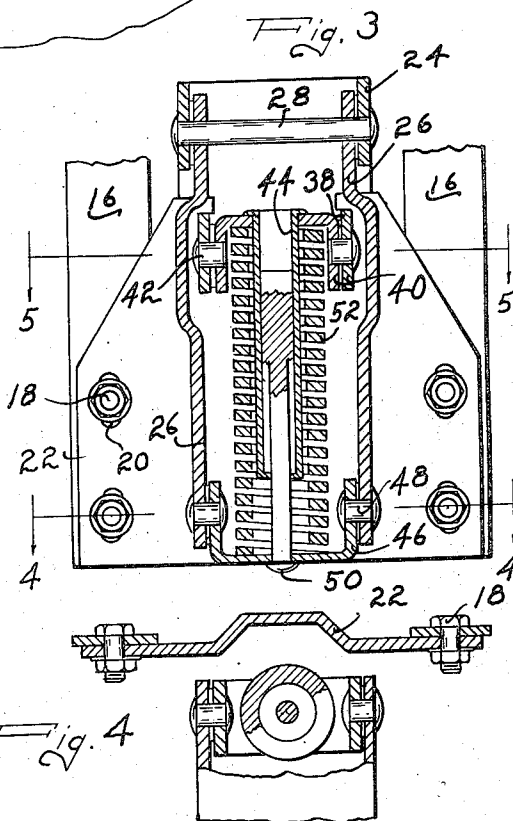
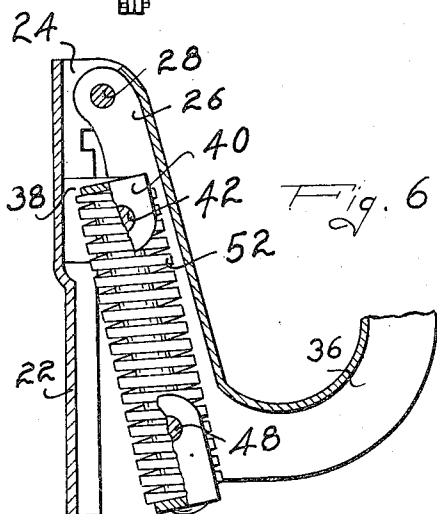
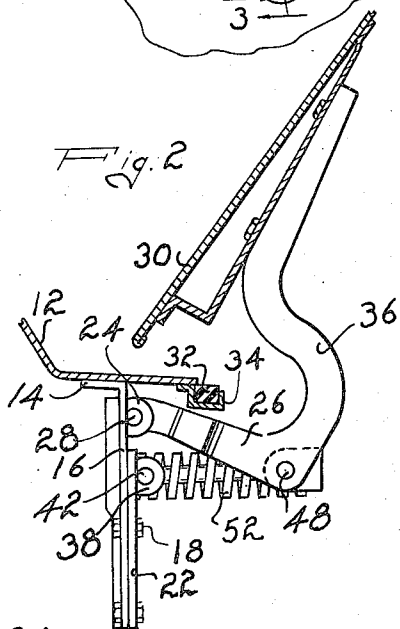
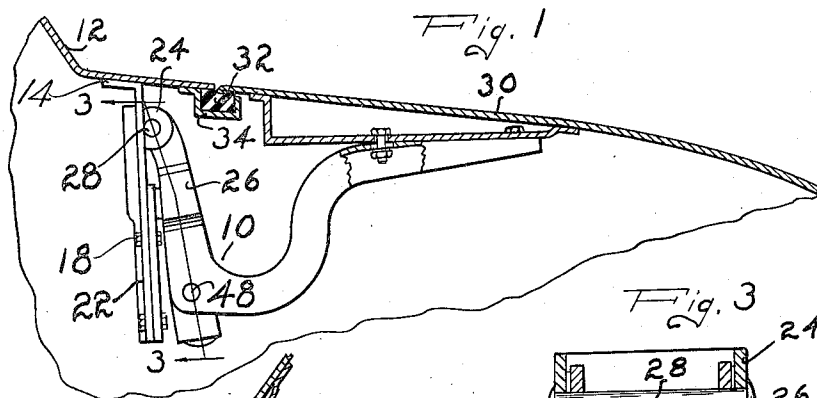
A. BENZICK

2,259,970

HINGE

Filed June 21, 1940

2 Sheets-Sheet 1



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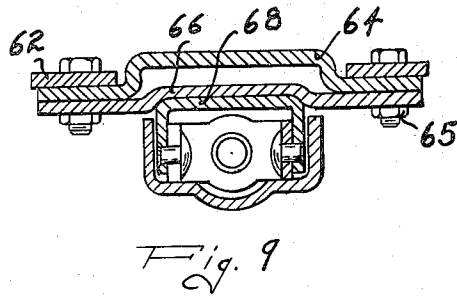
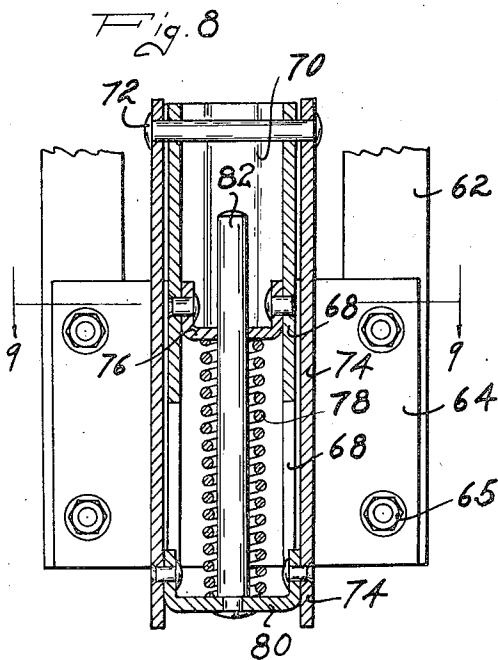
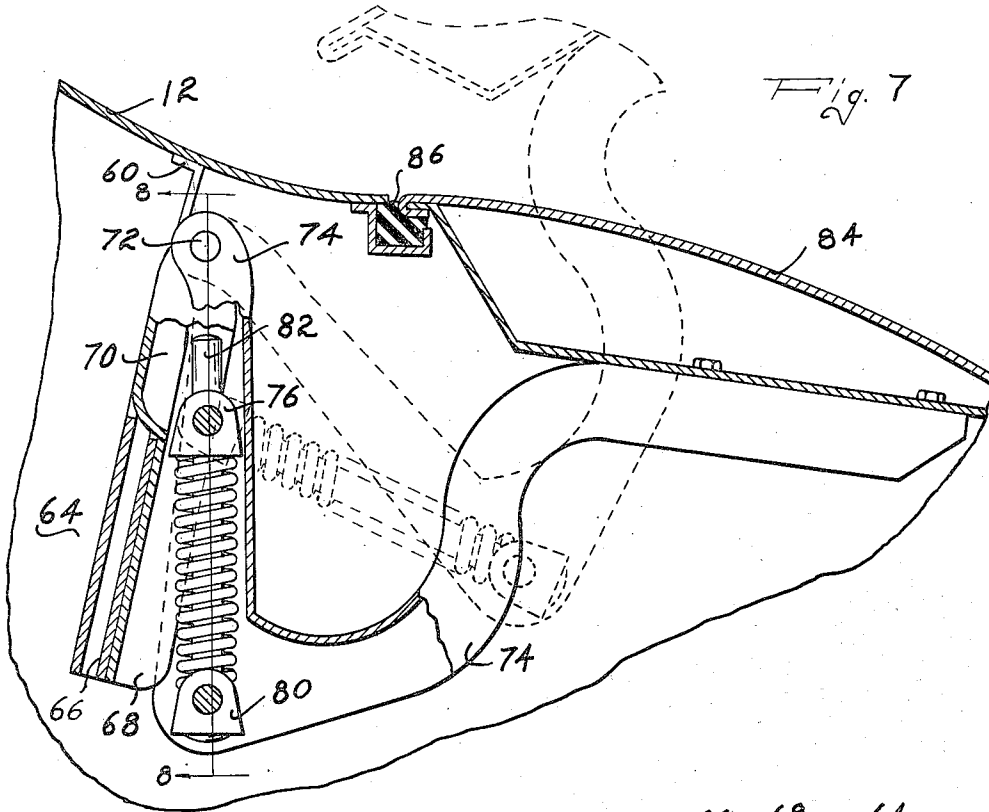
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HINGE

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2 Sheets-Sheet 2



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## UNITED STATES PATENT OFFICE

2,259,970

## HINGE

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Application June 21, 1940, Serial No. 341,616

5 Claims. (Cl. 16—135)

This invention relates to the art of hinges and more particularly to hinges which are employed in automobile body construction for securing movable closure members thereto. Formerly, hinges which were employed to secure a rear deck cover or trunk lid to the body of the automobile were required to have supplementary devices for supporting the deck cover or trunk lid when the same was in open position. Such supplementary devices have added needlessly to the expense of the automobile and have been a source of worry and trouble, as they very easily fall into a state of disrepair and become noisy and inoperative.

A primary object of the invention resides in the provision of means, as a part of a rear deck or trunk hinge, for supporting the trunk lid of an automobile in open position, which means operates automatically, is trouble free and relatively inexpensive.

A further object of the invention is to provide a hinge which co-acts with spring means, which serves to raise a deck or trunk lid to its open position and which serves to close the deck or trunk lid or at least reduce the opening force upon the approach of the lid to a closed position.

Further objects and advantages of the invention will appear more fully hereinafter as the description proceeds and will be pointed out more completely in connection with the attached claims.

This case is a continuation in part of my earlier filed application for Hinges, Serial No. 229,273, filed September 10, 1938.

For a more complete understanding of the invention, reference is had to the following description and the accompanying drawings, wherein:

Figure 1 is a view in vertical section of a portion of a motor vehicle illustrating the apparatus comprising the present invention and showing the trunk lid in closed position;

Figure 2 is a view similar to Figure 1 but showing the deck or trunk lid in open position;

Figure 3 is a sectional view taken upon planes as indicated by the broken line 3—3 of Figure 1 and looking in the direction of the arrows;

Figure 4 is a horizontal sectional view through the hinge mechanism shown in Figure 3, taken upon planes, as indicated by the broken line 4—4 of Figure 3 and looking in the direction of the arrows;

Figure 5 is a horizontal sectional view through the hinge taken upon a plane as indicated by the line 5—5 of Figure 3 and looking in the direction of the arrows;

Figure 6 is an enlarged sectional view of the hinge structure with parts broken away in order more clearly to show the construction;

Figure 7 is a view similar to Figure 1 but showing a modified type of hinge structure and showing the lid in full lines in closed position and in dotted lines in open position;

Figure 8 is a vertical sectional view through the modified type of hinge taken substantially upon a plane as indicated by the line 8—8 of Figure 7 and looking in the direction of the arrows; and,

Figure 9 is a horizontal sectional view through the modified type of hinge taken upon a plane as indicated by the line 9—9 of Figure 8.

Referring more particularly to the drawings, in which similar reference characters are employed to designate similar parts, and which are to be taken as exemplifying rather than as limiting the invention, the device will be seen to be embodied in a hinge indicated generally at 10, which is secured in any suitable manner to the interior of the automobile body 12. A pair of brackets 14 are welded or otherwise attached upon the interior of the body 12 and have downwardly projecting portions 16 provided with apertures to receive bolts 18, which pass through slots 20 in the base plate 22 of the hinge structure.

The base plate 22 is provided at its upper end with a pair of rearwardly extending ears 24 between which is received the main leaf 26 of the hinge. Leaf 26 of the hinge is provided with a pair of apertures through which a pivot pin 28 extends to connect it to the ears 24 of the base member 22, the leaf member 26 comprising an irregular channel-shaped section. Upon the other end of the leaf member 26 the inner side of deck lid 30 is secured in any suitable manner for cooperation with a rubber gasket 32 carried in a channel 34 surrounding the aperture to be closed by the deck lid 30. The hinge member 26 is provided with a downwardly offset portion 36 so as to clear the inwardly projecting edge or channel portion 34 of the compartment body 12.

A second set of rearwardly projecting ears 38 is provided upon the base plate 22 below the pivot 28, such ears having a spring cradle 40 pivoted thereto by means of the rivets 42. A tubular member 44 has one end securely fastened through an aperture in the spring cradle 40 and extends downwardly therefrom toward an intermediate portion of the hinge leaf 26.

A second spring cradle 46, is pivoted as at 48 to the hinge leaf 26 and has rigidly secured thereto a pin 50 for cooperation with the interior

of the tubular member 44. A spring 52, initially under compression, encloses the telescoping pin 50 and tube 44, and has its ends seated upon the cradles 46 and 40 respectively.

Referring more particularly to Figure 6, it will be noted that when the lid is in closed position the pivots 28, 42 and 48 lie very nearly in alignment so that the spring 52 exerts little or no force in a direction which tends to rotate the hinge leaf 26 in a counter-clockwise direction or tends to raise the lid 30 to which the hinge leaf 26 is connected. That is to say, the cradles or spring seats 40 and 46 are in substantial alignment with the hinge pin 28, and both extend in the same general direction with regard to said pin. When the common plane relationship of the pivot points 28, 42 and 48 is disturbed as by lifting upwardly upon the lid 30, the pivot point 48 will be displaced therefrom and swing to the right as viewed in Figure 6, thus moving the line of action of the spring out of alignment or approximate alignment with pivot pin 28 and urging the pivot 48 rearwardly and upwardly with a force which increases directly as the angle between the lid and the body increases. The effectiveness of the spring 52 is limited, however, by reason of the separation which is effected between the pivot points 42 and 48 upon counter clockwise rotation of the leaf 26. Leaf 26 and its attached lid 30 will soon reach a position of equilibrium which is determined by the initial compression of the spring and the weight of the lid. Such position of equilibrium is shown in Figure 2.

When it is desired to close the lid 30, it is only necessary to press downwardly thereupon, thus simultaneously compressing the spring 52 and reducing the distance between the pivot points 48 and 42 and, at the same time, decreasing the angle between the axis of the spring 52 and a line extending through the centers 28 and 48, which angle vectorially determines the turning moment impressed by the spring upon the hinge leaf 26 for raising the lid, a decrease in this angle reducing the turning moment and an increase in the angle increasing the turning moment.

The fixed brackets 14 and the hinge pin 28 and spring seat 40 which they support in spaced relation may conveniently be designated as a hinge sub-assembly, as may also the movable hinge member 36 and the seat or cradle 46 which it carries.

Referring to the modification shown in Figures 7 to 9 inclusive, the device is here shown as comprising a portion of the body structure of the vehicle 12 which has secured to it frame member 60 having downwardly projecting portions 62 to which the hinge base member 64 is secured by means of bolts 65. The base member 64 comprises a two-part structure, the most rearward piece 66 of which has welded thereto a pivot support frame 68, channel-shaped in cross section, the upper part of which is forwardly bent as at 70 for a purpose hereinafter to be described. The uppermost portion of the forwardly bent section 70 receives a pivot pin 72 upon which there is suitably secured the main hinge leaf 74. An intermediate portion of the support 68 has riveted thereto for pivotal movement a spring cradle 76, against the under side of which there is seated a compression spring 78. The opposite end of the compression spring 78 is seated against a spring cradle 80 pivotally carried upon the hinge leaf 74. A pin 82 rigidly secured to the lower spring cradle 80 extends upwardly through the spring 78 and is loosely received within an aper-

ture in the upper spring cradle 76. Since the pin 82 projects through the upper spring cradle 76, and since the hinge in open position causes this pin to be rotated approximately 90 degrees with upper spring cradle 76, it is essential that the base member 68 be relieved as at 70 to accommodate the thus-rotated pin 82.

The outer or rear free end of the hinge member 74 is suitably secured to the deck or trunk lid 84, the edges of which cooperate with a sealing gasket 86 carried in a frame surrounding the aperture to be closed by the lid 84.

The operation of the device shown in Figures 7 to 9 is the same as that shown in Figures 1 to 6.

Although the pivots 28, 42, 48 of Figures 1 to 6 and the corresponding pivots of Figures 7 to 9 have been described as in alignment when the hinge is in closed position, it will be understood that this alignment may occur prior to the return of the hinge to close position so that instead of the spring exerting its force along the line of centers when in closed position, it exerts a slight force in a direction tending to close the hinge and maintain it thus closed. Such an arrangement is similar in many respects to an overcentering toggle.

It should also be noted that with modern production methods it is not always possible to hold the dimensions of parts exactly and it may sometimes occur that alignment of the spring seat pivots with the hinge pivot will not take place. This is true because of the necessity for assembling a hinge usually fabricated by a hardware manufacturer with a body and trunk lid which are manufactured in a body plant. Quite large expanses of sheet metal are being dealt with in the case of body and trunk lid and slight aberrations are considerably magnified over such large expanses. For this reason it should be apparent that the desired radial alignment of the hinge with the spring seat pivots may fail to occur when the closure is in its closed position. Accordingly, there may under such circumstances be some slight pressure directed as to exert an opening force upon the trunk lid but normally insufficient to swing the closure to open position.

I claim:

1. Hinge construction comprising a stationary hinge element, a movable hinge element, a pivot connecting said elements, said movable element comprising a channel member bent intermediate its ends with the channel facing said stationary hinge element, a pair of ears formed on said stationary element, a U-shaped spring seat, pivot means connecting the arms of said spring seat to said ears, a second U-shaped spring seat, further pivot means connecting the arms of said second seat to the sides of said channelled hinge member adjacent the bent portion thereof, spring means extending and compressed between said spring seats, and means extending between and maintaining the spring-engaging portions of said seats in parallelism in all positions of displacement of the hinge elements, said spring seats being so positioned that the axes of said spring seat pivots and the hinge pivot lie substantially in a common plane when the hinge is in closed position and are displaced therefrom to exert an opening force upon the hinge when it is moved from closed position.

2. A hinge construction comprising a fixed hinge member, a movable hinge member movable between predetermined limits, means piv-

otally connecting said hinge members, a spring seat pivoted to said fixed hinge member and having its pivot axis spaced from the axis of said connecting means, a second spring seat pivoted to said movable hinge member and spaced from said pivot axis of said connecting means, the pivot axes of said spring seats and connecting means being disposed in parallel relation, each of said spring seats having a spring engaging portion, and a coiled compression spring seating on and extending between said spring engaging portions, said movable hinge member being movable through an arc about said pivotal connecting means a sufficient distance to one of its predetermined limits to cause the longitudinal axis of said spring to substantially intersect the axis of said pivotal connecting means, the distance between the pivot axes of said spring seats being less than the distance between said spring engaging portions of said spring seats.

3. A hinge construction comprising a fixed hinge member, a movable hinge member, means pivotally connecting said hinge members, a pair of U-shaped members, the base of the U of each U-shaped member forming a spring seat, means pivotally connecting the legs of one U-shaped member to said fixed hinge member, means pivotally connecting the legs of the other U-shaped member to said movable hinge member, the axes of all of said pivotal connecting means being in parallel relation, and a coiled compression spring having its ends in abutting engagement with said spring seats and disposed between the legs of said U-shaped members.

4. A hinge construction comprising hinge means adapted to be located wholly within a compartment and including a first hinge sub-assembly adapted to be secured to an inner wall of said compartment adjacent an aperture therein, said first hinge sub-assembly including a hinge pin and a spring seat in spaced relation, a second hinge sub-assembly adapted to be secured at one end to the inner side of a closure lid for said compartment aperture and having its

other end pivotally connected to said hinge pin, said second hinge sub-assembly having a generally U-shaped offset portion intermediate its ends adapted to clear the adjacent boundary of the compartment aperture in the open position of the closure lid, and said second hinge sub-assembly being provided with a spring seat spaced from said hinge pin, and a coiled compression spring mounted between and in end abutting engagement with said spring seats, the longitudinal axis of said spring in the normal closed position of the closure lid substantially intersecting the axis of said hinge pin, whereby said spring in such closed position of the closure lid exerts no substantial force tending to open the closure lid.

5. A hinge construction comprising hinge means adapted to be located wholly within a compartment and including a first hinge part adapted to be secured to an inner wall of said compartment adjacent an aperture therein, a hinge pin and a spring seat both supported by said first hinge part, a movable second hinge part adapted to be secured at one end to a closure lid for said compartment aperture and having its other end connected to said hinge pin, said second hinge part having a generally U-shaped offset portion intermediate its ends to clear the edge of the compartment aperture in the open position of the closure lid, and said second hinge part having a spring seat, and a coiled compression spring mounted between and in end abutting engagement with said spring seats, the longitudinal axis of said spring in normally closed position of the hinge means substantially intersecting the axis of said hinge pin, and said spring seats in the closed position of said movable second hinge part being substantially in alignment with and extending in the same general direction with regard to said hinge pin, whereby said spring in the closed position of the hinge means exerts no substantial force tending to open the hinge means.

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