Sept. 14, 1954 A. C. A. SQUIRE 2,688,764

LID AND HOOD HINGE

Filed June 11, 1952 2 Sheets-Sheet 1

Fig. 1

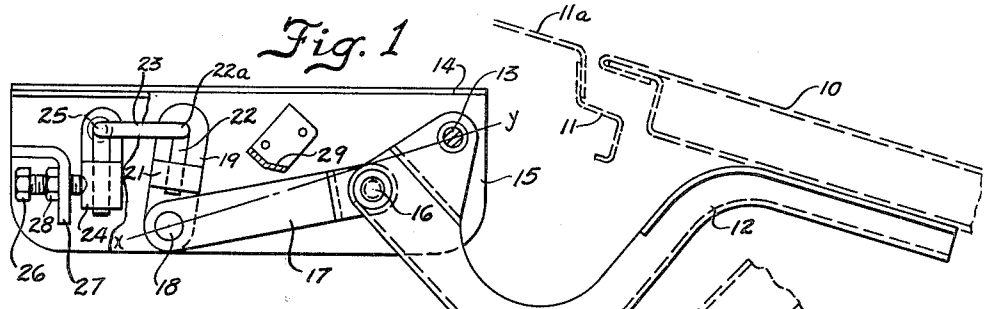


Fig. 2

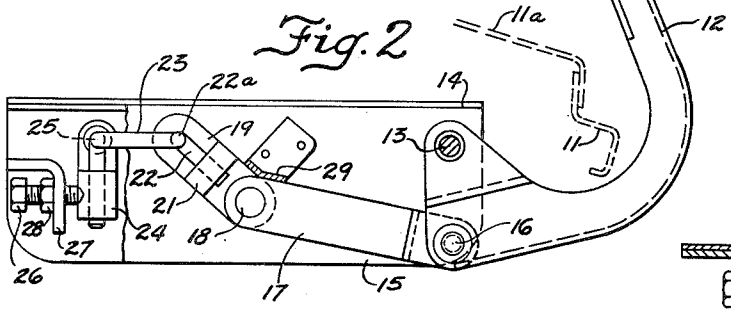


Fig. 4

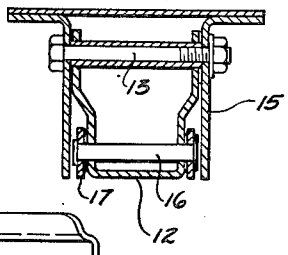
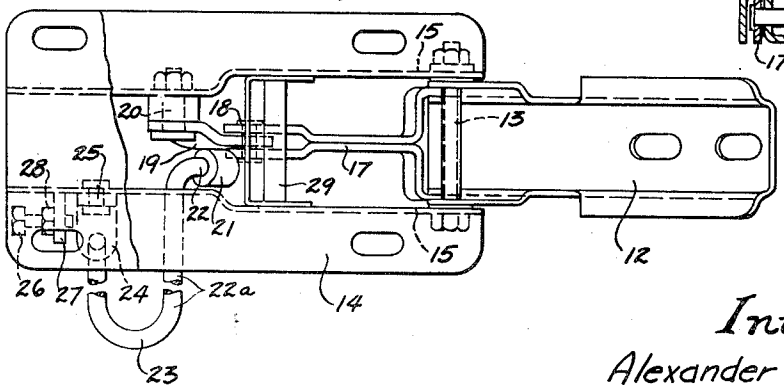


Fig. 3



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LID AND HOOD HINGE

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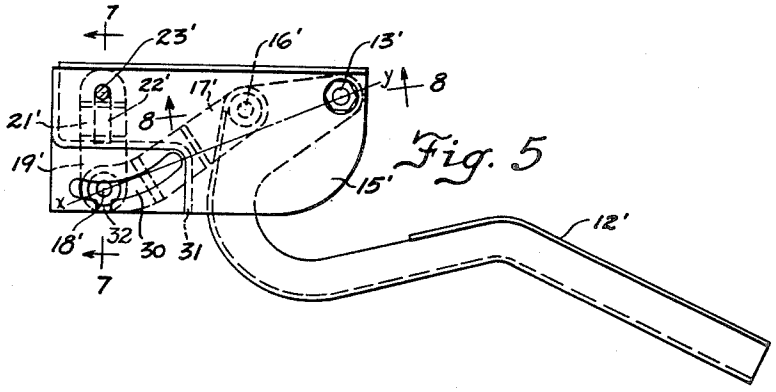


Fig. 5

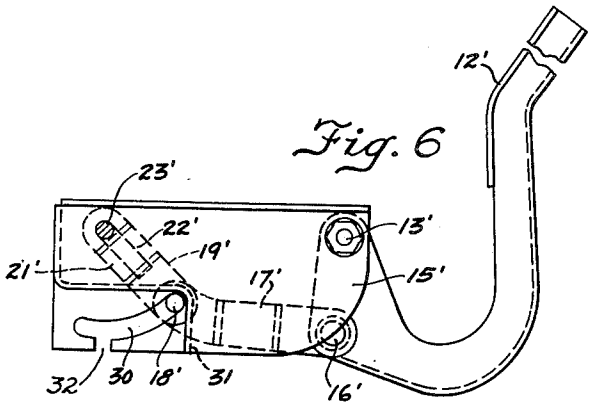


Fig. 6

Fig. 7

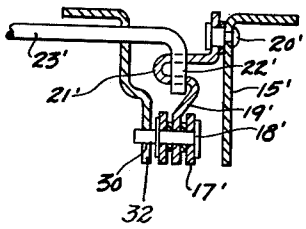
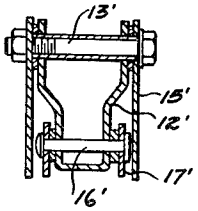


Fig. 8



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2,688,764

LID AND HOOD HINGE

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8 Claims. (Cl. 16—180)

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The invention relates to hinges and more especially to hinges for lids used on the rear luggage compartments of automobiles and the like, the invention being also applicable to engine hood hinges, and other uses.

It has been the practice to mount a rear lid on hinge arms provided with toggle link connections to supporting springs arranged so that the lid in opening or closing is counterbalanced by this spring pressure, which assists in holding the lid in the fully opened or fully closed position. The linkage has been keyed to the inner end of a spirally wound spring or clock type spring which requires a deep mounting bracket to accommodate the spring and allow for the movement of the linkage.

My invention comprises a spring-loaded hinge suitable for the purposes mentioned in which a hinge arm secured to the hood or lid is angularly movable about a fixed pivot, and said hinge arm has a link connection with the free end of a lever arm which is also angularly movable about a fixed pivot and is loaded by a torsion bar which exerts a turning moment on the lever arm that is transmitted through the link connection to the hinge arm to counterbalance the weight of the hood or lid in the open position. The arrangement of the aforesaid parts may be such that in the closed position of the hood or lid the torsion bar exerts a minimum force on the hinge arm in the opening direction or even exerts a force directed to hold the hood or lid in the closed position.

The hinge-arm and the lever arm are, for convenience of installation and economy of manufacture, mounted for angular movement about fixed pivot pins on a common attachment bracket, and the torsion bar may be anchored to the same or to a separate bracket. Two practical embodiments of the invention are herein illustrated.

In the accompanying drawings:

Figure 1 is a side elevation of the hinge and associated parts showing the lid in the closed position and showing certain parts in section;

Figure 2 is a similar view with the lid in the raised or open position;

Figure 3 is a plan view of the hinge and associated parts;

Figure 4 is a vertical section through the pivotal axis of the hinge arm;

Figure 5 is a side elevation of an alternative form of hinge with the lid in the closed position;

Figure 6 is a similar view with the lid in the raised or open position, and

Figures 7 and 8 are fragmentary sections on

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the lines 7—7 and 8—8, respectively, of Figure 5.

Similar reference numerals are used to designate corresponding parts in these views.

In Figures 1 to 4, reference numeral 10 indicates the lid of a luggage compartment which when closed engages suitable seal means on a seat 11 provided on the surrounding part of the body that is commonly referred to as the "rear deck," a portion of which is indicated at 11*a* in Figures 1 and 2.

The lid is supported at each side adjacent to its upper edge on a gooseneck-shaped channel-section arm 12 of which one end is secured to the underside of the lid and the other end is pivoted on a hinge pin 13 in a pressed metal bracket 14 mounted on the underside of the deck 11*a* in the upper part of the luggage compartment. The pin 13 extends horizontally between spaced parallel flanges 15 on the bracket.

At a point on the arm 12 spaced from the hinge pin 13, the arm is coupled by a pin 16 to one end of a link 17, and the other end of this link is coupled by a pin 18 to the free lower end of a lever arm 19, which, in turn, is mounted for angular movement about a fixed pivot 20 on the inner bracket flange 15. The pivot 20 is in substantially the same horizontal plane with the hinge pin 13.

A socket 21 is welded or otherwise secured to one side of the lever arm 19 with its axis parallel to the length of the arm and receives the crank arm end 22 of one limb 22*a* of a U-shaped torsion bar 23, this limb 22*a* being in axial alignment with the pivot 20. The end of the other limb of the bar also has a crank arm on it which is anchored in a socket 24 pivotally mounted by means of a rivet 25 on the outer bracket flange 15. An abutment for the socket 24 is formed by a bolt 26 which is screwed through a lug 27 on the outer bracket flange 15 and is provided with a lock-nut 28 so that the setting of the torsion bar can be readily controlled by adjustment of the bolt.

In operation, when the lid is in the closed position the parts are in the positions shown in Figure 1. The torsion bar 23 is stressed to exert a force tending to rotate the lever arm 19 in an anti-clockwise direction and so open the lid, but as the pin 16 connecting the link 17 to the hinge arm is close to a dead center line x—y connecting the pivots 13 and 18, as appears in Figure 1, the bar 23 is acting through a very small leverage and the weight of the lid 10 is acting through a large leverage so that the lid will remain closed even when the usual retaining locks or catches are released. However, the bar 23 provides an

appreciable assist action making it much easier to raise the lid. To open the lid, it is raised manually through a small angle with a small amount of assist action from the torsion bar **23**, despite its full loading, this being due to the small leverage available at the start, as should be clear from an inspection of Fig. 1. The turning moment exerted on the lever arm **19** by the torsion bar **23** gives a more noticeable assist action when the lid is part way open, because this force is then active through the link **17** on a longer and longer radius, the farther the arm **12** swings counterclockwise in the opening direction, and will swing the lid up into the open position, the parts of the mechanism then assuming the positions shown in Figure 2.

A positive stop for the lever arm **19** and link **17** in the open position of the lid is formed by an abutment **29** mounted on the bracket flanges **15** and adapted to be engaged both by the lever arm and the link, as appears in Figure 2.

In the alternative construction shown in Figures 5 to 8, the mechanism is so arranged that the force exerted by the torsion bar is operative to hold the lid both in the open and the closed positions.

In this form, **12'** is a gooseneck-shaped channel-section hinge arm which is secured to the lid **10** and is hinged by a pin **13'** in a bracket **15'** adapted to be mounted on the underside of the rear deck in the upper part of the luggage compartment.

At a point on the hinge arm **12'** which, in the closed position of the lid, is approximately in the same horizontal plane with the hinge pivot **13'**, the arm is connected by a pivot-pin **16'** to one end of a link **17'** formed by a pair of complementary stampings. The other end of the link **17'** is pivotally connected by a pin **18'** to the lower end of a lever arm **19'** which is pivoted at its upper end by a pin **20'** to the bracket **15'**. The pin **20'** is in the same horizontal plane with the hinge pivot **13'**. The lever arm **19'** is formed with a U-shaped offset portion **21'** about the middle of its length which is drilled through in a direction parallel to the length of the arm to receive the crank arm end **22'** of a torsion bar **23'** which is supported in axial alignment with the pivot **20'** of the arm. The torsion bar **23'** is U-shaped like the bar **23** of Figures 1–4 and extends transversely within the upper part of the luggage compartment and its other end is fixed similarly as shown in Figures 1–4, at **24—28**, in an attachment plate or bracket in such a way that it can be adjusted angularly to vary the torsion on the bar according to requirements.

In operation, the setting of the torsion bar **23'** is such that it exerts a turning moment on the lever arm **19'** tending to rotate it in an anti-clockwise direction. In the closed position of the lid, as shown in Figure 5, the lever arm **19'** is substantially vertical and the pivotal connection **16'** between the link and the hinge arm lies above the dead center line *x—y*. The turning moment exerted by the torsion bar therefore tends to turn the hinge arm in a clockwise direction so to hold the lid closed.

To open the lid, it is first raised manually far enough to carry the pin **16'** downwardly past dead center and then the force exerted by the torsion bar **23'** turns the hinge arm **12'** in an anti-clockwise direction and swings the lid up into the open position. The various parts are then in the positions shown in Figure 6.

A stop for limiting lid movement in the open position (Figure 6) is formed by an extension of one end of the pin **18'** which works in an arcuate slot **30** in the bracket **15'** concentric with the pivot **20'** of the lever arm **19'**. Alternatively, in the open position of the lid the extension of the pin **18'** may abut against a laterally projecting flange **31** on the bracket **15'**. The entrance **32** to slot **30** facilitates assembly of the crank arm end **22'** of the torsion bar **23'** in the drilled holes in the arm **19'** by allowing relative movement between the opposite side portions of bracket **15'** in a direction lengthwise with respect to crank arm **22'**, the pin **18'** entering slot **30** through entrance **32** at the same time that arm **22'** becomes connected with arm **19'**, as should be clear from inspection of Fig. 7.

Both forms described above are extremely compact as the torsion bars can be mounted close to the surface to which the hinge brackets are secured so that the mechanism has a very limited projection into the luggage compartment or other space enclosed by the lid.

While my invention has been described above as applied to the lid of a luggage compartment, it will be appreciated that the invention can be applied equally well to an engine hood and particularly to a one-piece hood hinged at its rear end.

It is believed the foregoing description conveys a good understanding of the objects and advantages of my invention. The appended claims have been drawn to cover all legitimate modifications and adaptations.

I claim:

1. A spring-loaded hinge for an engine hood, a lid of a luggage compartment, or the like, comprising a hinge arm secured to the hood or lid and angularly movable about a fixed pivot, a link coupled at one end to the arm at a point spaced radially from the pivot and coupled at its other end to the free end of a lever arm that is also angularly movable about a fixed pivot, a torsion bar having on its one end a crank arm extending substantially perpendicularly from said end and adapted to be adjusted angularly and having on its other end another crank arm extending substantially perpendicularly from that end and connected to said lever arm so as to exert a turning moment on the lever arm and, through the link, on the hinge arm to counterbalance the weight of the hood or lid in its open position, and means for angularly adjusting the first mentioned crank arm relative to said torsion bar to vary the spring loading of said hinge.

2. A spring-loaded hinge for an engine hood, a lid of a luggage compartment, or the like, comprising a hinge arm secured to the hood or lid and angularly movable about a fixed point, and a link coupled at one end to the arm at a point spaced radially from the pivot and coupled at its other end to the free end of a lever arm that is also angularly movable about a fixed pivot, said lever arm being spring-loaded by a torsion bar which exerts a turning moment on the lever arm and, through the link, on the hinge arm to counterbalance the weight of the hood or lid in its open position, said lever arm carrying a socket to receive a crank arm provided on the end of the torsion bar, one end portion of said bar next to said crank arm being in axial alignment with the pivot of the lever arm and the other end portion of the bar being secured in a mounting permitting angular adjustment of the bar to vary the spring loading.

3. A spring-loaded hinge for an engine hood, a lid of a luggage compartment, or the like, comprising a hinge arm secured to the hood or lid and angularly movable about a fixed point, and a link coupled at one end to the arm at a point spaced radially from the pivot and coupled at its other end to the free end of a lever arm that is also angularly movable about a fixed pivot, said lever arm being spring-loaded by a torsion bar which exerts a turning moment on the lever arm and, through the link, on the hinge arm to counterbalance the weight of the hood or lid in its open position, said torsion bar being U-shaped, and the lever arm having secured to it a crank portion provided on the end of one limb of said torsion bar, this limb being in axial alignment with the pivot of the lever arm, and the end of the other limb also having a crank portion that is secured to a member that is angularly adjustable to vary the spring loading.

4. A spring-loaded hinge for counterbalanced hinging support of a raisable lid or hood comprising a fixed supporting bracket, a hinge arm pivoted at its one end on said bracket and adapted to be secured to the lid or hood, a U-shaped torsion spring providing a pair of arms having crank portions on the ends thereof, said spring being supported by the crank portion on one arm of the U in rigid relation to said bracket and spaced from the hinge arm pivot, a lever carried on a support rigidly mounted on said bracket for pivotal movement on an axis coaxially aligned with the other arm of the U and attached to the crank portion on that arm, and a link connecting the lever with the hinge arm maintaining said torsion spring under a predetermined torsional load to oscillate said lever in a predetermined relation to the opening and closing of the lid or hood.

5. A hinge as set forth in claim 4, including another lever carried on a support rigidly mounted on said bracket for pivotal movement on an axis coaxially aligned with the first mentioned arm of the U, said last named lever being pivotally adjustable and attached to the crank portion on that arm of the U, and a screw adjustable on said bracket and engaging said last named lever to adjust the same and accordingly increase or decrease the spring loading.

6. A spring-loaded hinge as defined in claim 4, including a positive stop limiting pivotal movement of the first mentioned lever in the fully opened position of the hinge arm.

7. A spring-loaded hinge as defined in claim 4, including a positive stop engaging the first mentioned lever and link to limit movement thereof in the fully opened position of the hinge arm.

8. A spring-loaded hinge for an engine hood, a lid of a luggage compartment, or the like, comprising a hinge arm secured to the hood or lid and angularly movable about a fixed pivot, a lever arm that is also angularly movable about a fixed pivot, means operatively connecting said hinge arm and said lever arm to transmit a predetermined angular movement to the lever arm in a predetermined angular movement of the hinge arm, a torsion bar having on its one end a crank arm extending substantially perpendicularly from said end and adapted to be adjusted angularly and having on its other end another crank arm extending substantially perpendicularly from that end and connected to said lever arm so as to exert a turning moment on the lever arm and accordingly on the hinge arm to counterbalance the weight of the hood or lid in its open position, and means for angularly adjusting the first-mentioned crank arm relative to said torsion bar to vary the spring loading of said hinge.

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