DECK LID COUNTERBALANCE AND HOLD-OPEN

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This invention relates to a deck lid hinge and counterbalance, and more particularly to a torque rod deck lid hinge and counterbalance for an automobile.

One feature of the invention is that it provides an improved deck lid hinge and counterbalance; another feature of the invention is that it provides a counterbalance in the form of a U-shaped torque rod having its ends mounted on the hinge box with one end connected to the hinge strap, the rod being twisted when the deck lid is closed to provide a torque force urging the deck lid open; a further feature of the invention is that the torque rod is formed with a crank portion which is pivotally connected to one of the hinge elements; still another feature of the invention is that the crank portion forms one link of a pair of toggle links connected between the hinge box and the hinge strap; yet another feature of the invention is that the toggle links include stop means for preventing the crank from twisting beyond a center position in alignment with the other toggle link; and yet another feature of the invention is that the folded torque rod has both of its ends mounted on the hinge box and has an offset portion forming a crank which is pivotally connected to the hinge strap through a toggle link.

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

Fig. 1 is a top plan view of the rear portion of an automobile, portions of the body and deck lid being broken away to show the hinge and counterbalance structure;

Fig. 2 is an enlarged view of one of the folded torque rods;

Fig. 3 is an enlarged section taken along the line 3—3 of Fig. 1, the position of the parts when the deck lid is closed being shown in solid lines and the position of the parts when the deck lid is open being shown in broken lines;

Fig. 4 is a section through the hinge box taken along the line 4—4 of Fig. 3, but with the hinge box removed from the automobile; and

Fig. 5 is a section through the hinge box taken along the line 5—5 of Fig. 3, but with the hinge box removed from the automobile.

Because of space limitations for the hinge and counterbalance structure in automobile trunks it has been found advantageous to use torque rod type counterbalance devices for the deck lid in place of bulky coil type springs. In the past these torque rod counterbalance devices have comprised straight rods having one end secured to a hinge member at one side of the automobile body and the other end secured to a hinge member at the other side of the automobile body. While this arrangement did not take the space required for coil springs, it had certain disadvantages in that it was necessary first to mount each hinge box assembly in the automobile and subsequently to install the torque rods, since each torque rod was connected to hinge members on opposite sides of the automobile body. Furthermore, the length available for the torque rod was definitely limited by the space between the hinges so that it was difficult to obtain the desired torque or operating characteristics, and in addition, when different styles of automobiles were manufactured, it was difficult to obtain a standard torque rod arrangement which would be satisfactory for different automobiles having different size deck lids of varying weights.

The improved counterbalance disclosed and claimed herein is in the form of a folded torque rod having both ends connected to one hinge box. Therefore, the entire hinge and counterbalance assembly can be made and put together before mounting it in the automobile body. Furthermore, since the torque rod is folded into the form of a U, there is approximately twice the space available, and torque rods almost twice as long as the straight rods formerly used can be provided. Because of this feature compensation can be made for variations in size and weight of the deck lid merely by using different length torque rods since the entire available space is not used by the folded rod.

Referring now more particularly to the drawings, in Fig. 1 the rear portion of an automobile is shown as having rear quarter panels 10 and 11 formed with a trunk opening back of the rear window 12. A deck lid 14 is hingedly mounted to cover this opening. As shown in Fig. 3, an interior body wall 16 extends generally vertically below the rear window 12 of the automobile, this wall defining the upper front portion of the trunk compartment. At each side of the body a hinge is provided for mounting the deck lid 14 on the body, these hinges being designated generally at 18 and 20 in Fig. 1. As the hinges are similar, only one will be described in detail and the corresponding parts of the other hinge will be indicated by the same reference characters.

Each hinge comprises a hinge box which is fixedly mounted on the interior body wall 16, as by spotwelding as indicated at 22 in Fig. 3. The hinge box is formed of spaced parallel walls 24 and 26 which are joined at the bottom by a base 28. A second hinge member is formed as a gooseneck strap 30 which is pivotally mounted on the hinge box by a hinge pin 32, and which extends between the walls 24 and 26 of the hinge box and has its free end bolted to an inner panel 34 of the deck lid 14.

A counterbalance for each hinge is provided by an elongated torque or spring rod folded into the form of a U, each rod being designated generally at 36. As shown in Fig. 2, the U-shaped rod has two arms 38 and 44 of substantially the same length, the free end 40 of the arm 38 being bent substantially at right angles and terminating in an anchor hook portion 42. The arm 44 of the rod is formed adjacent its free end with a crank providing an offset portion 46. An anchor bracket 48 is welded to the arm 24 of the hinge box and has a flange which extends outwardly from the hinge box and is formed with a groove 50 (Figs. 4 and 5) into which the anchor hook 42 is connected. A pivotal mounting for the free end of the arm 44 of the torque rod is provided by aligned openings 52 and 54 in the hinge box walls 24 and 26, the crank portion 46 of the torque rod being located between the walls 24 and 26.

A link 56 (Figs. 1 and 3) is articulated to the hinge strap 30 by means of a pin 58 at a point spaced from the hinge pin 32. As shown in Fig. 1, this link preferably is formed as a yoke comprising two similar stampings which are bent to straddle the hinge strap 30. At its base end the link 56 has a recess 60 in which the crank portion 46 of the torque rod seats to form a pivotal connection between the torque rod and the link, and a lug 62 projects from each stampting of the link, the face of each lug being adapted to abut the hinge strap 30 when the deck lid is open, as shown in Fig. 3.
When each torque rod 36 is assembled with its associated hinge elements the free end 40 of the arm 38 is twisted as shown in broken lines in Fig. 2 to preload the rod so that torque will be exerted by the rod when the deck lid is open, and so that the rod will not fall off the hinge before assembly of the parts in the automobile body. The crank portion of the torque rod and the link 56 form a pair of toggle links, and the engagement of the face of the lug 62 with the strap 30 when the deck lid is open prevents twisting of the crank portion of the rod beyond a center position in alignment with the link 56 and provides a stop for opening movement of the deck lid.

The folded rods may overlap at the center of the automobile body and may be secured together by clips 64 to prevent rattling.

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 forth in the appended claims.

I claim:

1. A hinge and counterbalance for a swinging lid adapted to be moved to open and close an opening, comprising: a hinge box adapted to be located within a compartment and connected to a wall thereof, a hinge strap adapted to be rigidly secured to a lid for said compartment, means hingedly mounting said strap on said hinge box to swing said lid between open and closed positions, an elongated spring rod folded into the form of a U, means anchoring one end of said rod to said hinge box, a crank adjacent the other end of said rod and providing an offset portion, a link having one end pivotally connected to said strap and having a recessed edge at its other end into which said offset portion seats, and a lug projecting from said one end of said link and engaging said hinge strap when said lid is opened a predetermined amount to prevent said crank of said rod from twisting beyond a dead center position in alignment with said link.

2. A hinge and counterbalance for a swinging lid as defined by claim 1 wherein said link comprises two similar stampings secured together at their recessed ends and spaced apart to straddle said hinge strap at their pivotally connected ends.

3. A hinge and counterbalance for a swinging lid adapted to be moved to open and close an opening, comprising: a hinge box adapted to be located within a compartment and connected to a wall thereof, a hinge strap adapted to be rigidly secured to a lid for said compartment, means hingedly mounting said strap on said hinge box to swing said lid between open and closed positions, and elongated spring rod folded into the form of a U, an anchor hook portion integral with said rod at one end thereof, a crank adjacent the other end of said rod and providing an offset portion, an anchor bracket secured to said hinge box and engaged by said hook portion to prevent rotation of said one end of said rod upon the application of force to said offset portion, a link having one end pivotally connected to said strap and having a recessed edge at its other end into which said offset portion seats, and a lug projecting from said one end of said link and engaging said hinge strap when said lid is opened a predetermined amount to prevent said crank of said rod from twisting beyond a dead center position in alignment with said link.

4. A hinge and counterbalance means for a swinging lid adapted to be moved to open and close an opening, including: a pair of hinges adjacent opposite sides of the opening comprising first and second hinge boxes adapted to be located within a compartment adjacent opposite sides thereof and connected to a wall thereof, first and second elongated hinge straps pivotally connected to said first hinge box and to said second hinge box respectively, a link pivotally connected to said first hinge box and to said second hinge box respectively, means pivotally connecting said crank end of each rod to one of said hinge boxes; means anchoring the other end of each rod to the hinge box to which the crank end of the rod is connected; a first link pivotally connected to said first hinge strap and a second link pivotally connected to said second hinge strap; each of said links having a recessed edge at its free end; the offset portion of the rod connected to said first hinge box being seated in the recessed edge of said first link, and the offset portion of the rod connected to said second hinge box being seated in the recessed edge of said second link; each of said links further having lugs adjacent their pivotally connected ends and engaging their associated hinge strap when said lid is opened a predetermined amount to prevent the crank portions of said rods from twisting beyond its dead center position in alignment with their associated links.

5. A hinge and counterbalance means for a swinging lid as defined by claim 4 wherein each of said rods comprises two similar stampings secured together at their recessed ends and spaced apart to straddle their associated hinge strap at their pivotally connected ends.

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