HINGE FOR CLOSURE ELEMENTS

Leslie Ralph Shaw and Joseph Henry Cotton, both of The Bloxwich Lock & Stamping Company, Limited, Alexander Works, Bloxwich, near Walsall, Staffordshire, England

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This invention relates to hinges which are spring-loaded in order to support wholly or partially the weight of a lid or other hinged member, and so reduce the effort required to open it. Hinges according to the invention are primarily intended for the lids of vehicle boots or luggage receptacles or for vehicle bonnets, but can be used for other purposes.

The principal object of the invention is to provide a hinge in which a hinge arm is mounted for angular movement about a pivot in a stationary member and a cam surface or track on the hinge arm is engaged by a spring-loaded member mounted for rocking and sliding movement relative to the stationary member and also guided by means which locate it angularly during angular movement of the hinge arm.

A more detailed object is to provide a hinge where the hinge arm which carries a lid or the like is pivotally connected at one end of a bracket adapted to be secured to a stationary member, and a compression spring is mounted on a carrier which is pivotally and slidably mounted at one end or in the bracket and has at the opposite end a follower urged by the spring into engagement with a cam surface or track on the hinge arm, the carrier being angularly located during the movement of the hinge arm by the engagement of the follower with guiding means in the bracket.

The invention also contemplates a follower which may comprise a flanged roller engaging a cam track provided by an edge of the hinge arm, which may be of any required form, but will usually be so arranged that the turning moments applied by the spring to the hinge arm in any angular position is substantially equal to the opposing moment exerted by the lid or bonnet. The follower may comprise a further roller or rollers to engage the guiding means in the fixed bracket.

Other objects and advantages of the invention will become apparent from the following detailed description taken in connection with the accompanying drawings, in which

FIGURE 1 is a side elevation of a hinge embodying the novel features of the present invention.

FIG. 2 is a plan view of the hinge.

Fig. 3 is an end view.

FIGS. 4 and 5 are side elevations similar to FIG. 1 but showing alternative contours for the cam surface or track on the hinge arm.

The surfaces of bracket 9 of the hinge illustrated comprises a flat top plate 10 having laterally extending lug portions 11 by means of which it is secured to a stationary part of a vehicle, and two spaced parallel vertical plates 12 (FIG. 2) welded or otherwise secured to the plate 10. In an alternative construction the bracket may be formed by a single pressing.

The hinge arm is a member 14 of substantially C outline which at one end is provided with holes 15 to receive bolts for securing it to a boot lid or like member to be hingedly supported. At its other end the arm is pivoted by means of a pin 16 between spaced upstanding lugs 17 on the bracket 9.

Between the plates 12 of the bracket 9 there is located a spring carrier 18 formed by two metal strips secured together over the greater part of their length but separated at the end adjacent to the hinge arm to form a parallel-sided fork 19. At the other end, a longitudinal slot 21 of considerable length is formed in the carrier and a transverse pin 22 fixed in the plates 12 passes through the slot.

A helical compression spring 23 fits over the carrier and abuts between the pin 22 and the inner end of the fork 19. The spring urges the carrier to the right in FIG. 1 to the limit imposed by the slot 21.

The limbs of the fork are formed with open-ended slots to receive a pin 24 on which is rotatably mounted a grooved or bobbin-shaped roller 25 located between the limbs. The pin also carries on its ends auxiliary rollers 26 working in guide slots 27 in the plates 12, the slots being stamped in the plates from the inner side to provide outwardly directed flanges 28 which provide guiding surfaces of substantially wide for the rollers 26.

The bobbin-shaped roller 25 serves as a cam follower and cooperates with a cam surface or track 29 on the adjacent edge of the hinge arm and, to provide a bearing surface of substantial width, the part of the hinge arm carrying the cam surface or track is preferably thickened by welding or riveting a part 31 of the same outline to it.

The hinge-arm is shown in full lines in FIG. 1 in the fully open position, a stop for the arm being formed by a cranked portion 32 on one of the lugs 17. The arm and the lid which it carries are supported in this position by the spring 23 acting through the carrier and the roller 25 on the hinge arm.

When the lid is moved from the open position toward the closed position, the cam surface or track 29 on the hinge arm bearing on the roller 25 urges the carrier 18 to the left in FIG. 1 against the resistance of the spring 23 which applies a turning moment to the arm in opposition to force exerted by the weight of the lid. By selection of an appropriate contour for the cam surface or track, the turning moment exerted by the spring can be varied for different parts of the angular movement of the arm.

The contour illustrated in FIG. 1 is designed to allow a greater angular movement of the hinge arm for a given increase in spring compression toward the end of the closing movement of the lid.

FIG. 4 shows an alternative in which similar parts are indicated by the same but primed reference characters. Here the contour for the cam surface or track 29 on the hinge arm 14 is designed to hold the lid in the open position in which the hinge arm is in the position shown in broken lines, and to allow the weight of the lid to hold it in the closed position.

When the lid is in the closed position the hinge arm is in the position shown in full lines and the roller 25' is in engagement with a part 33 of the cam surface which is concentric about the pivot pin 16 so that there is no force acting on the lid to move it away from the closed position in which it is held by gravity.

FIG. 5 shows another arrangement where the corresponding parts are indicated by double primed reference characters. In this case, as the lid approaches the closed position, the roller 25' passes over a hump 34 and into a recess 35 in the cam surface and the spring then exerts a force on the arm urging the lid into the closed position.

The guide slots 27' are lengthened as shown at 36 to allow for the additional movement of the roller as the hump 34 passes over it.

With this arrangement the lid is resiliently held in the fully open and closed positions and its weight is counterbalanced as it moves between these positions.

We claim as our invention:

1. A hinge comprising an elongated bracket, said bracket being provided with a plurality of fixedly spaced pivot points, at least one of which is disposed laterally of the longer axis of the bracket; a hinge arm mounted on said laterally disposed pivot point, said hinge arm includ-
3. The hinge of claim 2 in which said track is defined by the walls of guide slots formed in said bracket, said combination further including auxiliary rollers on said follower for movement in said slots.

4. The hinge of claim 1 in which said cam surface includes a first portion which engages with said follower and assists in holding the hinge arm in an open position, a second portion on said cam surface which when engaged by said follower biases said hinge arm to a closed position, and an intermediate portion on said cam surface for engagement with said cam follower and biasing the arm to an open position.

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MARVIN A. CHAMPION, Primary Examiner.
EDWARD C. ALLEN, Examiner.
D. L. TROUTMAN, Assistant Examiner.