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AUTOMOBILE DOOR HINGE EMBODYING HOLD-OPEN MEANS

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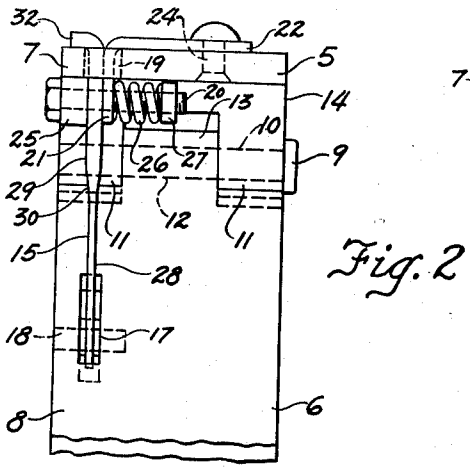


Fig. 2

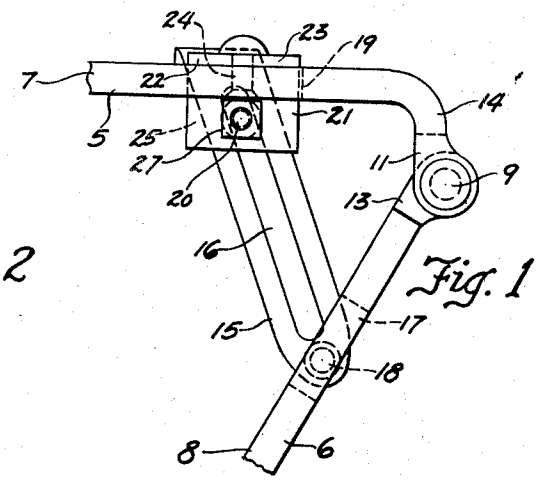


Fig. 1

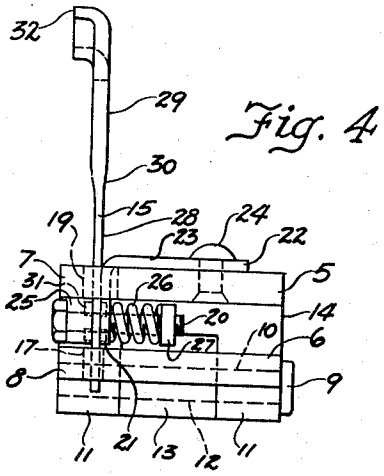


Fig. 4

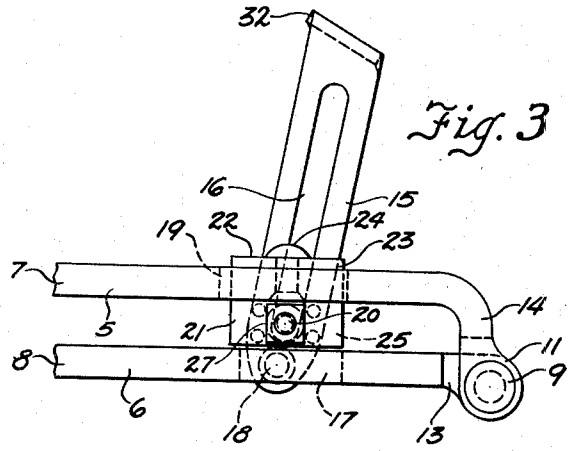


Fig. 3

INVENTORS
SETH B. ATWOOD
& AGNAR JOHNSON

BY

Andrew F. Wintercorn

ATTY.

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Seth B. Atwood and Agnar Johnson, Rockford, Ill., assignors to Atwood Vacuum Machine Company, Rockford, Ill., a corporation of Illinois

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1 Claim. (Cl. 16—141)

This invention relates to improvements in automobile door hinges and is more particularly concerned with the provision of a novel form of hold-open device designed to prevent accidental closing of the door when it has been opened.

Various designs of hold-open devices have been proposed but many are too complicated and expensive in construction and are not practical for various reasons. It is, therefore, the principal object of our invention to provide a hold-open device of simpler and less expensive construction, and one which is designed to give satisfactory performance throughout the life of the car without ever being apt to require any attention.

In accordance with our invention, a slotted link that is pivotally connected at one end to one of the hinge members extends through a slot in the other hinge member where it has a sliding pivotal connection on a bolt carried on a bracket attached to said hinge member, the bolt extending through a follower plate that engages the link from the opposite side and serves as a friction shoe, the bolt carrying a coiled compression spring exerting its pressure on the shoe, the loading of the spring being variable by the tightening of a nut on the bolt against the spring to obtain the desired amount of friction drag and accordingly resist the closing of the door when opened and prevent accidental closing. The link in accordance with the invention is relatively thin throughout that portion of its length corresponding to that portion of the range of door movement in which no friction drag is desired, and is of appreciable thickness throughout the remainder of its length, namely, in that portion of its length corresponding to the final 15° or so of door opening movement, in which range the door, due to the friction drag imposed on this thickened portion of the link, will be held open quite securely at any point, thereby avoiding the necessity for the motorist having to take the trouble to move the door to a certain predetermined position at which the hold-open means is effective. The slot in the link is long enough to allow the full 60° or so of door opening movement but, to save wear and tear on the bolt by avoiding having the bolt strike the end of the slot to limit door opening movement, we prefer to provide a separate stop on the free end portion of the link itself by bending the extremity thereof at right angles for abutment with the back of the fixed hinge member on the body adjacent the slot in said hinge member.

The invention is illustrated in the accompanying drawing, in which—

Fig. 1 is a plan view of an automobile door hinge embodying a hold-open device made in accordance with our invention showing the parts in what corresponds to the fully opened position of the door;

Fig. 2 is a view of Fig. 1 taken from the left;

Fig. 3 is a view similar to Fig. 1 showing the parts in the other extreme position corresponding to the closed position of the door, and

Fig. 4 is a view of Fig. 3 taken from the left.

The same reference numerals are applied to corresponding parts in these four views.

Referring to the drawing, the reference numerals 5 and 6 designate two members of an automobile door hinge, member 5 being the one attached to the body pillar by its shank portion 7 and member 6 being the one attached to the door pillar by means of its shank portion 8. A pintle 9 entered in registering holes 10 in a pair of spaced knuckles 11 provided on the outer end of member 5 is received with a working fit in a bearing hole 12 provided in the knuckle 13 that projects from the outer end of member 6 and is received between the knuckles 11 of member 5. The outer end portion 14 of member 5 is bent substantially at right angles to offset the knuckles 11 in relation to the attaching shank portion 7, and the members 5 and 6 are therefore in spaced parallel relation to one another when the door is closed, as illustrated in Fig. 3.

In accordance with our invention, a link 15 that is slotted longitudinally, as indicated at 16, is pivotally connected at one end to the hinge member 6 in a slot 17 intermediate the ends thereof, as indicated at 18. The free end portion of the link extends through a slot 19 provided in the other hinge member 5 intermediate the ends thereof and is slidably pivotally connected to that hinge member by means of a bolt 20 entered in the slot 16 and carried on the projecting end portion 21 of an L-shaped sheet metal bracket 22 that is secured by its other end portion 23 to the back of the hinge member 5 by means of a rivet 24. A single rivet is sufficient because the end portion 21 of the bracket 22 projects through the slot 19 and is thereby held against turning about the rivet 24 as a center, and also because the end 21 has surface to surface abutment with the link 15 and is thereby further held against pivotal movement relative to the rivet 24. A rectangular follower plate or shoe 25 is held by means of the bolt 20 in abutment with the other side of the link 15 and is spring-loaded to exert friction drag to resist sliding of the link 15 endwise between the plate 25 and the end portion 21 of the bracket 22, the spring-loading being obtained by a coiled compression spring 26 that surrounds the threaded end portion of the bolt 20 between the end portion 21 of the bracket 22 and a nut 27 threaded on the bolt. The nut 27 is held against turning by sliding engagement with the adjacent hinge member, as shown, and there is no likelihood of the bolt turning after it has been adjusted, because the spring keeps the bolt under tension. The link 15 is relatively thin throughout a major portion of its length, as indicated at 28 in Figs. 2 and 4, and is relatively thick throughout the remainder of its length, as indicated at 29, and tapered between these two portions, as indicated at 30, so that the link will slide smoothly, the tapered portion 30 serving to force the follower plate 25 away from the end portion 21 of the bracket enough to admit the thick portion 29 and thereby increase the compression of spring 26 to give the desired additional friction drag through the last 15° or so of door opening movement. If there is any tendency for the hold-open device to squeak, due to the rubbing friction of link 15 between the bracket 22 and plate 25, we may provide recesses in the bracket and plate, as indicated at 31, in which a small amount of semi-solid lubricant, containing graphite, is provided, to insure quiet operation without reducing the friction drag too much. On the other hand, the plate 25, and another plate provided on the other side of the link 15, between the link and bracket 22, may be provided of a special compressed powdered metal containing graphite to the requisite extent to give quiet frictional engagement. Obviously the spring 26 is subjected to appreciable further compression when the thick portion 29 of the link 15 slides between the plate 25 and the end portion 21 of the bracket 22 so that a much heavier friction drag is ex-

erted. When the door reaches the fully opened position the bent extremity 32 of the link comes into abutment with the back of the hinge member 5, thereby positively limiting the door opening movement without subjecting the bolt 20 to any wear and tear, the slot 16 being extended far enough, as indicated in Figs. 1 and 2, so that the bolt does not strike the end of the slot.

In operation, the nut 27 is adjusted at the automobile plant after the door is hung, the nut being then secured by its cotter pin in the adjusted position. Should there be sufficient wear on the link 15 and plate 25 to make it necessary to tighten the nut 27 a turn or so to compensate for this wear, it is a simple matter to remove the cotter pin and make such an adjustment and then replace the cotter pin to lock the nut in the adjusted position. When the door is being opened, there is no frictional drag noticeable in the first 45° or so of door opening movement, because the thin portion 28 of the link 15 is slidable more or less freely between the end portion 21 of the bracket 22 and the follower plate 25, due to the slight amount of compression of spring 26. However, throughout the last 15° or so of door opening movement the friction drag is sufficient to hold the door in any position throughout this range, the thick portion 29 of the link being disposed between the bracket and follower plate and subjected to a heavy friction drag as a result of the increased amount of compression of spring 26. When the door reaches the fully opened position the bent end portion 32 of the link 15 strikes the back of the hinge member 5 to limit movement, without relying upon the bolt 20 striking the end of the slot 16, although, of course, such a construction might also be considered practical.

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

We claim:

A hinge for a vehicle door comprising first and second elongated hinge members connected together at one end for relative pivotal movement through a predetermined angle, one of said hinge members being adapted to be mounted on a body pillar of the vehicle and the other adapted to be mounted on and for movement with the door pillar, said hinge members being disposed in side-by-side relation in the closed position of the door, an elongated longitudinally slotted link pivotally connected at one end to said first hinge member in radially spaced relation to the hinge axis, said second hinge member being provided with a slot in radially spaced relation to the hinge axis, said link passing through said slot, a projection on said second hinge member extending parallel with said link and adjacent one side thereof at the slot through which said link passes, a bolt extending through an aperture in said projection and passing through the slot in said link, a friction drag plate on said bolt abuttting said link at the side away from said projection, spring means on said bolt having one end thereof bearing against said projection and the opposite end reacting against a nut on said bolt and urging said bolt axially in the direction to cause said drag plate to frictionally resist sliding movement of said link between said drag plate and projection, a flat portion on said nut slidably engaging said second hinge member to prevent the nut from turning with the bolt, the end portion of said link opposite the pivotally connected end being relatively thick to effect a comparatively high degree of friction drag on said link when the movable one of said hinge members has been moved away from the other hinge member to a position corresponding to the open position of the door thereby retaining said movable hinge member and door in the open position, the remaining longitudinal portion of said link being relatively thinner thereby to effect a comparatively much lower degree of friction drag thereon exerted by said drag plate and projection for movement of said movable hinge member and door between the closed and open position.

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