

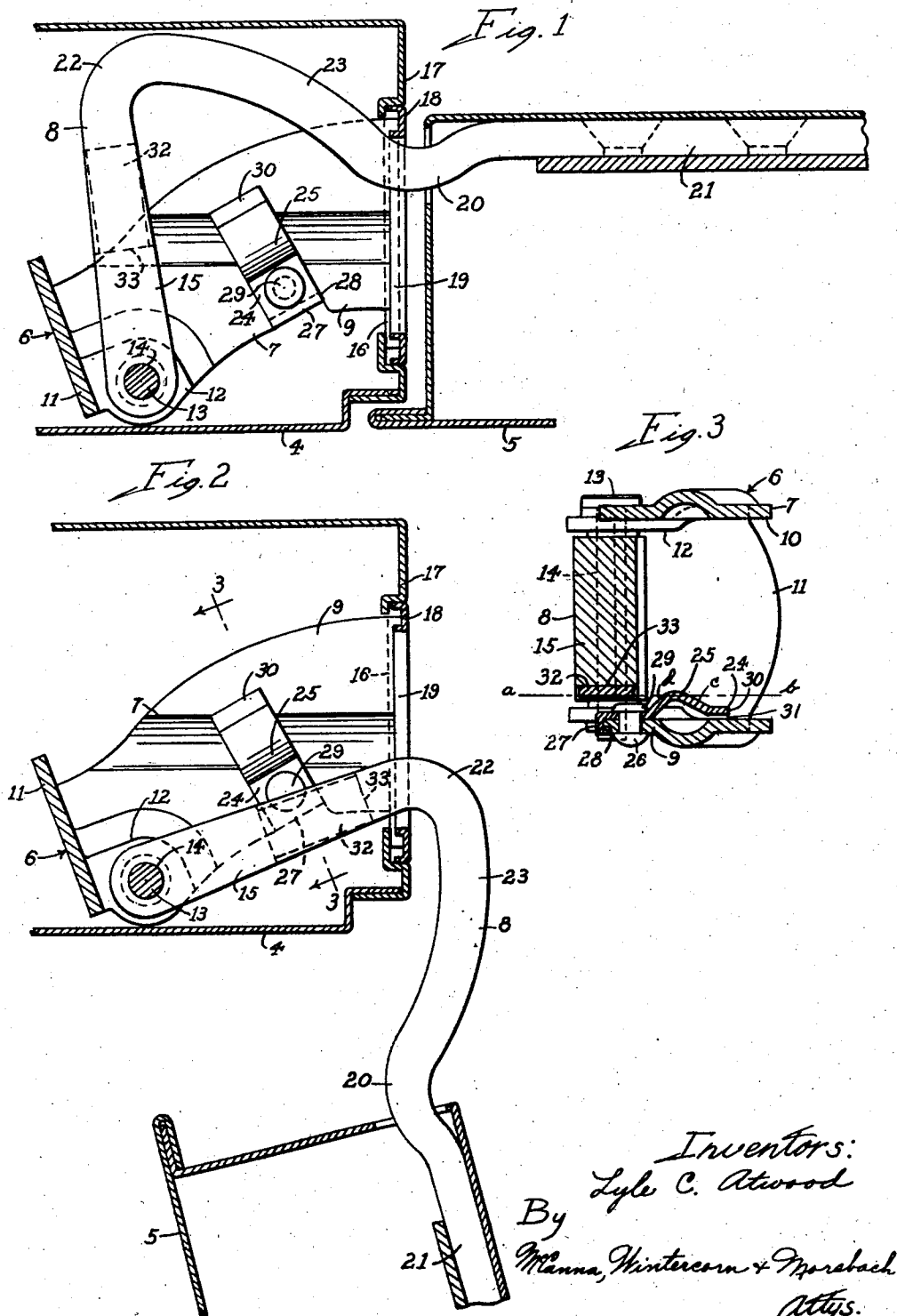
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AUTOMOBILE DOOR HINGE

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AUTOMOBILE DOOR HINGE

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3 Claims. (Cl. 16—135)

This invention relates to a new and improved hinge of the concealed type for use on the doors of motor vehicles.

The principal object of my invention is to provide a hinge embodying a simple and inexpensive although very effective means for releasably locking the door in fully open position against accidental closing, the means employed for this purpose being preferably of a form to act also to exert a frictional drag to resist movement of the door so that the full force of violent opening is not assumed by the conventional door check, which limits the opening movement as is well known.

Another object is to provide a resilient door stop or detent in the hinge proper for the purpose stated which consists of a bowed leaf-spring slidably engageable by the edge of the gooseneck hinge member, the hinge member having a hardened steel wear plate mounted in a recess in the edge thereof for sliding contact with the leaf-spring, whereby to minimize wear and make for long life. The leaf-spring which is carried on the other hinge member is preferably formed with a sharp rise on one side of the hump and a gentler rise on the other side, the spring being fastened at that end adjacent the sharp rise and so that the gooseneck hinge member rides up the gentle rise in the opening of the door and up the sharp rise in the closing of the door, the sharp rise affording a better detent or stop for the door to hold it open. The spring also has a right angle bent end portion on its attached end to abut the edge portion of the hinge member to hold the spring against turning relative to its fastening rivet and also assume end thrust incident to the closing of the door so that the rivet is relieved from shock and strain.

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

Fig. 1 is a horizontal section through an automobile door hinge embodying the resilient door stop of my invention, the door being shown closed with the gooseneck hinge member in spaced relation to the stop;

Fig. 2 is a horizontal section similar to Fig. 1, but showing the door opened so as to illustrate the operation of the door stop, and

Fig. 3 is a vertical sectional detail on the line 3—3 of Fig. 2.

The same reference numerals are applied to corresponding parts in the three views.

Referring to the drawing, 4 designates a portion of the body and 5 a portion of the door of an automobile hingedly mounted on the body by two or more hinges, one of which appears in sec-

tion at 6. The hinge shown comprises an outer member 7 and an inner member 8 mounted on the body and door, respectively. The outer member 7 is formed from sheet metal to a generally U-shaped cross-section so as to provide opposed substantially horizontal parallel walls 9 and 10 interconnected by a substantially vertical wall 11. The horizontal walls have embossed portions 12 forming supports for the pintle 13 received in a bearing hole 14 provided therefor in the enlarged end portion 15 of the inner hinge member 8. The walls 9 and 10 are also flanged outwardly as at 16 to provide attaching portions for bolting, riveting, or otherwise securing the outer hinge member 7 to the body pillar, a portion of which appears at 17. A sheet metal face plate 18 suitably welded to the attaching portions 16, is cut away as at 19 to provide operating clearance for the inner hinge member 8. The inner hinge member 8 has an offset portion 20 next to its attaching end portion 21 where it extends through the cut-out portion 19 of the plate 18, whereby to provide operating clearances for the gooseneck portion 22 when the door closes. The gooseneck portion 22 is next to the offset portion 20, and its radius is long enough so that the portion 23 clears the body pillar in the opening of the door, as appears in Fig. 2. The pintle end portion 15 provided on the other half of the gooseneck portion 22 is approximately at right angles to the attaching end portion 21, and the door 5 is accordingly free to swing through approximately 90° from closed to open position. A door check, not shown, of any suitable form, as for example one like that covered by Atwood Patent 2,148,674, is provided for limiting and cushioning the opening movement of the door. The door 5 is shown in Fig. 2 in approximately the extreme open position.

In accordance with my invention, a leaf-spring 24 having a bowed or generally V-shaped hump portion 25 intermediate the ends thereof is secured onto the inner side of one of the horizontal walls 9 and 10 of the outer hinge member 7 at a predetermined radial distance from the pintle 13 for slidable engagement with the edge of the inner or gooseneck portion 22 to be compressed as the door approaches its extreme open position, the hump being thereafter permitted to expand again to normal position so as to constitute a detent or stop to hold the door yieldingly in approximately its extreme open position and prevent accidental closing thereof. A single rivet 26 entered through registering holes in the leaf-spring and horizontal wall of the hinge member serves to fasten the leaf-spring in place, the spring having a right-

angle bent end 27 fitting in a notch 28 in the edge of the horizontal wall of the hinge member to hold the leaf-spring against turning about the rivet as a center. The bent end 27 furthermore assumes the greater end thrust when the inner hinge member 8 slides over the hump 25 in the closing of the door, thus relieving the rivet of strain and eliminating likelihood of the leaf-spring working loose in time. The flat head 29 on the inner end of the rivet, as clearly appears in Fig. 3, is well below the horizontal plane of operation of the lower edge of the inner hinge member 8, as indicated by the line *a—b*, so that the hinge member will not scrape thereon. The line *a—b* serves further to indicate the extent to which the hump 25 of the leaf-spring is subjected to deflection and compression from the sliding of the edge portion of the inner hinge member 8 over the same in the opening and closing of the door, while at the same time indicating to what extent the hump 25 projects into the plane of the hinge member 8 to serve as a stop to prevent accidental closing of the door when fully opened. The hump 25 has a gentle rise on one side *c* and a sharp rise on the other side *d* thereof, as clearly appears in Fig. 3, the sharp rise being on that side toward the rivet 26. In the opening of the door the inner hinge member 8 rides up the gentle rise *c*, whereas in the closing of the door it rides up the sharp rise *d*. This arrangement has a two-fold advantage. It provides the sharp rise *d* as a better detent or stop for the door and enables opening of the door with minimum drag and less end thrust on the leaf-spring than there is when the inner hinge member 8 rides up the sharp rise *d* in the closing of the door, the greater end thrust incident to the closing of the door being assumed both by the rivet 26 and the bent end 27. The free end portion 30 of the leaf-spring 24 is bent into substantially parallel relation to the adjacent wall 9 of the outer hinge member and disposed in slightly spaced relation to said wall, as indicated at 31 in Fig. 3, so that at least to a small extent the leaf-spring 24 is merely deflected downwardly when the edge portion of the inner hinge member 8 rides over the hump 25, the bent free end portion 30 having a sled runner action as it slides freely on the wall 9 in the deflection of the spring. In other words, the free end portion 30 of the leaf-spring must first bottom on the wall 9 before the hump is subjected to any compression or pinching between the edge portion of the hinge member 8 and the wall 9, and in that way the opening and closing of the door is not as much obstructed by the leaf-spring and it is not subjected to nearly as much wear and tear and will accordingly last indefinitely. A hardened steel wear plate 32 is set in a depression 33 provided therefor in the lower edge of the inner hinge member 8 and is preferably welded in place, although it may, of course, be fastened in any other suitable manner. This wear plate has the bottom surface thereof in the plane of the line *a—b* and therefore clears the flat head 29 of the rivet 26 in the swinging movement of the inner hinge member 8.

In operation, it will be understood from the foregoing description that as the door 5 is opened the inner hinge member 8 brings the wear plate 32 into sliding engagement with the side *c* of the hump portion 25 of the leaf-spring 24 when the door is about half way open, and it is during the latter half or less of the opening movement of the door that the inner hinge member 8 first deflects and then compresses the hump portion 25 in the

manner previously described. When the door is fully open, the wear plate 32 has moved past the hump 25 and may or may not have any actual contact with the side *d* of the hump, depending upon where the door check limits the opening movement of the door. Since the door check won't allow the door to open any farther and the door stop spring 24 holds the door against closing, it is clear that the door is held yieldingly in the fully open position. The stop spring 24 offers sufficient resistance to closing of the door so that there is no danger of its closing accidentally, and yet the operator does not have to exert much force on the free edge portion of the door to swing it to closed position, especially in view of the amount of leverage available at that point on the door in relation to the leaf-spring 24. The sliding action of the hinge member 8 relative to the leaf-spring 24 is substantially noiseless and not at all noticeable. The embodiment of the door stop in one or more of the hinges of the door in such a simple and inexpensive although thoroughly effective form is considered preferable to the embodiment of stop means in a door check, inasmuch as experience has shown that door stops of that type have not been generally as satisfactory and have moreover necessitated complicating the construction of the door checks to such an extent that the added cost of production of such door checks was substantially greater than what is involved where the door stop is embodied in the hinges in the manner herein disclosed.

It is believed the foregoing description conveys a good understanding of the objects and advantages of my invention. The appended claims have been drawn with a view to covering all legitimate modifications and adaptations properly coming within the scope of my invention.

I claim:

1. Detent means for use with a hinge comprising an outer hinge member and an inner hinge member pivotally connected together by a pintle, the outer hinge member having at least one wall in a plane in closely spaced substantially parallel relation to an edge portion of the inner hinge member, in relation to which said edge portion of said inner hinge member is movable in the pivotal movement of said hinge members relative to one another, said detent means comprising an elongated, longitudinally bent leaf spring secured to and compressible on said wall toward straightened form between the wall and the edge portion of the other hinge member by sliding engagement of said edge portion thereon, said spring being disposed in radially spaced relation to the pintle axis and being bent so as to provide a V-shaped hump portion intermediate the ends thereof the crown of which projects normally into the plane of movement of the edge portion of the other hinge member so as to be deflected thereby in the sliding engagement of said edge portion with said hump, a single fastener extending through one end portion of said leaf spring detent and through said wall to fasten the detent in place thereon, and an interfitting lug on the end of the detent and a notch in the wall in radially spaced relation to said fastener for preventing turning of the detent about the fastener as a center.

2. In combination, a hinge comprising an outer hinge member and an inner hinge member pivotally connected together by a pintle, the outer hinge member having at least one wall in a plane in closely spaced substantially parallel relation to

an edge portion of the inner hinge member, in relation to which said edge portion of said inner hinge member is movable in the pivotal movement of said hinge members relative to one another, and a leaf spring detent fastened at one end on said wall by a single rivet and disposed in radially spaced relation to the pintle axis and having a hump portion intermediate the ends thereof the crown of which projects normally into the plane of movement of the edge portion of the other hinge member so as to be deflected by sliding engagement of said edge portion lengthwise of said hump, one side of the hump having a relatively gentle rise but the other side toward the fastened end of the leaf spring having a relatively sharp rise, the latter side facing the edge portion of the other hinge member when the door is held by said hump in open position, and a lug on the fastened end portion of said leaf spring engaging a portion of said wall in radially spaced relation to the rivet to prevent turning of the leaf spring relative to the rivet as a center and to assume end thrust independently of the rivet incident to sliding engagement of the other hinge member on the hump in a direction away from the lug.

3. In combination, a hinge comprising an outer hinge member and an inner hinge member piv-

otally connected together by a pintle, the outer hinge member having at least one wall in a plane in closely spaced substantially parallel relation to an edge portion of the inner hinge member, in relation to which said edge portion of said inner hinge member is movable in the pivotal movement of said hinge members relative to one another, and a leaf spring detent on said wall in radially spaced relation to the pintle axis having a hump portion intermediate the ends thereof the crown of which projects normally into the plane of movement of the edge portion of the other hinge member so as to be deflected thereby in the sliding engagement of said edge portion with said hump, a single fastener extending through one end portion of said leaf spring detent and through said wall to fasten the detent in place thereon, said wall having an opening provided therein in radially spaced relation to the fastener, and a lug on the end portion of said leaf spring detent adjacent the fastener projecting into said opening to prevent turning of the detent relative to the fastener as a center and to assume end thrust independently of the fastener incident to sliding engagement of the other hinge member on the hump portion of said leaf spring detent.

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