

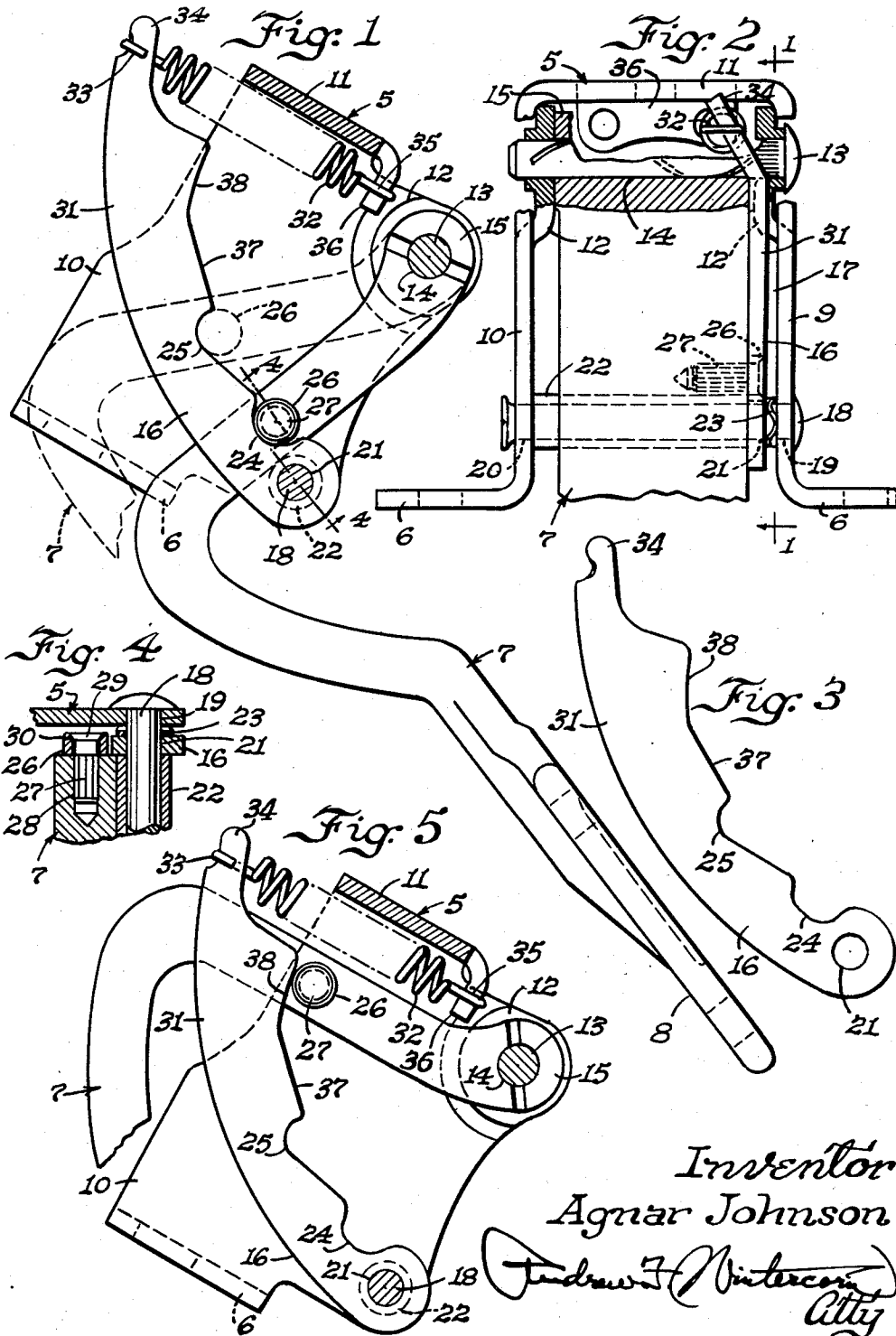
May 3, 1960

A. JOHNSON

2,934,783

AUTOMOBILE DOOR HINGE

Filed Oct. 7, 1954



1

2,934,783

AUTOMOBILE DOOR HINGE

Agnar Johnson, Rockford, Ill., assignor to Atwood Vacuum Machine Company, Rockford, Ill., a corporation of Illinois

Application October 7, 1954, Serial No. 460,977

4 Claims. (Cl. 16—146)

This invention is concerned with improvements upon the hinge disclosed in my copending application, Serial No. 98,575, filed June 11, 1949, which resulted in Patent No. 2,707,302, issued May 3, 1955.

The hinge of said copending application embodies a hold-open device designed to prevent accidental closing once the door is fully opened, and designed also to serve as an assist, both in opening and closing, the assist action coming into play after the door passes the mid-point moving in either direction. The present hinge has the same general construction but is improved in the following four respects:

(1) a hold-open action is obtainable both in a half-open and in the fully open position, so that when the door is operated in more or less cramped quarters, as in a parking lot, or in a garage, the door can be held open in the half-open position to provide an added convenience for which there has long been a real need;

(2) the follower projection on the inner hinge member which operates on the spring pressed arm to provide the hold-open and assist actions is provided with an anti-friction roller to make for easier and smoother as well as quieter operation, and less wear and tear and hence greater durability;

(3) the spring-pressed arm which cooperates with the follower on the inner hinge member is profiled so as to provide a rise on the end portion of the cam surface which comes into play as the door approaches closed position, whereby a snubbing or shock absorbing action is obtained which tends to reduce the noise as well as the shock and jar incident to closing the door, and

(4) the spring-pressed arm is pivoted on a pin extending through the top and bottom walls of the outer hinge member, and a sleeve is carried on this pin as a bearing support for the arm, there being also a spring washer on the pin bearing on the other side of the arm to maintain it in a plane in a precise closely spaced relationship to the edge of the inner hinge member, so that the arm will not rub on said hinge member and interfere with easy door movement, the sleeve and pin together serving also as a stop engaged by the inner hinge member at the limit of door opening movement.

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

Fig. 1 is a sectional view of an automobile door hinge embodying the improvements of my invention, taken on line 1—1 of Fig. 2, and showing the inner hinge member in full lines in the fully opened position, and in dotted lines in the half-open position;

Fig. 2 is a side view of Fig. 1 taken from the left-hand side serving to better illustrate the construction;

Fig. 3 is an isolated plan view of the spring-pressed cam lever or arm;

Fig. 4 is a sectional detail taken on line 4—4 of Fig. 1, and

Fig. 5 is a view similar to Fig. 1, showing the inner hinge member in closed position.

2

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

Referring to the drawing, the automobile door hinge shown is of the well-known concealed type, similar to that of Harmon Patent No. 2,322,933, and comprises an outer cage member 5 that is adapted to be mounted by means of its attaching flanges 6 on the door pillar on the body, and a gooseneck-shaped inner member 7 mounted on the door by means of its attaching end portion 8. The outer cage member 5 is formed from sheet metal to a generally U-shaped cross-section so as to provide opposed, substantially parallel, horizontally extending walls 9 and 10, connected by a substantially vertical wall 11. The horizontal walls 9 and 10 have embossed portions 12 forming supports for the pintle 13 which is received in a bearing hole 14 provided therefor in the enlarged end portion 15 of the inner hinge member 7.

In accordance with my invention, a hook member 16 is provided in the form of a lever or arm which can be punched from sheet metal at low cost but is preferably case-hardened to reduce wear to a minimum and is disposed in the space 17 between the upper wall 9 of the outer hinge member 5 and the upper edge of the inner hinge member 7, as clearly appears in Fig. 2. Hook member 16 is pivoted at one end on a pin 18 that is disposed in radially spaced parallel relationship to the pintle 13 and extends through registering holes 19 and 20 in walls 9 and 10 and a registering hole 21 provided in the pivoted end of the hook member and through a sleeve 22 disposed under the hook member and also through a wavy spring washer 23 disposed in slightly compressed condition above the hook member between it and the top wall 19, whereby said hook member 16 is supported with freedom to oscillate with respect to the outer hinge member 5 in the horizontal plane of the upper edge of the inner hinge member 7 but is supported by the spacer sleeve 22 just above the hinge member 7 so as not to slide on the upper edge of said hinge member, although held by the spring washer 23 in as close relationship to the upper edge thereof as possible. The sleeve 22 and pin 18 together constitute a stop for abutment by the inner hinge member 7 when the door reaches fully opened position. The hook member 16 has two notches provided in longitudinally spaced relation in one longitudinal edge portion thereof, as shown at 24 and 25, and a roller 26 mounted on a pin 27 set in a hole 28 spaced radially from the pintle 13 and provided in the upper edge portion of the inner hinge member 7 is arranged to engage in either of these notches, as indicated in full and dotted lines in Fig. 1, to hold the door fully opened, as shown in full lines in Fig. 1, or about half-way open, as shown in dotted lines in Fig. 1. The upper end of the pin 27 has a flared portion 29, as indicated in Fig. 4, and this portion cooperates with a chamfer 30 in the outer end of the hole in the roller 26 to retain the roller on the pin. The hook member 16 has an unnotched arm portion 31 extending outwardly from the notched portion. A coiled tension spring 32 is attached at one end 33 to a lug 34 on the arm 31 and at its other end 35 to a lug 36 on the cage 5, and urges the hook member 16 in a clockwise direction, as viewed in Figs. 1 and 5, into abutment with the roller 26. The smooth straight edge 37 on portion 31 extending outwardly from the outer one of the two notches an appreciable distance, terminates in an angular "rise" portion 38 upon which the roller 26 runs when the door closes, as shown in Fig. 5, so that a snubbing or shock absorbing action is obtained tending to reduce the noise and the shock and jar incident to closing the door. The spring 32 has a certain preload stretch, as indicated in

3

Fig. 1, and is stretched further when the door is closed, as shown in Fig. 5.

In operation, the spring 32, it will be understood, keeps the hook member 16 resiliently engaged at all times with the roller 26, the spring pressure varying somewhat according to the position of the roller with respect to the hook member. However, the resistance offered to movement of the door depends to a large extent upon the position of the roller 26 and the leverage effective at that particular position. Thus, while the spring pressure in the fully opened and half opened positions is approximately the same, there being approximately the same stretch of the spring 32 in those two positions, it requires more force applied to the door to close it when it is in the fully opened position than when it is in the half opened position, because the spring 32 acts through so much more leverage in the fully opened position than in the half opened position, as can readily be appreciated by a study of Fig. 1. It will be seen that the spring 32 is stretched to its maximum extent when the roller 26 is at the midpoint of the member 16 engaging edge 37, and is stretched to its minimum extent when roller 26 is at either end of member 16. The parts are on dead-center when roller 26 is at the midpoint and spring 32 tends to assist the door opening movement when the roller 26 moves from this dead-center position toward notches 24 and 25, and also tends to assist door closing movement when the roller 26 moves from dead-center position toward the inclined end 38. Spring 32 works through minimum leverage at the commencement of door opening movement, as appears in Fig. 5, the member 16 resisting rather lightly the opening movement of the door up to the midpoint but from that point on the member 16 assists the opening movement with gradually increasing force. On the other hand, when the door is in the half opened position indicated in dotted lines in Fig. 1, as when the car is parked in a parking lot or is standing in a garage, a perceptible assist action is obtained in closing the door, this assist action being noticeable immediately after the resistance to closing afforded by notch 25 has been overcome, and yet, if the operator should apply more than the necessary amount of force in closing the door, that assist action will not cause the door to be slammed too violently, inasmuch as the rise 38 up which the roller 26 must run as the door approaches the closed position provides a snubbing or shock absorbing action.

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. In combination, a hinge comprising a generally U-shaped outer member, and an inner member having a gooseneck-shaped portion pivoted on a pintle disposed at right angles to and supported on the arms of said U-shaped member, said inner hinge member having parallel top and bottom edges, there being a space left between one of said edges of said inner hinge member and an adjacent arm of said outer hinge member, said inner hinge member having a projection spaced radially from said pintle on the aforesaid edge of its gooseneck portion and being movable from one extreme position to another through an angle of approximately 90°, an elongated hook member disposed in said space, said hook member being pivoted at one end on one arm of said outer hinge member for engagement on one longitudinal edge between the ends thereof by said projection and oscillation in a plane parallel to the aforesaid edge of said inner hinge member and the adjacent arm of said outer hinge member, and spring means urging the hook member into engagement with said projection on said inner hinge member, the pivot for said hook member being provided by a cross-pin that extends through and is supported at its

4

opposite ends on the arms of said U-shaped outer hinge member, said pin being spaced radially from said pintle and arranged in the path of movement of the inner hinge member and acting as a positive stop to limit movement of the inner hinge member at one extreme position.

2. In combination, a hinge comprising a generally U-shaped outer member, and an inner member having a gooseneck-shaped portion pivoted on a pintle disposed at right angles to and supported on the arms of said U-shaped member, said inner hinge member having parallel top and bottom edges, there being a space left between one of said edges of said inner hinge member and an adjacent arm of said outer hinge member, said inner hinge member having a projection spaced radially from said pintle on the aforesaid edge of its gooseneck portion and being movable from one extreme position to another through an angle of approximately 90°, an elongated hook member disposed in said space, said hook member being pivoted at one end on one arm of said outer hinge member for engagement on one longitudinal edge between the ends thereof by said projection and oscillation in a plane parallel to the aforesaid edge of said inner hinge member and the adjacent arm of said outer hinge member, and spring means urging the hook member into engagement with said projection on said inner hinge member, the pivot for said hook member being provided by a cross-pin that extends through and is supported at its opposite ends on the arms of said U-shaped outer hinge member, said pin being spaced radially from said pintle and arranged in the path of movement of the inner hinge member and acting as a positive stop to limit movement of the inner hinge member at one extreme position, there being a spacer sleeve surrounding said pin and abutting at its one end one of the arms of said U-shaped outer hinge member and at its other end abutting said hook member and providing bearing support therefor adjacent the other arm of said U-shaped outer hinge member.

3. In combination, a hinge comprising a generally U-shaped outer member, and an inner member having a gooseneck-shaped portion pivoted on a pintle disposed at right angles to and supported on the arms of said U-shaped member, said inner hinge member having parallel top and bottom edges, there being a space left between one of said edges of said inner hinge member and an adjacent arm of said outer hinge member, said inner hinge member having a projection on the aforesaid edge of its gooseneck portion and being movable from one extreme position to another through an angle of approximately 90°, an elongate hook member disposed in said space, said hook member being pivoted at one end on one arm of said outer hinge member for engagement on one longitudinal edge between the ends thereof by said projection and oscillation in a plane parallel to the aforesaid edge of said inner hinge member and the adjacent arm of said outer hinge member, and spring means urging the hook member into engagement with said projection on said inner hinge member, the pivot for said hook member being provided by a cross-pin that extends through and is supported at its opposite ends on the arms of said U-shaped outer hinge member, said pin being arranged in the path of movement of the inner hinge member and acting as a positive stop to limit movement of the inner hinge member at one extreme position, there being a spacer sleeve surrounding said pin and abutting at its one end one of the arms of said U-shaped outer hinge member and at its other end abutting said hook member and providing bearing support therefor adjacent the other arm of said U-shaped outer hinge member, and there being also a compressible spring washer surrounding said pin and compressed between the last mentioned arm of said U-shaped outer hinge member and said hook member, holding said hook member resiliently engaged with the end of said sleeve and the sleeve resiliently engaged with the first mentioned arm of said U-shaped outer hinge member.

5

4. In combination, a hinge comprising a generally U-shaped outer member, and an inner member having a gooseneck-shaped portion pivoted on a pintle disposed at right angles to and supported on the arms of said U-shaped member, said inner hinge member having parallel top and bottom edges, there being a space left between one of said edges of said inner hinge member and an adjacent arm of said outer hinge member, said inner hinge member having a projection spaced radially from said pintle on the aforesaid edge of its gooseneck portion and being movable from one extreme position to another through an angle of approximately 90°, an elongated hook member disposed in said space, said hook member being pivoted at one end on one arm of said outer hinge member for engagement on one longitudinal edge between the ends thereof by said projection and oscillation in a plane parallel to the aforesaid edge of said inner hinge member and the adjacent arm of said outer hinge member, and spring means urging the hook member into engagement with said projection on said inner hinge member, the pivot for said hook member being provided by a cross-pin that extends through and

6

is supported at its opposite ends on the arms of said U-shaped outer hinge member, said pin being spaced radially from said pintle and arranged in the path of movement of the inner hinge member and acting as a positive stop to limit movement of the inner hinge member at one extreme position, the longitudinal edge of said hook member having a notch provided therein near the pivoted end to receive said projection and releasably hold said inner hinge member in what corresponds to the fully opened position of a door with the inner hinge member at the limit of its movement stopped by said pin.

References Cited in the file of this patent

UNITED STATES PATENTS

15	597,480	Fellows	Jan. 18, 1898
	1,357,655	Sandell	Nov. 2, 1920
	1,620,512	Bourgon	Mar. 8, 1927
	1,694,764	Beringer	Dec. 11, 1928
	2,313,582	Rees	Mar. 9, 1943
20	2,314,416	Muldoon	Mar. 23, 1943
	2,335,201	Ulrich	Nov. 23, 1943
	2,683,447	Pollock	July 13, 1954