Oct. 20, 1964 E. R. GIONET 3,153,260

CLOSURE HINGE

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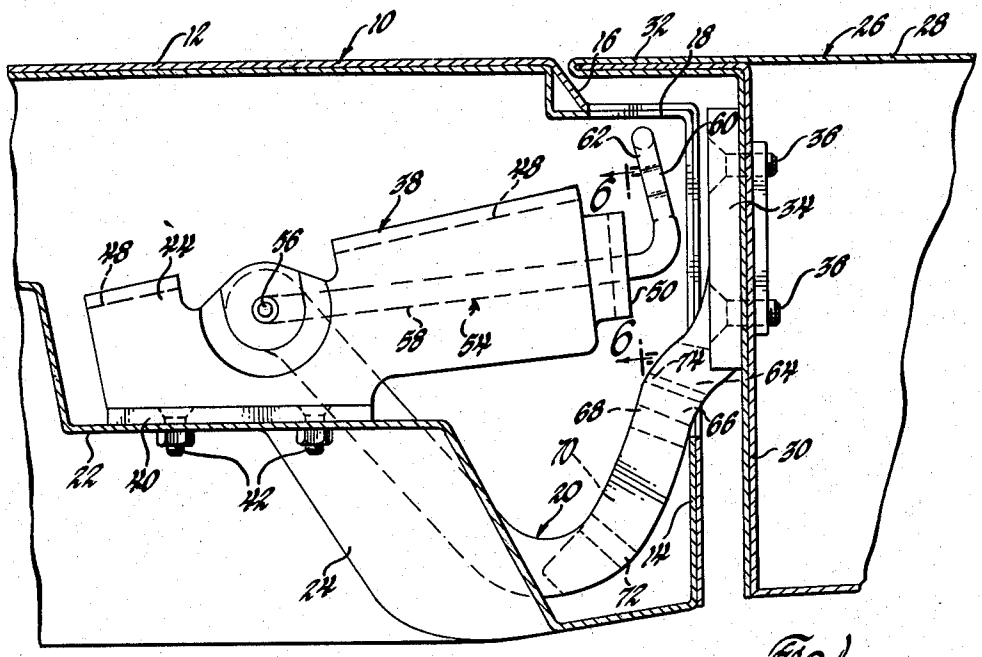


Fig. 1

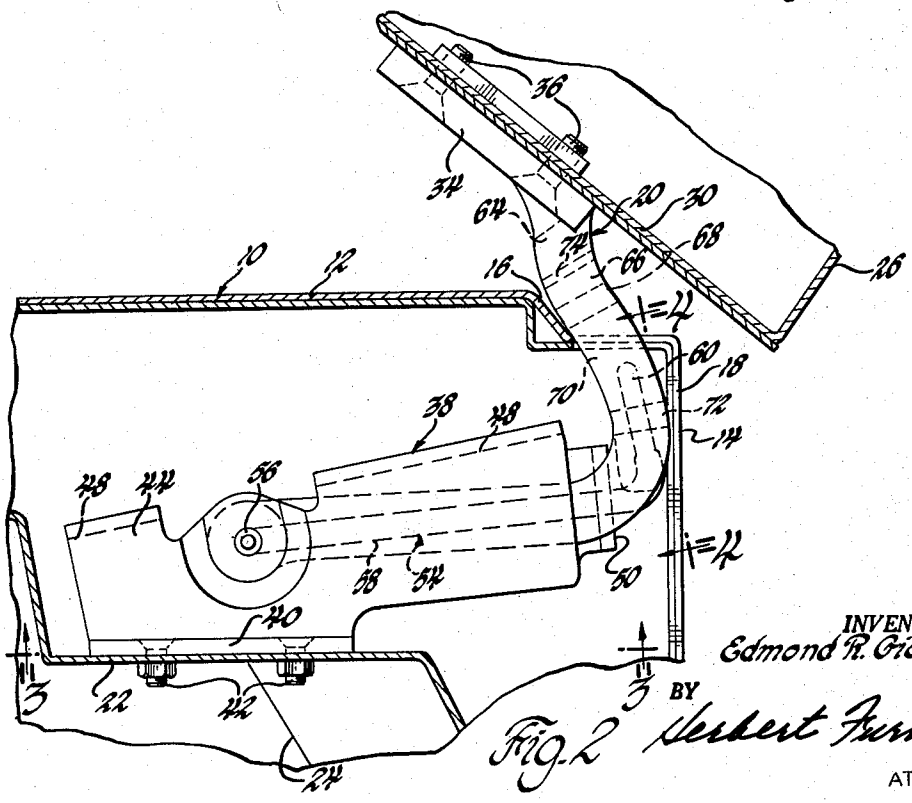


Fig. 2

INVENTOR.
Edmond R. Gionet
BY
Herbert Furman
ATTORNEY

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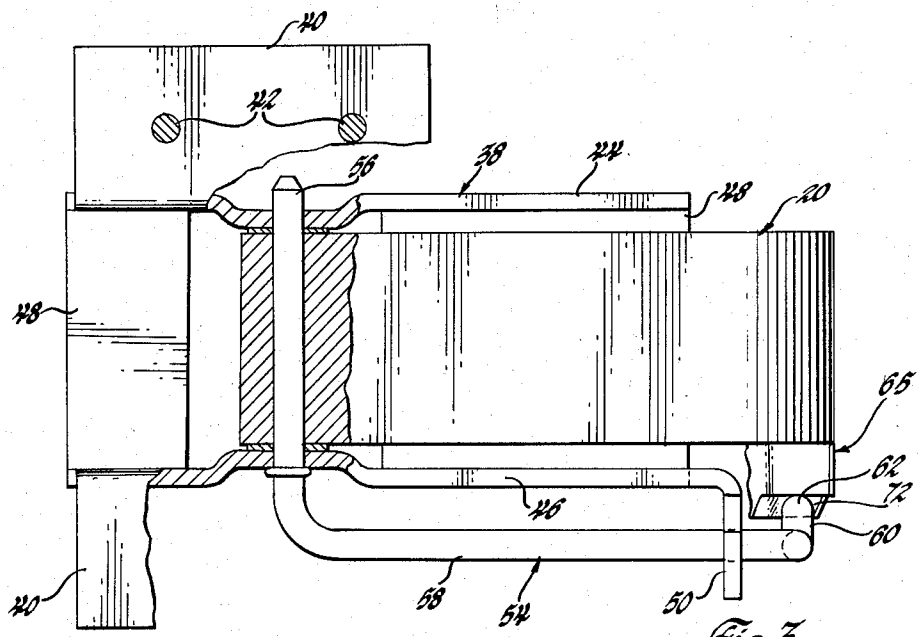


Fig. 3

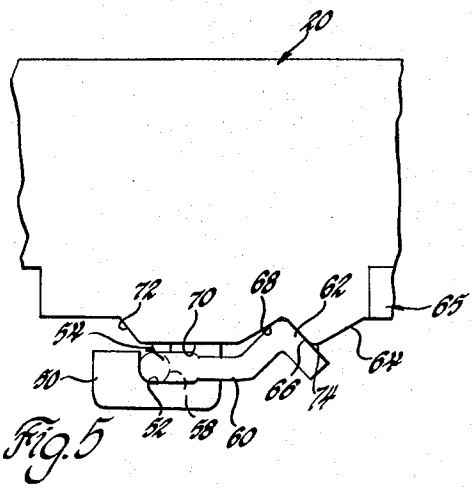


Fig. 5

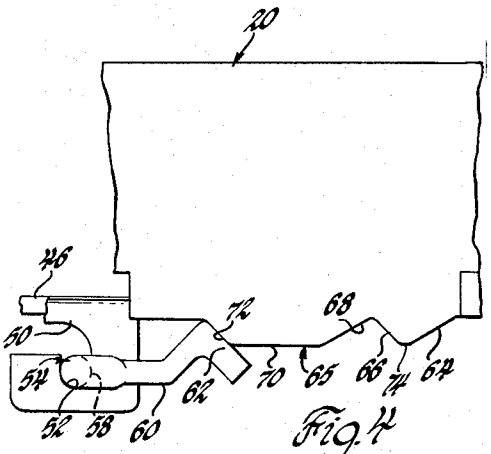


Fig. 4

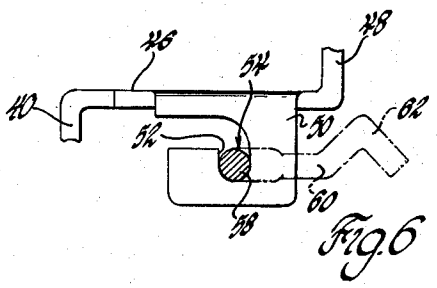


Fig. 6

INVENTOR.
Edmond R. Gionet

BY
Herbert Furman

ATTORNEY

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CLOSURE HINGE

Edmond R. Gionet, Detroit, Mich., assignor to General Motors Corporation, Detroit, Mich., a corporation of Delaware

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This invention relates to closure hinges and more particularly to a closure hinge and hold open.

The hinge and hold open of this invention is of very simple construction and yet provides a hinge for mounting a vehicle door on a vehicle body support member and also provides a multi-stage hold open for releasably holding the door in a plurality of open positions. In the preferred embodiment of the invention, a pair of relatively movable hinge members are respectively secured to a vehicle body support member and a vehicle door. A resilient rod includes a first leg which pivotally interconnects the hinge members to provide the hinge pivot and a second leg extending generally laterally to the first leg and parallel to the path of swinging movement of the hinge members. The stationary hinge member includes a notched portion which receives the second leg of the rod so as to hold the rod stationary during movement of the hinge members relative to each other. The second leg further includes a lateral end portion having a shoulder located in the path of swinging movement of the movable hinge member. The movable hinge member includes a plurality of spaced notches on the edge thereof, with each notch being defined by cam ramp surfaces. The shoulder of the rod is out of engagement with the movable hinge member in the closed position of the door. Upon opening movement of the door, this shoulder will engage one of the cam ramps of the movable hinge member so as to twist the second leg and end portion of the rod relative to the first leg as the shoulder of the rod moves along the cam ramp surface and into engagement with a notch of the movable hinge member to provide a first stage hold open. Thereafter, upon further opening movement of the door, the second leg and end portion of the rod are again twisted as the shoulder of the rod moves out of engagement with the first notch and into engagement with the next successive notch to provide a second stage hold open in the fully open position of the door. As many notches may be provided as desired to provide a single or multi-stage hold open for the hinge.

The primary object of this invention is to provide an improved vehicle closure hinge and multi-stage hold open. A further object of this invention is to provide an improved closure hinge and multi-stage hold open wherein a single resilient member provides both the hinge pivot and the hold open, with this member being secured to one of a pair of relatively movable hinge members for movement therewith and including means cooperating with the other hinge member to provide a hold open. A further object of this invention is to provide an improved hinge and hold open which includes a rod member having one leg thereof providing the hinge pivot, and the other leg thereof extending laterally thereto and generally parallel to the path of swinging movement of the hinge members, with the other leg including means cooperating with one of the hinge members to provide the hold open and being torsionally movable relative to the one leg during engagement and disengagement of the cooperating means.

These and other objects of the invention will be readily apparent from the following specification and drawings wherein:

FIGURE 1 is a sectional view of a vehicle body including a body support member and a closure swingably

mounted thereon by a hinge and hold open according to this invention, with the closure being shown in closed position;

FIGURE 2 is a view similar to FIGURE 1 showing the closure in open position;

FIGURE 3 is a view taken generally along the plane indicated by line 3—3 of FIGURE 2;

FIGURE 4 is a view taken generally along the plane indicated by line 4—4 of FIGURE 2 and showing the second stage hold open in the fully open position of the closure;

FIGURE 5 is a view similar to FIGURE 4 showing the first stage hold open in a partially open position of the closure; and

FIGURE 6 is a view taken generally along the plane indicated by line 6—6 of FIGURE 1.

Referring now particularly to FIGURE 1 of the drawings a vehicle body support member 10, such as a body pillar, includes an outer wall 12 of multiple thickness metal which is integral with an end wall 14. Wall 12 includes a rabbeted portion 16 adjacent the juncture of this wall with wall 14, with a slot 18 being provided in the rabbeted portion 16 and end wall 14 to allow movement of a gooseneck type male hinge member 20 relative to these walls. The inner member walls 12 and 14 provides the inner wall 22 of support member 10, with this wall including an embossment 24 receiving the hinge member 20 in the closed position of the door.

A vehicle door 26 includes an outer wall 28, and an end wall 30 located in juxtaposed relationship to the wall 14 in the closed position of the door, as shown in FIGURE 1, with door 26 further including a laterally extending flange 32 received within the rabbeted portion 16 in the closed position of the door.

The hinge member 20 includes a mounting flange 34 bolted at 36 to the end wall 30 of door 26. The other end of the hinge member 20 is pivotally supported on the member 10 by a female hinge member or box 38 of generally U-shaped construction and including a pair of mounting flanges 40 bolted at 42 to the wall 22 of member 10. The upper and lower walls 44 and 46, respectively, of the hinge box are interconnected by spaced webs 48, with the lower wall 46 further including a downwardly extending bent tab 50 provided with a notch 52. A generally L-shaped resilent rod or member 54 includes a first leg 56 which extends through aligned openings in the hinge box 38 and the hinge member 20 to provide the hinge pivot. A second leg 58 of member 54 is located laterally to the leg 56 and generally parallel to the path of swinging movement of the hinge members 20 and 38. The outer end of the leg 58 is received within the notch 52, as shown in FIGURE 6 so that the member 58 is held stationary by the hinge box 38 during movement of the hinge member 20 relative to both the hinge box and the rod. The outer end of the member 58 includes a lateral extension 60 which is bent so as to form an upwardly extending shoulder 62 thereon. The shoulder 62 is located in the path of swinging movement of the lower edge of the hinge member 20 and is out of engagement with the hinge member 20 in the closed position of the door 26, as shown in FIGURE 1.

Upon initial opening movement of the door 26, the hinge member 20 will swing outboard of the body or counterclockwise, as viewed in FIGURE 1. Upon initial opening movement of the door 26, a cam ramp surface 64 of a lug 65 on the lower edge of the hinge member 20 will engage the shoulder 62 to cause this shoulder to ride downwardly along the ramp 64 and be received within a notch 66 immediately adjacent the ramp 64 to provide a first stage hold open. During this movement of the shoulder 62 along the ramp 64, the extension 60 and leg 58 of member 54 will twist as a unit relative

to the leg 56, as the leg 58 rotates within the notch 52, this notch preventing any lateral movement of the leg 58 to the leg 56.

Thereafter, upon further opening movement of the door 26, a cam ramp surface 68 which defines one side of the notch 66 will again cause the extension 60 and leg 58 to twist relative to the leg 56 as the shoulder 62 moves downwardly along this cam ramp surface and into engagement with a flat surface 70. The extension 60 and leg 58 remain in twisted position until the door 26 has moved to a fully open position wherein the shoulder 62 will then move upwardly and into engagement with a cam ramp surface 72 to provide a second stage hold open in the fully open position of the door 26.

It is believed that the movement of the member 54 relative to the hinge member 20 during closing movement of the door 26 will be apparent from the foregoing description.

It will also be noted that the extension 60 and leg 58 are in an untwisted or free position only when the shoulder 62 engages the notch 66, the ramp surface 72 or when the door is in a fully closed position. It will also be noted that a lead in-lead out short flat surface 74 is provided immediately adjacent the ramp 64. This prolongs the useful life of the rod on member 54. The engagement of the shoulder 62 with the surface 70, intermediate the positive first stage and second stage hold opens, can also be said to provide a hold open since the leg 58 and extension 60 are in a twisted position during this engagement and will frictionally hold the door in this intermediate position, depending, of course, on the inclination of the hinge axis and the weight of the door 26.

Thus, this invention provides a new and improved hinge and multistage hold open.

What is claimed is:

1. A hinge and hold open comprising, in combination, a hinge box member including at least one wall, a hinge arm member adapted to be pivotally connected to said box for swinging movement relative to said wall between open and closed positions, a generally L-shaped resilient member having one leg thereof pivotally connecting said hinge members and the other leg thereof extending generally parallel to the path of swinging movement of said arm member and being torsionally movable about its axis, said other leg including first detent shoulder means, means on said hinge box member securing said other leg thereto and permitting said torsional movement thereof about its axis, second detent shoulder shoulder means on said hinge arm member, movement of said hinge arm member relative to said hinge box member to open position causing said second detent shoulder means to engage said first detent shoulder means and twist said other leg about its axis as said detent shoulder means move relative to each other into opposite engagement to provide a releasable hold open, said other leg being untwisted while said first shoulder means is in said opposite engagement with said second shoulder means.

2. A hinge and hold open comprising, in combination, a hinge box member including at least one wall, a hinge arm member located to one side of said wall and

adapted to be pivotally connected to said box for swinging movement relative to said wall between open and closed positions, a generally Lshaped resilient member having one leg thereof pivotally connecting said hinge members and the other leg thereof located to the other side of said wall and extending generally parallel to the path of swinging movement of said hinge arm member and being torsionally movable about its axis, said other leg including first detent shoulder means, means on said hinge box member securing said other leg thereto and permitting torsional movement thereof about its axis, spaced second and third detent shoulder means on said hinge arm member providing a detent notch, movement of said hinge arm member relative to said hinge box member toward open position causing said second detent shoulder means to engage said first detent shoulder means and twist said other leg about its axis as said first and second detent shoulder means move relative to each other and said first shoulder means moves into engagement with said notch to provide a releasable hold open, said other leg being untwisted while said first shoulder means is in engagement with said notch.

3. A hinge and hold open according to claim 2 wherein further movement of said hinge arm member relative to said hinge box member toward open position causes said third detent shoulder means to engage said first detent shoulder means and twist said other leg about its axis as said first and third detent shoulder means move relative to each other into opposite engagement to provide a releasable hold open, said other leg being untwisted while said first shoulder means is in said opposite engagement with said third shoulder means.

4. A hinge and hold open comprising, in combination, a pair of hinge members, one being movable relative to the other between open and closed positions, a resilient member having one end thereof secured to said other hinge member and including a portion having an axis extending generally parallel to the path of swinging movement of said one member, said portion being twistable about said axis and including first detent shoulder means adjacent a terminal end thereof, second detent shoulder means on said one hinge member, movement of said one hinge member relative to said other hinge member to open position causing said second detent shoulder means to engage said first detent shoulder means and twist said portion about said axis as said first and second detent shoulder means move relative to each other into opposite engagement to provide a releasable hold open, said portion being untwisted while said first detent shoulder means is in said opposite engagement with said second detent shoulder means.

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