April 2, 1957 S. J. GALLA 2,787,019

DOOR CHECKING AND HOLDING DEVICE

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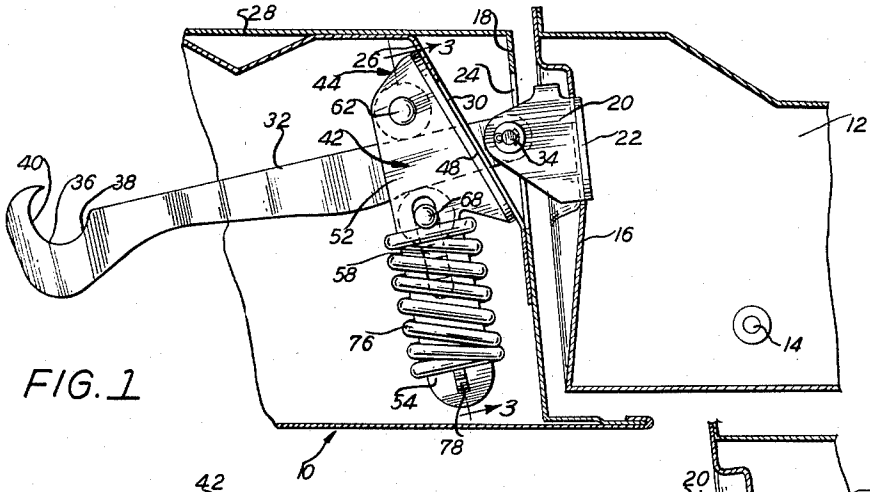


FIG. 1

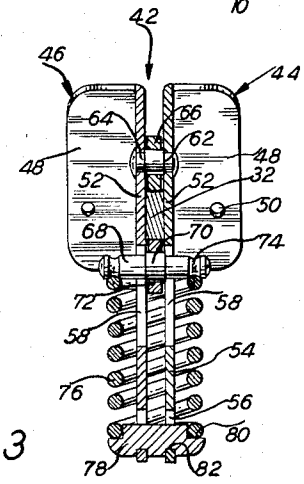


FIG. 3

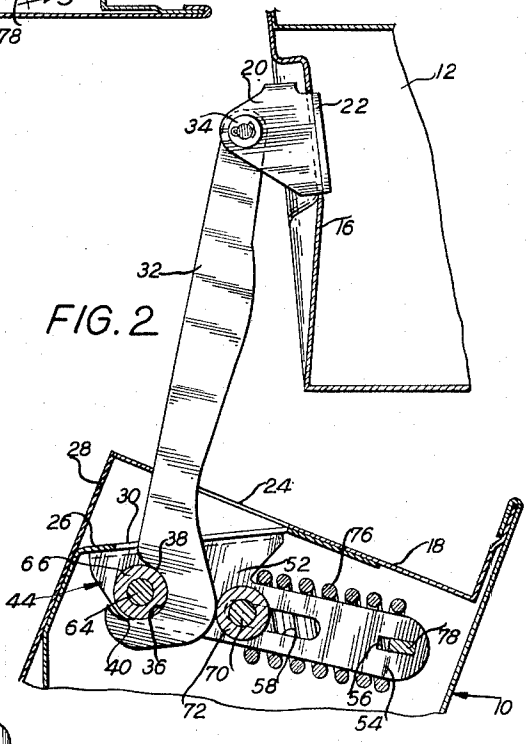


FIG. 2

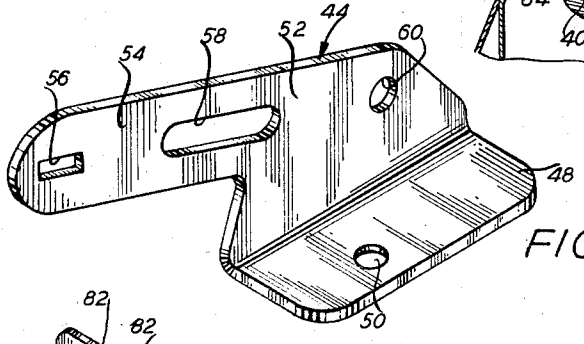


FIG. 4

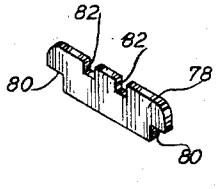


FIG. 5

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DOOR CHECKING AND HOLDING DEVICE

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3 Claims. (Cl. 16—85)

This invention relates generally to door checking and holding devices for motor vehicle doors, and constitutes an improvement of the structure disclosed in copending application Serial No. 255,054, filed by H. F. Cromwell and S. J. Galla November 6, 1951, now Patent No. 2,693,616, dated November 9, 1954.

It is an object of the present invention to provide a door checking and holding device which is positive in operation and inexpensive to manufacture and assemble. According to the present invention a simple two-piece bracket is provided to support a fixed roller and a spring urged movable roller for cooperation with a one-piece check arm. The two-piece bracket is formed of complementary sections assembled to each other to form a unit, the means of assembly including parts performing other functions as well and consequently contributing toward an economical structure.

Other objects and advantages of this invention will be made more apparent as this description proceeds, particularly when considered in connection with the accompanying drawing, wherein:

Figure 1 is a horizontal cross sectional view through a portion of the vehicle door and the adjacent door pillar, showing the door checking and holding mechanism of the present invention.

Figure 2 is a view similar to Figure 1, but partly broken away and in section and showing the door in its open position.

Figure 3 is an enlarged cross sectional view taken on the plane indicated by the line 3—3 of Figure 1.

Figure 4 is a perspective view of one section of the supporting bracket.

Figure 5 is a perspective view of the retainer.

The reference character 10 indicates a motor vehicle door hinged to the adjacent body pillar 12 for pivotal movement about a hinge axis 14. Conventional hinge means can be used and are not shown in this drawing. The wall 16 of the pillar adjacent the jamb face 18 of the door is depressed and is provided with an opening through which extends a U-shaped bracket 20 having a base 22 suitably secured to the pillar wall 16. The bracket 20 also extends through an opening 24 in the jamb face 18 of the door in the closed position of the latter as shown in Figure 1.

A reinforcing member 26 is located within the door 10 and is secured to the inner panel 28 of the door and also the jamb face 18. The reinforcing member is provided with an opening 30 in alignment with the opening 24 in the jamb face.

A flat one-piece check arm 32 is pivotally connected by means of a pin 34 to the bracket 20 carried by the pillar 12. The check arm extends through the opening 30 in the reinforcing member 26 and projects into the interior of the door 10. Adjacent its free end the check arm 32 is formed with a notch 36 having a retaining portion 38 and a checking ramp portion 40. As thus far described, the construction is similar to that shown in copending application Serial No. 255,054, filed November 6, 1951,

by H. F. Cromwell and S. J. Galla, now Patent No. 2,693,616, dated November 9, 1954.

Secured to the inner side of the reinforcing member 26 is a supporting bracket assembly indicated generally at 42 and including complementary shaped brackets 44 and 46. With reference now to Figure 4, the bracket 44 is formed with a base 48 adapted to be welded to the reinforcing member 26 of the door and formed with a hole 50 for locating purposes. The body portion 52 of the bracket is bent at right angles to the base 48 and integrally merges into a strut portion 54 inclined upwardly and outwardly away from the base 48. The strut portion 54 is formed with an elongated rectangular opening 56 adjacent the end thereof and with an elongated slot 58 in alignment with the rectangular opening 56 but spaced therefrom. The body portion 52 is formed with a hole 60 therethrough in alignment with the slots 56 and 58.

The bracket 46 is identical to the bracket 44 except that its base 48 extends in the opposite direction, as clearly shown in Figure 3.

Referring again to Figure 3, it will be seen that the body portions 52 of the brackets 44 and 46 are secured together by a stepped rivet 62 the opposite ends of which extend through the openings 60 in the brackets and are riveted thereto. The enlarged central portion 64 of the rivet 62 spaces the two brackets a predetermined distance apart, and in addition rotatably supports a roller 66. The roller is of slightly smaller thickness than the spacing between the body portions 52 of the bracket to provide for rotation of the roller.

An elongated stepped pin 68 extends through the slots 58 in the arm portion 54 of the brackets 44 and 46 and is likewise formed with an enlarged central portion 70 spacing the brackets apart a predetermined distance. The enlarged central portion 70 also rotatably supports a second roller 72 for free rotation between the two brackets.

Adjacent its opposite ends, the pin 68 is formed with annular grooves 74 adapted to receive and support the end convolution of a coil spring 76 which encircles and embraces the adjacent strut portions 54 of the brackets. The opposite end of the coil spring 76 is retained by a key 78 having corner notches 80 receiving the opposite end of the coil spring 76. The retainer 78 is formed with a pair of notches 82 along its outer edge, each adapted to embrace the strut portion 54 of one of the supporting brackets adjacent the outer ends of the rectangular slots 56 therein. As a result, it will be seen that the retainer 78, when in assembled position, not only supports the end of the coil spring 76 against longitudinal and lateral movement, but also supports the end portions of the two strut portions of the supporting brackets in a predetermined spaced relationship.

The supporting bracket assembly 42 is preassembled as a unit and then mounted within the vehicle door. The two brackets 44 and 46 are first secured together by the rivet 62, with the roller 66 mounted therebetween and with the pin 68 supported in the slots 58 of the brackets and with the second roller 72 in place on the enlarged central portion 70 of the pin. The coil spring 76 is thereafter sleeved over the strut portions 54 of the brackets and is held partially compressed while the retainer 78 is slipped through the rectangular slots 56 at the ends of the strut portions 54 of the brackets. The retainer 78 is interlocked with the strut portion 54 by means of moving the retainer outwardly until the notches 82 at the outer edge thereof engage the strut portions at the outer ends of the slots 56. The retainer 78 can of course be readily removed if necessary at any time for maintenance purposes.

It will be seen that the opposite ends of the body portions of the two supporting brackets are held in predetermined uniform spaced relationship by means of the re-

tainer 78 and the rivet 62, and that the intermediate portions are spaced apart the same distance by means of the stepped portion 70 of the pin 68.

The check arm 32 extends between the body portions 52 of the supporting brackets 44 and 46 intermediate the rollers 66 and 72. Roller 72 is constantly urged toward the edge of the check arm 32 by means of the spring 76, and when the door is moved to the open position as shown in Figure 2 the roller 66 engages the retaining portion 38 of the notch 36 at the outer end of the check arm to releasably hold the door in open position. The checking ramp 40 of notch 36 at the outer end of the check arm serves to resiliently check the opening movement of the door with an increasing resistance. In the event the door is opened with such force as to cause the roller 66 to continue past the bottom of the retainng portion 38, the sharply inclined ramp 40 causes the rollers 66 and 72 to be spread apart against the action of the spring 76. Overriding movement is thus cushioned with increasing resistance. The return bent hook-shaped terminal end of the check arm 32 beyond the ramp 40 forms a stop for the roller 66 and effectively prevents further opening movement of the door should the door be opened with such force as to cause the roller to reach this point.

It will be understood that the invention is not to be limited to the exact construction shown and described, but that various changes and modifications may be made without departing from the spirit and scope of the invention, as defined in the appended claims.

What is claimed is:

1. In a motor vehicle body having a door structure and a door supporting structure, a check arm pivotally connected to one of said structures and extending into the other of said structures, a pair of sheet metal supporting brackets having oppositely extending flat base portions secured to said other structure, said supporting brackets having flat body portions formed integrally with said base portions and projecting at right angles thereto, the body portions of said supporting brackets being parallel to each other and spaced apart a predetermined uniform distance slightly greater than the thickness of said check arm, elongated flat strut portions integrally formed with said body portions and coplanar therewith and extending at an acute angle with respect to said base portions, said strut portions having aligned slots therein, a pivotally mounted roller between the body portions of said brackets, a second roller mounted between said strut portions, a pin rotatably supporting said second roller and having its opposite ends projecting outwardly through said slots to guide said second roller toward and away from said first roller, a retainer carried by said strut portions at the outer ends thereof and having end portions projecting outwardly at either side of the strut portions, a coil spring encircling said strut portions between said pin and said retainer, the end convolutions of said coil spring being seated directly upon the end portions of said pin and said retainer respectively, said check arm extending between the body portions of said supporting brackets and between said first and second rollers, and a retaining portion on said check arm adapted to engage one of said rollers to releasably hold said door structure in open position.

2. The structure defined by claim 1 which is further characterized in that said first mentioned roller is pivotally mounted upon a rivet extending through the body portions of the supporting brackets and having an enlarged central portion spacing the body portions of said supporting brackets said predetermined distance apart, the pin through said second roller also having an enlarged central portion corresponding in axial dimension to the enlarged central portion of said rivet to space the body portions of said supporting brackets said predetermined distance apart in the zone of said slots, the projecting ends of said pin having annular grooves provided therein to receive an end convolution of said coil spring, and said retainer having corner notches receiving and supporting the opposite end convolution of the spring, said strut portions having aligned rectangular slots therein to receive said retainer, said retainer having a pair of notches formed in its outer edge corresponding in width to the thickness of the strut portions of said supporting brackets to receive and laterally support said strut portions apart a distance corresponding to the axial dimension of the enlarged central portions of said rivet and said pin, the width of said retainer being less than the length of said rectangular slots to permit the removal of said retainer and said coil spring.

3. In a motor vehicle body having a door structure and a door supporting structure, a check arm pivotally connected to one of said structures and extending into the other of said structures, a pair of sheet metal supporting brackets for receiving said check arm therebetween, a pivotally mounted roller between said brackets, said brackets having aligned slots therein, a second roller, a pin rotatably supporting said second roller and having its opposite ends projecting through said slots to guide said second roller toward and away from said first roller, the projecting ends of said pins having annular grooves provided therein said brackets having additional aligned slots therein spaced from said first mentioned slots, a retainer carried projecting through the last named slots in said brackets in alignment with said first and second rollers and spaced therefrom, said retainer having a pair of notches formed in its outer edge corresponding in width to the thickness of said supporting brackets to receive and laterally support said brackets apart a distance slightly greater than the thickness of said check arm, said retainer also having corner notches aligned with the annular grooves of said pin, a coil spring encircling said brackets and having its end convolutions seated in the annular grooves of said pin and the corner notches of said retainer, the width of said retainer being less than the length of said slots to permit the removal of said retainer and said coil spring.

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