

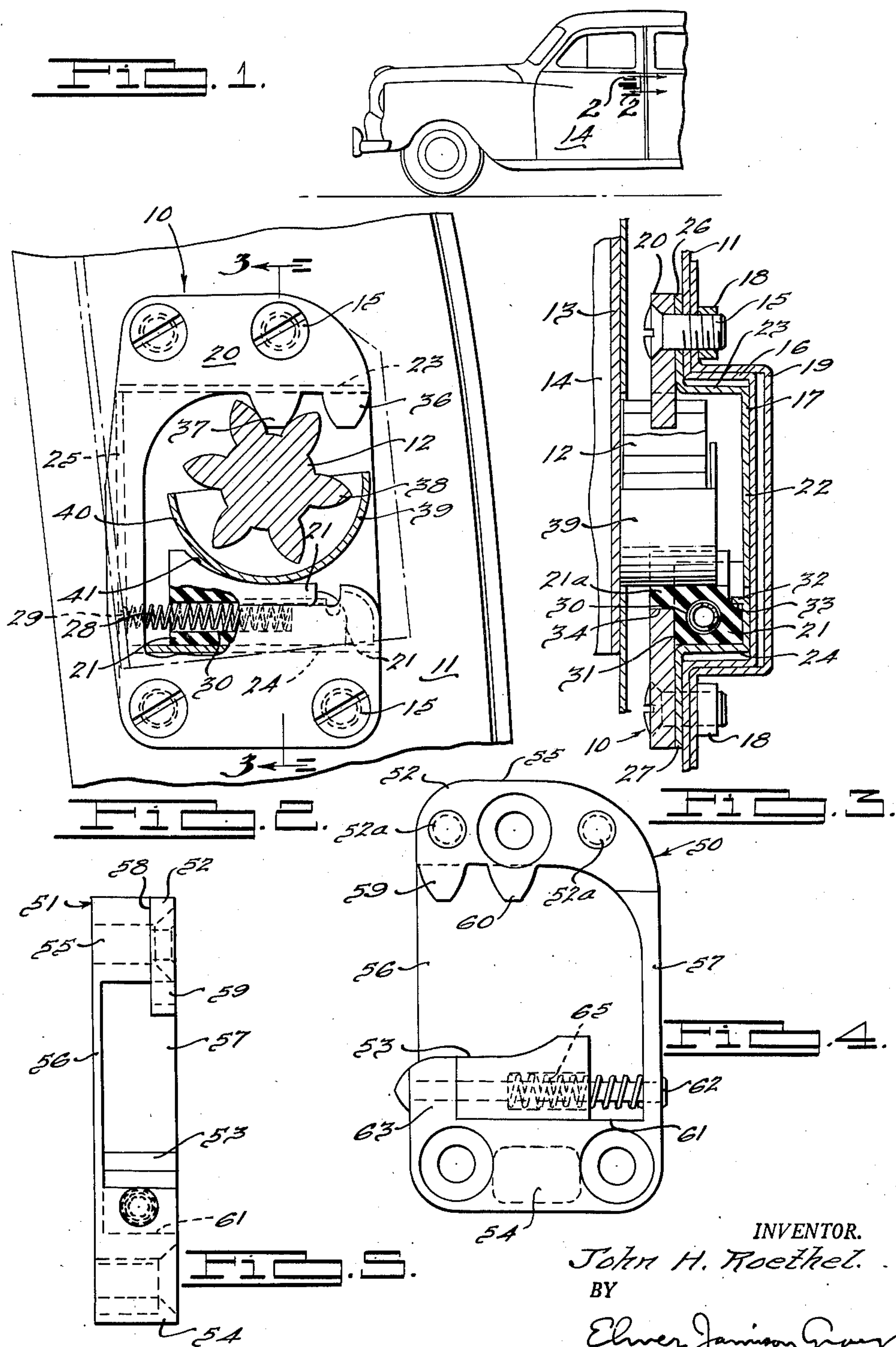
Feb. 24, 1953

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2,629,620

LATCH BOLT KEEPER

Filed Nov. 12, 1949



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2,629,620

LATCH BOLT KEEPER

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Application November 12, 1949, Serial No. 126,869

5 Claims. (Cl. 292—341.12)

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This invention relates to latch bolt keeper mechanism of the type constructed and arranged to be engaged by a multi-toothed latch bolt of a rotary latch mechanism mounted on a swinging door, especially a door of an automobile or other vehicle body, an object of the invention being to provide an improved latch bolt keeper mechanism which is characterized by its simplicity and compactness in construction, its ability to withstand the numerous impacts of the latch bolt as the door is repeatedly opened and closed, its resistance to wear at the points of frictional engagement with the latch bolt, and its efficiency in holding the door firmly against movement in a vertical plane while the vehicle is in operation.

A further object of this invention is to provide a latch bolt keeper mechanism having a frame member which may be fabricated from metal stampings, or formed as a die casting of suitable material, or molded from a plastic composition material, and to which frame member a wear resistant metal plate member is fastened, said plate member having teeth formed thereon for engagement with the multi-toothed latch bolt of a rotary latch mechanism.

A further object of this invention is to provide a latch bolt keeper mechanism having either a fabricated steel, a die cast metal, or a molded plastic frame member to which is fastened a plate member having teeth formed thereon adapted to engage the multi-toothed latch bolt of a rotary latch mechanism mounted on a swinging door of a vehicle, and on which frame member is mounted wedge shaped take-up means adapted to cooperate with an abutment means on the door when the door is in closed position and which will effectively and firmly maintain the door against movement in a vertical plane while the vehicle is in motion.

Other objects of this invention will appear in the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

Fig. 1 is a fragmentary side elevation of an automobile body equipped with a latch bolt keeper mechanism constructed in accordance with the present invention;

Fig. 2 is an enlarged fragmentary vertical section taken substantially through lines 2—2 of Fig. 1 looking in the direction of the arrows and illustrating a latch bolt keeper mechanism constructed in accordance with one embodiment of the invention.

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Fig. 3 is a section taken substantially through lines 3—3 of Fig. 2 looking in the direction of the arrows.

Fig. 4 is an enlarged vertical view taken substantially through lines 2—2 of Fig. 1 looking in the direction of the arrows and illustrating a latch bolt keeper mechanism constructed in accordance with a second embodiment of the invention.

Fig. 5 is a side elevation of the device shown in Fig. 4.

This application is a continuation-in-part of my copending application Serial No. 75,523, filed February 10, 1949, now abandoned.

Before explaining in detail the present invention it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

The latch bolt keeper device, generally designated as 10, constructed in accordance with the embodiment of the invention illustrated in Figs. 1 to 3 is shown mounted on the fixed jamb face or edge 11 of a door frame post or body pillar. The multi-toothed latch bolt 12 which engages the keeper when the door is closed is shown projecting outwardly from the selvage plate 13 of a rotary latch mechanism mounted within the vehicle door 14. Inasmuch as the interior actuating and operating means for the rotary latch bolt form no part of the present invention, such means are not here illustrated or described.

The keeper device 10 is held in place on the jamb face 11 by screws 15. The jamb face of the body pillar is recessed, as at 16, to receive the body portion or frame member 17 of the keeper device. The screws 15 penetrate through holes in the jamb face 11 and are threaded into fixed nuts 18 carried by a sheet metal member 19 called a tapping cage. The tapping cage 19 is shaped to fit the outer wall of the jamb face recess 16 and serves the dual function of reinforcing the jamb wall where the keeper device is mounted and of providing sufficient metal thickness for the tapping of threads to hold the screws 15.

The keeper device 10 is comprised of three major elements, the frame member 17, a plate member 20 and a slidable wedge 21. The cooperative relationship of these parts will become apparent as the construction and operation of the device is hereinafter explained.

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The frame member 17 is preferably a sheet metal stamping and has a vertical back wall 22 connecting two parallel horizontal walls 23 and 24 and an end wall 25, thus forming a generally C-shaped receptacle or casing having its outer side open and its inner vertical back side closed. This casing is shaped to receive the latch bolt when the door is in closed position, as is clearly shown in Figs. 2 and 3. At their front edges the parallel walls 23 and 24 are vertically and reversely flanged, the flanges 26 and 27 providing surfaces against which the plate member 20 bears and through which the screws 15 penetrate in holding the device against the jamb face 11.

The lower wall 24 provides a slideway for the slidable wedge 21. This wedge, which is preferably made of a non-metallic material such as hard rubber or plastic composition has the important function of preventing movement of the door in a vertical plane while the vehicle is in motion, as will be hereinafter explained.

It will be noticed especially in Fig. 2 that the wedge 21 is urged toward the open end of the frame member on casing 17 by a spring 28 one end of which abuts the end wall 25. The end wall 25 has an embossment 29 struck inwardly therefrom to retain the spring in proper position. The other end of the spring is seated within a recess 30 in the wedge. The slidable wedge is held on the wall 24 by a portion 31 of the plate member 20 and by a flange 32 struck inwardly from the back wall 22 of the casing 17. The flange 32 overrides a portion 33 of the wedge. Thus, with the plate member 20 in position the wedge cannot fall out.

The plate member 20 is an important element of the keeper device in that it carries the teeth 36 and 37 which engage the teeth 38 of the multi-toothed latch bolt 12. The plate 20 is substantially C-shaped in construction and has several countersunk holes therein in alignment with the holes in the casing on frame member 17 to receive the screws 15. The plate member 20 is rigidly fastened to the frame member 17 as by welding.

It will be understood that the latch bolt is freely rotatable in a clockwise direction as the door is moved from an open to a closed position. As the door is moved to a closed position the teeth of the latch bolt will strike and mesh with the tooth 36 of the keeper device first. This tooth 36 represents the safety locking position, and if for any reason the door is not fully closed the latch bolt will be held by this tooth against any inadvertent opening movement. When the door is fully closed the tooth 37 of the keeper will engage a pair of teeth of the latch bolt as clearly shown in Fig. 2. In order to provide keeper teeth of sufficient strength and durability to withstand the numerous impacts of the latch bolt as the door is repeatedly opened and closed and to firmly resist any shear stresses, the keeper teeth are formed as integral parts of the plate 20. As clearly shown in Fig. 3, the plate 20 is of much heavier stock than that used to form the frame member 17. The only direct load the frame member carries is that transmitted through the slidable wedge 21 to the wall 24. The wedge 21 has a laterally extending portion 21a overlying and slidably engaging an upper edge portion 34 of the plate member 20 so that this portion of the plate member together with the vertical flange 27 aid in carrying this load.

The load on the slidable wedge 21 referred to in the preceding paragraph is that which re-

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sults from the wedge acting as a take-up means to prevent movement of the vehicle door in a vertical plane while the vehicle is in motion. This slidable wedge 21 cooperates with an abutment member on the door. This member comprises a casing 39 which is rigidly fastened to the rotary latch mechanism selvage plate 13 and which embraces the lower portion of the bolt 12. The bottom wall 40 of the casing 39 is arcuate in shape and is adapted to engage a correspondingly shaped curved upper surface 41 of the wedge member 21 when the door is closed.

It will be apparent from the foregoing construction that on closing the door the cooperative engagement of the curved bottom wall 40 of the casing 39 with the correspondingly shaped curved upper surface 41 of the slidable wedge 21 will result in taking up any play between the latch bolt and keeper tooth 37, thus ensuring tight and final engagement of the bolt and striker when the door is closed and also that there will be substantially no movement of the door in a vertical direction while the vehicle is in motion.

The latch bolt keeper device, generally designated as 50, constructed in accordance with the embodiment of the invention illustrated in Figs. 4 and 5 has the same three major elements that the keeper device 10 hereinbefore described has, i. e., a frame member 51, a plate member 52, and a slidable wedge 53. However, the frame member 51 of the keeper 50 is preferably a die casting of metal, although it will be understood that the part could be molded from a plastic material.

The frame member as so formed comprises a lower or base portion 54 and an upper or overhanging portion 55 which are joined by a vertical back wall 56 and a vertical end wall 57. Thus, the frame member 51 is substantially C-shaped in construction and is installed on the body pillar so that the opening of the C faces outwardly to receive the rotary latch bolt on the door.

The overhanging or upper portion 55 of the frame member 51 is recessed as at 58 to receive the metal plate member 52. The plate member has formed thereon the keeper teeth 59 and 60 which project inwardly and downwardly into the frame opening where they are in position to be engaged by the multi-toothed latch bolt 12 on the door. The tooth 59 functions, as does the tooth 36 of the keeper device 10, in providing a safety locking position. The plate member 52 is located with respect to the frame member 51 by two dowel pins 52a, and is then securely welded thereto.

The top of the lower or base portion 54 of the frame member 51 provides a surface 61 on which the wedge 53 is slidable. The wedge is guided in its sliding movement by a rod 62 secured at one end to an abutment 63 on the frame member 51 and at its other end to the end wall 57. In order to resiliently urge the wedge member 53 in an outward direction along its supporting surface 61, a spring 64 is mounted on the rod 62 and extends into a recess 65 in the wedge, the spring being interposed between the base of the recess and the end wall 57.

The latch keeper device 50 functions similarly to the latch keeper device 10 in cooperating with the multi-toothed latch bolt in holding the door closed and against movement in a vertical plane. It is fastened to the jamb face 11 by screws 15 as in the case of the keeper device 10 except that only three screws are required.

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Both of the embodiments of the latch keeper device herein presented have the advantage that the frame member may be produced by inexpensive methods while producing a stronger and more desirable structure. The frame member merely serves the purpose of locating and holding the plate member having the keeper teeth thereon in the proper relationship to the slidable wedge. It is not necessary for the frame member to be structurally strong or to have high antifriction wear qualities. The keeper teeth absorb the greatest wear and strain from the impact and friction of the rotary latch bolt teeth. If the entire keeper device including the keeper teeth were to be fabricated from light gauge metal, the teeth could not be made strong enough and the forming of the teeth would present a difficult problem. Moreover, if the entire keeper device is formed as a die casting or of molded plastic the keeper device would not possess the strength to withstand as high impact stresses as the present keeper device and furthermore would not have as good wear qualities.

The present invention alleviates the recited disadvantages. The non-stress, non-wearing frame member of the keeper device is produced from a metal stamping, a die casting or a plastic molding. The keeper teeth which must be stress and wear resistant are formed on a heavy gauge metal plate which is conveniently fastened to the frame member. The device as thus constructed is inexpensive, wear resistant, and highly efficient in use.

I claim:

1. A keeper structure adapted to be fastened to a body for cooperative engagement with a pair of relatively fixed vertically spaced door abutment members carried on a swinging door, one of said abutment members being a rotatable toothed member and the other being formed as a curved casing embracing the lower portion of the other of said abutment members while leaving the upper portion of the latter exposed, comprising a generally C-shaped body having upper and lower generally horizontal body portions spaced apart vertically to provide an opening closed at one side by a vertical portion of the body rigidly connecting said upper and lower spaced portions, a wedge, means slidably mounting said wedge within said opening above the upper surface of said lower body portion, spring means urging said wedge outwardly, the upper side of said wedge having a curved surface engageable by said curved casing and offering progressively increasing resistance to the passage of said curved casing thereover, the upper surface of said lower body portion providing a surface upon which the wedge is slidable between such surface and the lower of said door abutment members in wedging relation therebetween, and a plate member rigidly fastened to said body at one side thereof and having spaced, tooth-like projections depending below the lower surface of the upper body portion for cooperation with the upper of said door abutment members, said projections and said upper surface of the lower body portion being held by said body in fixed vertically spaced relation.

2. A keeper structure adapted to be fastened to a body for cooperative engagement with a pair of relatively fixed vertically spaced door abutment members carried on a swinging door, comprising a frame member having upper and lower generally parallel body portions spaced apart vertically to provide an opening closed at

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its inner side by an inner wall portion and at one end by an end wall portion rigidly connecting said upper and lower spaced portions, a generally C-shaped plate member also having upper and lower generally parallel body portions spaced apart vertically to provide an opening closed at one side by a vertical portion connecting said upper and lower body portions, said plate member being rigidly fastened to said frame member at one side thereof, a wedge, means slidably retaining said wedge within said opening above the upper surface of said frame member lower body portion, and spring means urging said wedge outwardly, the upper surface of said frame member lower body portion providing a surface upon which the wedge is slidable between such surface and the lower of said door abutment members in wedging relation therebetween, said upper body portion of the plate member having spaced, tooth-like projections depending below the lower surface of the frame member upper body portion for cooperation with the upper of said door abutment members, said projections and said upper surface of the frame member lower body portion being held by the rigid fastening of the plate member to the frame member in fixed vertically spaced relation.

3. A keeper structure adapted to be fastened to a body for cooperative engagement with a pair of relatively fixed vertically spaced door abutment members carried on a swinging door, comprising a frame member having a base portion and an overhanging portion spaced apart vertically to provide an opening closed at its inner side and at one end by a back wall and an end wall rigidly connecting said base and overhanging portions, a wedge, means slidably mounting said wedge within said opening above the upper surface of said base portion, spring means urging said wedge outwardly, the upper surface of said base portion providing a surface upon which the wedge is slidable between such surface and the lower of said door abutment members in wedging relation therebetween, and a plate member rigidly fastened to a recessed portion at one side of the overhanging frame portion, said plate member having spaced, tooth-like projections depending below the lower surface of the overhanging frame portion for cooperation with the upper of said door abutment members, said projections and said upper surface of the base portion being held by said frame member in fixed vertically spaced relation.

4. A keeper structure adapted to be fastened to a body for cooperative engagement with a pair of relatively fixed vertically spaced door abutment members carried on a swinging door, comprising a frame member having a rear wall connecting an upper and lower wall and an end wall, the upper and lower walls having flanges extending outwardly therefrom in a plane normal to the planes thereof, a plate member having generally parallel upper and lower body portions spaced apart vertically to provide an opening closed at one side by a vertical portion connecting said upper and lower body portions, said plate member upper and lower body portions being rigidly fastened to the flanges of said upper and lower walls so as to be positioned at one side of the frame member, the vertical portion of the plate member being in juxtaposed relation to said end wall, a wedge, means slidably retaining said wedge on the upper surface of said lower wall, and spring means urging said wedge outwardly, said upper surface of the lower wall providing a

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surface upon which the wedge is slidable between such surface and the lower of said door abutment members in wedging relation therebetween, said upper portion of the plate member having spaced, tooth-like projections depending below the lower surface of said upper wall for cooperation with the upper of said door abutment members, said projections and said upper surface of the lower wall being held by said frame member in fixed vertically spaced relation.

5. A keeper structure adapted to be fastened to a body for cooperative engagement with a pair of relatively fixed vertically spaced door abutment members carried on a swinging door, one of said abutment members being a rotatable toothed member and the other being formed as a curved casing embracing the lower portion of the other of said abutment members while leaving the upper portion of the latter exposed, comprising a generally C-shaped body having upper and lower generally horizontal body portions spaced apart vertically to provide an opening closed at one side by a vertical portion of the body rigidly connecting said upper and lower spaced portions, a wedge, means slidably mounting said wedge within said opening above the upper surface of said lower body portion, spring means urging said

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wedge outwardly, the upper side of said wedge having a curved surface engageable by said curved casing and offering progressively increasing resistance to the passage of said curved casing thereover, the upper surface of said lower body portion providing a surface upon which the wedge is slidable between such surface and the lower of said door abutment members in wedging relation therebetween, said body having spaced tooth-like projections depending below the lower surface of the upper body portion for cooperation with the upper of said door abutment members, said projections and said upper surface of the lower body portion being held by said body in fixed vertically spaced relation.

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