

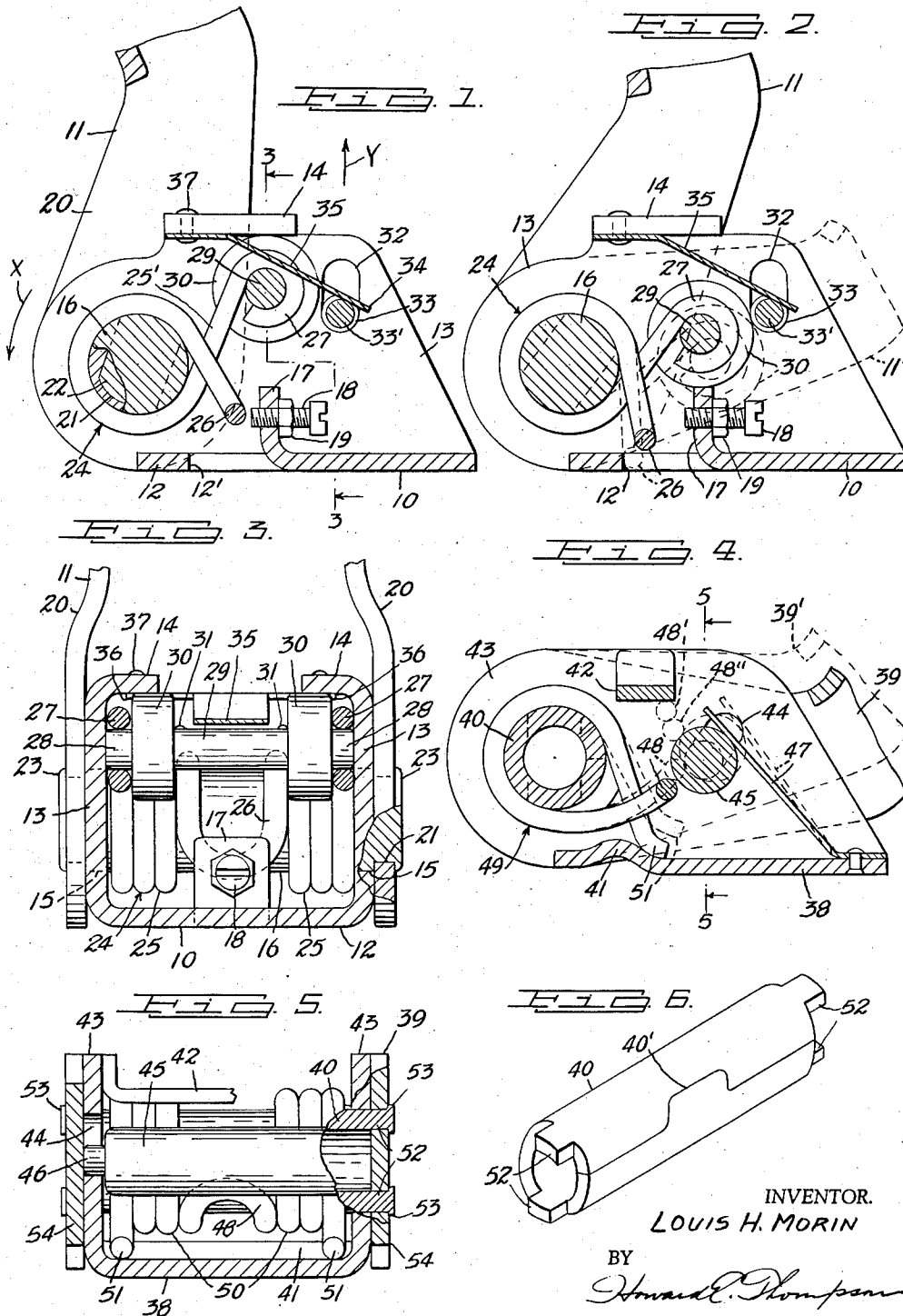
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L. H. MORIN
HOLD-OPEN HINGE

2,964,781

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2 Sheets-Sheet 1



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FIG. 7.

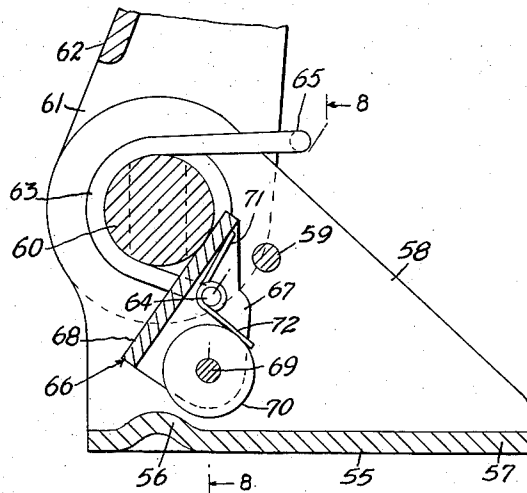
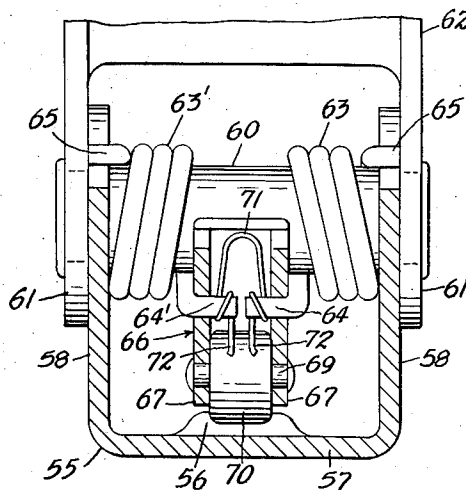


FIG. 8.



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HOLD-OPEN HINGE

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This invention relates to hinges employing means for holding the door or swinging member in open position against accidental movement while, at the same time, permitting forcible movement to a closed position. More particularly, the invention deals with a structure of the character described, wherein the swinging member includes a pintle portion enveloped by a coiled gripping spring employing means cooperating with the spring ends to control the hold-open action of the hinge.

Still more particularly, the invention deals with the structure of the character described, wherein a trigger-like action is provided in actuation of the spring to grip the pintle in accomplishing the hold-open action.

Further, the invention deals with a hinge structure, wherein adjustable means is employed to provide an auxiliary stop definitely checking opening movement of the door or swinging member.

The novel features of the invention will be best understood from the following description, when taken together with the accompanying drawing, in which certain embodiments of the invention are disclosed and, in which, the separate parts are designated by suitable reference characters in each of the views and, in which:

Fig. 1 is a diagrammatic sectional view through a hinge, with parts of the construction broken away.

Fig. 2 is a view similar to Fig. 1, illustrating the parts in a different position and also indicating in dotted lines the closed position of the hinge.

Fig. 3 is a section on the broken line 3—3 of Fig. 1, with parts of the construction broken away and with parts shown in elevation.

Fig. 4 is a view, similar to Fig. 1, showing a modification and indicating, in dotted lines, a partially opened position of the hinge and further indicating, in dot-dash lines, the position of portion of one part of the hinge when in fully opened position.

Fig. 5 is a section on the line 5—5 of Fig. 4, with parts of the construction broken away and with parts shown in elevation.

Fig. 6 is a perspective view of the pintle employed in the structure shown in Figs. 4 and 5.

Fig. 7 is a view, similar to Fig. 1, showing another modification;

Fig. 8 is a section on the broken line 8—8 of Fig. 7, with parts of the construction shown in elevation.

In the several illustrations, the butts of the hinge are diagrammatically shown, it being understood that these butts will be fashioned to suit the particular intended use. Hinges of the type and kind under consideration are applicable for use in the mounting of motor vehicle doors, the rear compartment closures of motor vehicles and doors or swinging members of any type or kind, wherein it would be desirable to temporarily check swinging movement of a door to prevent accidental closure of the door.

In the accompanying drawing, I have shown in Figs. 1 to 3, inclusive, one form of construction, in which 10 represents a hinge butt secured to the doorframe or other support and 11 represents the swinging butt which is secured to the door. Only part of the latter butt is shown.

The butt 10 is generally U-shaped in cross-sectional form, in other words, comprises a bottom wall 12 and parallel side walls 13, the latter having inwardly extending flange portions 14. The side walls have aligned apertures 15, in which a pintle pin 16 is rotatably mounted.

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The bottom wall 10 is fashioned to form an integral upwardly extending bracket 17, in which is mounted an adjustable stop screw 18 employing a lock nut 19. In the present showing, the stop screw 18 is shown in an operative position, insofar as providing an auxiliary definite stop in checking swinging movement of the butt 11. However, by moving the screw 18 to the left, it can be brought into a definite stop position.

The butt 11 has a pair of parallel side plates 20, having irregularly-shaped key apertures 21 to receive key shank portions 22 at end portions of the pintle 16, the outer ends of the pintle being riveted over, as seen at 23 in Fig. 3 of the drawing, in retaining the plates 20 adjacent the walls 13 in a manner to provide free swinging movement of the butt 11. From the foregoing, it will appear that the pintle moves with the swinging butt 11 in the operation of the hinge.

Mounted on the pintle 16 is a coil spring gripping element 24 employing two series of coils 25 disposed at end portions of the pintle, these coils being joined by an integral U-shaped loop 26 disposed between the coils 25, as clearly noted in Fig. 3 of the drawing. The free ends of the coils 25 are fashioned to form ring portions 27, which are mounted on ends 28 of a shaft 29. Rotatably mounted on the shaft 29 are two rollers 30, which form what I term trigger-like elements controlling hold-open action of the hinge. It will be noted that the shaft 29 has formed stop lugs 31 to check movement of the rollers 30 toward each other.

The side walls 13 of the butt 10 have aligned elongated apertures, one of which is shown at 32 in Figs. 1 and 2 of the drawing. The apertures 32 are arranged tangentially to the pintle 16. A stop rod 33 is mounted in the apertures 32. The rod 33 has a reduced central portion 33', in which seats the end portion 34 of a flat spring 35, the other end having lateral extensions 36 riveted to the flanges 14, as seen at 37. The spring 35 normally biases the rod 33 in the depressed position. It will, thus, be seen that, as the butt 11 is moved from its fully closed position, indicated at 11' in dotted lines in Fig. 2, to the fully opened position of Fig. 1, the rollers 30 engage and operate upon the rod 33 against the tension of the spring 35. The coils 25 of the element 24 are made slightly smaller on their inside diameter than the diameter of the pintle 16 to thus grip the same and rotate therewith as the butt 11 is opened in the direction of the arrow X. This action forces the stop rod 33 upwardly in the direction of the arrow Y against the action of the spring 35, until the stop rod 33 clears the rollers 30; whereupon, the stop rod 33 is moved back to the bottom of the apertures 32 by action of the spring 35. This operation takes place during all of the early stages of swinging movement of the butt 11 and until the butt reaches a substantially fully opened position, at which time, the rod 33 passes over the rollers 30 and the rollers then strike the flanges 14, as noted in Figs. 1 and 3, which action restricts the movement of the ring ends 27 in the opposite direction, thus releasing the grip of the coils 25 on the pintle 16. At this time, it is well to point out that, as the butt 11 is moved into its fully closed position, the rollers 30 again clear the rod 33, as indicated in dotted lines at 11' in Fig. 2, and the central loop portion 26 of the spring unit 24 will strike the surface 12' of the bottom wall 12, where the bracket 17 has been fashioned from the wall and this again releases the gripping action of the coils 25 on the pintle 16 because it tends to unwind the grip of the coil on the pintle.

The spring 35 functions to return the stop rod 33 to the bottom of the apertures 32. The gripping action of the coils 25 on the pintle 16 develops when the butt 11 begins to close in the direction opposite the arrow X. Here it should be kept in mind that the tangential angu-

larity of the apertures 32 with respect to the pintle 16 sets up the resistance which urges the end portions 25' of the coils 25 in the direction of the pintle 16 to increase the grip of the coils on the pintle. Note Fig. 1 of the drawing.

It will, thus, appear that, in moving the butt 11 in the direction of the arrow X, the rod 33 is moved upwardly in the apertures 32 and, as these apertures may be said to lean away from the pintle 16, this action is free and continuous until the rollers 30 clear the rod 33; whereupon, the spring 35 then returns the rod 33 to the bottom of the apertures 32. At this point, if the butt 11 is moved in the direction opposite to the arrow X, the rollers 30 are moved into positive engagement with the rod 33, which sets up the resistance actuating the coil ends 25' to tighten the grip of the coils on the pintle 16. By applying forcible pressure, the trigger-like rollers are caused to snap past the rod 33 and move into the position indicated in dotted lines in Fig. 2 of the drawing, after which, the butt 11 is free to move into its fully closed position. This latter operation is facilitated by the loop 26 striking the wall 12 in releasing the grip of the coils 25 on the pintle 16.

It will be understood, however, that, at all times, this hold-open gripping action provides only a temporary check and does not interfere with positive movement of the butt 11 to a further opened position or to the closed position.

At the same time, it will be understood that, by adjustment of the screw 18, the final opening movement of the butt 11 can be checked by moving this screw in sufficiently to engage the U-shaped portion 26 of the spring and, thus, act as a stop instead of the stop provided by the rollers 30 engaging the flanges 14. This stop action of the butt 11 may be said to be a snubbing action, rather than an abrupt or dead-stop, the latter being controlled by adjustment of the screw 18. It will be apparent that movement of the loop 26 in the direction of the axis of the pintle increases the grip of the coils 25 on the pintle.

The above described operation and function of the hinge will be generally the same with the modified structures of the hinge shown in Figs. 4 to 8, inclusive.

In Figs. 4, 5 and 6, I have shown a modification of the structure shown in Figs. 1 to 3, inclusive, in which 38 shows the stationary butt, 39 the swinging butt and 40 the pintle hingedly coupling the two butts. The butt 38 has, on its bottom wall, a raised mound portion 41.

Substituted for the flanges 14, a transverse stop strip 42 is welded or otherwise fixed to the side walls 43 of the butt 38 and the side walls 43 have aligned elongated angularly positioned apertures, one of which is shown at 44 in Figs. 4 and 5 of the drawing.

Arranged and operating in the apertures 44 are the reduced ends of a roller 45, one of these ends being indicated at 46 in Fig. 5 of the drawing. Fixed to the bottom wall of the butt 38 is a spring 47, the function of which is generally similar to the spring 35 and operates upon the roller 45 to apply tension on the central U-shaped portion 48 of a spring gripper unit 49, which is generally similar to the unit 24, in other words, employs two gripping coils 50, functioning in the same manner as the coils 25.

With the structure shown in Figs. 4 and 5 of the drawing, the ends of the unit 49 terminate in rounded finger portions 51, which are adapted to operate in conjunction with the mound 41 in releasing the gripping action of the unit 49 when the butt 39 begins to move to its fully closed position, as shown in full lines in Fig. 4 of the drawing. At 39', the butt is shown in a slightly opened position, preparatory to movement of the U-shaped portion 48 into engagement with the roller 45. It will, thus, be apparent that, as the butt 39 swings to its opened position, 48 is in constant engagement with the roller 45, thus, pushing the roller 45 upwardly in the

apertures 44 against the action of the spring 47 until 48 clears the roller 45. At this time, the roller 45 is moved downwardly in the apertures 44 by the spring 47 to its starting position, as is clearly indicated in Fig. 4.

It should also be kept in mind that the coils 50 are in frictional engagement with the axis or pintle 40, the same as the engagement of coils 25 with the pintle 16. In other words, the spring element 49 rotates with said pintle 40. In counterclockwise movement of the butt 39, 48 will easily latch over roller 45 which moves upwardly in apertures 44 against the action of the spring 47.

As this counterclockwise movement continues, the U-shaped portion 48 eventually strikes the stop 42, which serves to release the grip of the coils 50 on the pintle 40 and, thus, the butt 39 is free to easily swing open, until the full allowable opening limit which is provided.

In moving the butt 39 in a clockwise direction, 48 will strike the roller at the position indicated in dotted lines at 48' and, as this movement continues, if force is applied on the butt 39 to close the same against the hold-open resistance caused by the U-shaped portion 48 being moved in the direction of the pintle 40, the grip action is applied to the coils 50, as will be apparent.

In the aforesaid closing movement of the butt 39, 48 pushes the roller 45 downwardly against the walls of the apertures 44, which results in the applied gripping action mentioned and this continues until 48 reaches a point where it moves the roller 45 upwardly in the apertures 44; whereupon, 48 is free to pass the roller 45, as indicated in the dotted line position of the butt 39 in Fig. 4 of the drawing.

It is this movement of 48 over the roller 45 that provides what I term the trigger-like action which permits forcible movement of the movable butt 39 into its closed position.

It will be understood that the unit 49 moves with the pintle 40 and, as the butt 39 continues its closing movement, the action will be free, and, in this later action, the spring ends 51 strike the abutment 41 to release or free the grip of the coils 50 on the pintle so that the butt 39 is easily moved into its fully closed position.

It will be understood that engagement of the loop 48 with the stop 42 releases gripping action of the coils 50 on the pintle 40 in the opening cycle. With the structure shown in Figs. 4 and 5, the roller 45 constitutes the trigger-like element.

From the standpoint of economy in construction, the pintle 40 is preferably made from sheet metal rolled into the tubular construction with an alining and key tongue 40' maintaining the key action in the tubular sheet. In forming the pintle 40, the ends of the sheet are provided with pairs of projecting lugs 52 which are riveted over, as indicated at 53 in Fig. 5 of the drawing, positively securing the pintle 40 to the side plates 54 of the butt 39.

In Figs. 7 and 8 of the drawing, I have shown another modification, in which 55 represents the stationary butt, which has a raised mound or bump 56 in the bottom wall 57 and fixed to the side walls 58 is a transverse stop pin 59. Rotatable on the walls 58 is a pintle 60 fixed in the side plates 61 of the movable butt 62 in the same manner as attachment of the pintle 16 with the plates 20.

In Figs. 7 and 8, two coil grippers 63, 63' are arranged upon the pintle 60, the coils having inwardly extending offset ends 64, 64', as clearly noted in Fig. 8 of the drawing, and the other ends of the coils extend laterally, as seen at 65, 65' in Fig. 8, to overlie and operatively engage the side walls 58 of the butt 55.

The ends 64, 64' form pivots, on which a yoke-shaped actuating member 66 is rotatable, the pivots being arranged in side walls 67 of the element, these walls being joined by a crosshead 68. Mounted in the side walls 67 is an axis 69 for a freely rotating roller 70, forming the trigger-like element of this structure.

Mounted on the pivots 64, 64', within the side walls

67, is a spring having a central loop portion 71, end portions of the spring being coiled around the pivots 64, 64' with the terminal ends 72 of the spring bearing upon the roller 70.

The hinge is shown in its fully opened position and, in this position, the roller 70 is at the right of the mound or bump 56. When the butt 62 is closed in a clockwise direction, the roller 70 is forced over the bump 56. This creates resistance or, in other words, the hold-open action. If increased pressure is then exerted on the butt 62 to forcibly overcome the hold-open resistance, then the end portion of the coils 63, 63', having the pivots 64, 64', will move toward the pintle 60 under the applied load, thus decreasing the distance from the center of the pintle 60 to the center of 69 of the roller 70 and, thus, 70 triggers over the bump 56, after which, the load is instantly released and the butt 62 is free to continue closing movement. Here again, it will be apparent that the pintle carries the coils 63, 63' with it by virtue of the frictional engagement with the pintle 60.

After the butt 62 has moved in the clockwise direction, enough for 70 to pass 56, it will be observed that the extension 65 will strike the edges 58 and this loosens the frictional grip of the coils 63, 63' on the pintle 60 and the butt 62 is thus free to easily close the rest of the way.

When the butt 62 is opened by movement in a counterclockwise direction, the roller 70 freely snaps over the bump 56 by reason of the fact that the roller is mounted in the swinging member 66, which pivots on 64, 64' only against the comparatively light action of the torsion spring 71-72. The member 66 then assumes the position, as clearly shown in Fig. 7 of the drawing.

At this time, it should be kept in mind that the slight contact friction established between the coils 63, 63' and the pintle 60 is great enough to overcome the action of the torsion spring 71-72 during the counterclockwise movement of the butt 62.

In the several figures of the drawing, it will be apparent that the springs employed have what may be termed widely spaced ends, as at 26, 27, Fig. 2; 48, 51, Fig. 4 and 64, 65, Fig. 7. Operation upon these ends controls gripper action of the respective springs.

The coils gripping the pintles in the several forms of construction shown may be said to define the gripping means and the protruding portions of these coils may be said to define members projecting beyond the surface of the pintle and it will be noted that, in each instance, one of these members operatively engages the trigger-like element; whereas, the other member operatively engages the stationary butt in releasing the gripping action of said means. In all instances, tensional means is employed to actuate the element in applying the gripping action of the gripper means on the pintle as and when the movable butt assumes any one of a predetermined number of opened positions or predetermined opened positions between the partially closed and fully opened positions.

For purposes of description, 26, 27 of Figs. 1 to 3; 48, 51 of Figs. 4 and 5 and 64, 65 of Figs. 7 and 8 may be regarded as protruding portions projecting outwardly from the coil springs.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A hinge of the character described, comprising a stationary butt and a movable butt, a pintle fixed to the movable butt and rotatable in the stationary butt, a coiled gripper spring engaging the pintle, said spring having outwardly protruding portions having widely spaced ends, a trigger-like actuating element movable in the stationary butt and engaging at least one of the protruding ends of the spring in automatically applying gripping action of the spring on said pintle in opening movement of said movable butt and in support of the movable butt in predetermined opened positions, means operatively engaging

another protruding end of said spring for automatically releasing the gripping action of the spring on the pintle when the movable butt is in the closed and fully opened positions, and tensional means operatively engaging said element in the movement of the spring into gripping action on said pintle.

2. A hinge as defined in claim 1, wherein said element comprises a rotatable roller.

3. A hinge as defined in claim 2, wherein means is employed for supporting the roller in connection with a protruding end of said spring.

4. A hinge as defined in claim 2, wherein means is provided for movably supporting the roller in the stationary butt of the hinge.

5. A hinge as defined in claim 1, wherein said tensional means comprises a flat spring supported in connection with the stationary butt.

6. A hinge as defined in claim 5, wherein said flat spring operates upon a rod movably supported in the stationary butt.

7. A hinge as defined in claim 1, wherein said tensional means comprises a spring engaging a member supporting said element and the element supported on said member.

8. A hinge as defined in claim 1, wherein adjustable means is supported on the stationary butt operatively engaging a part of said spring in providing a predetermined check in opening movement of the movable butt.

9. A hinge of the character described, comprising a stationary butt, a movable butt, a pintle fixed to the movable butt and rotatable in the stationary butt, means engaging the pintle in establishing gripping action thereon in support of the movable butt in predetermined opened positions, said means having at least two portions projecting outwardly beyond the surface of said pintle, said portions having widely spaced ends, the end of part of said protruding portions operatively engaging a trigger-like element movable in the stationary butt in automatic application of gripping action of the means on said pintle, the end of another of said protruding portions operatively engaging the stationary butt in releasing gripping action of said means on the pintle, and tensional means urging said element into operative position.

10. A hinge as defined in claim 9, wherein said part of the protruding portions engages means rotatably supporting said element.

11. A hinge as defined in claim 9, wherein said element comprises a roller.

12. A hinge as defined in claim 11, wherein said tensional means directly engages the roller.

13. A hinge as defined in claim 9, wherein said last named means includes a rod movably supported in the stationary butt and actuated by a spring supported in the stationary butt.

14. A hinge as defined in claim 9, wherein adjustable means is provided on the stationary butt operatively engaging the end of the second named protruding portion in adjustably checking fully opened movement of the movable butt.

15. A hinge as defined in claim 9, wherein the stationary butt includes means engaging the end of the first named protruding portion in releasing gripping action of said first named means in movement of the movable butt into fully opened position.

16. A hinge as defined in claim 9, wherein means is provided on the stationary butt engaging said element in releasing gripping action of the first named means in movement of the movable butt into fully opened position.

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