July 12, 1966 V. E. SHERIDAN 3,259,936

DOOR HOLDER AND CONTROL

Filed May 5, 1964 2 Sheets-Sheet 1

Fig. 1.

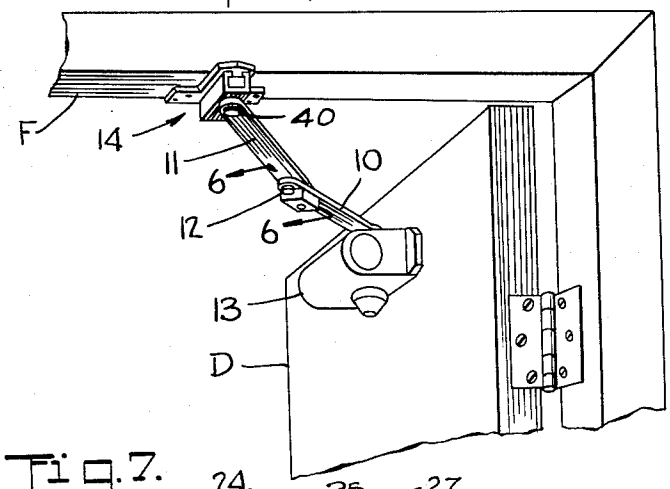

Fig. 3.

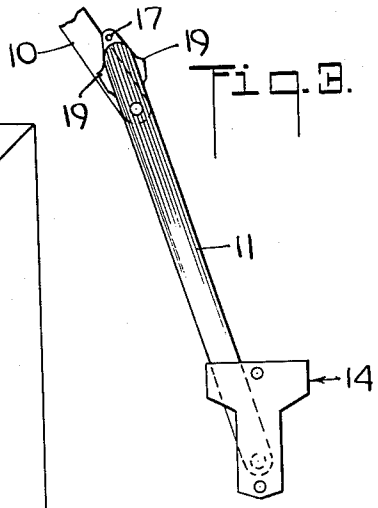

Fig. 7.

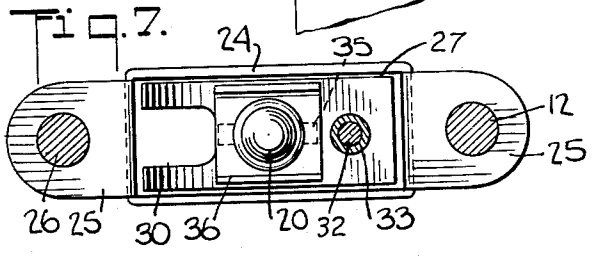

Fig. 6.

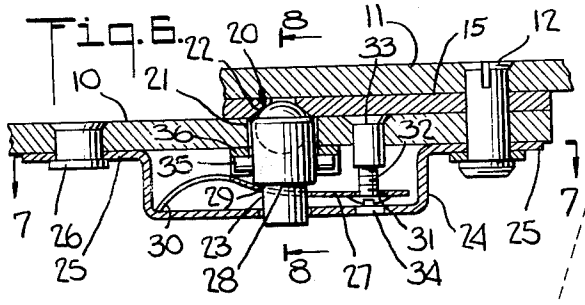

Fig. 2.

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DOOR HOLDER AND CONTROL

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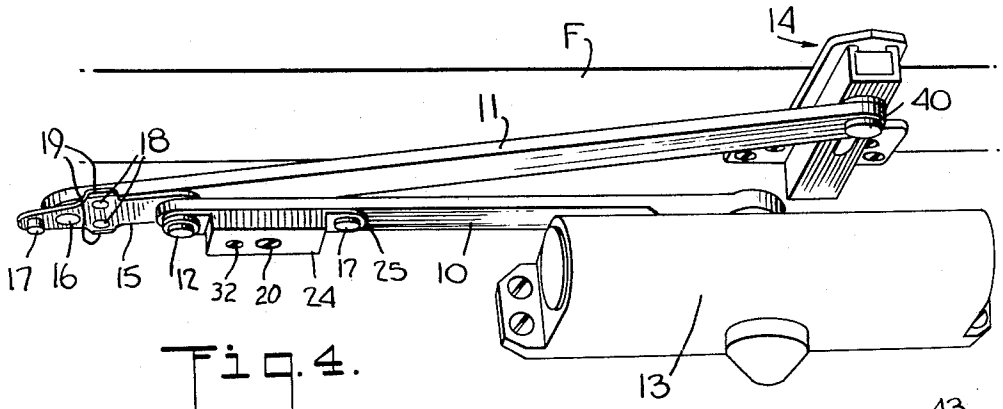

Fig. 4.

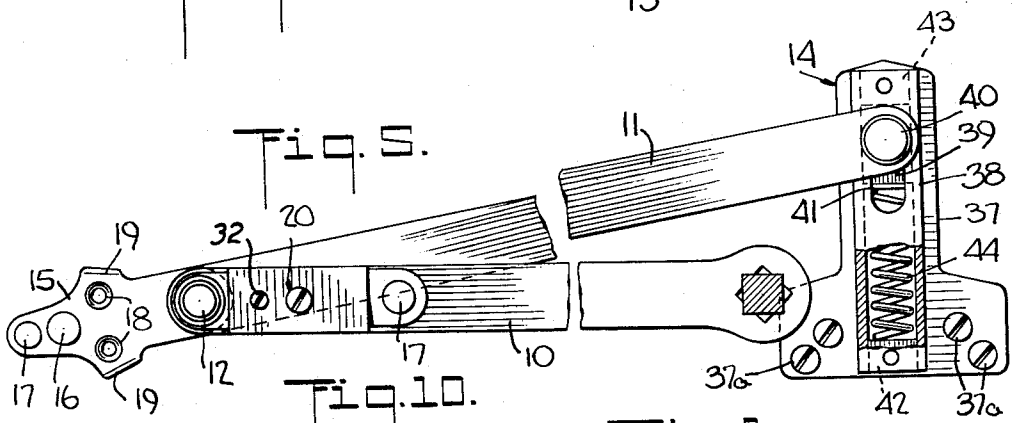

Fig. 5.

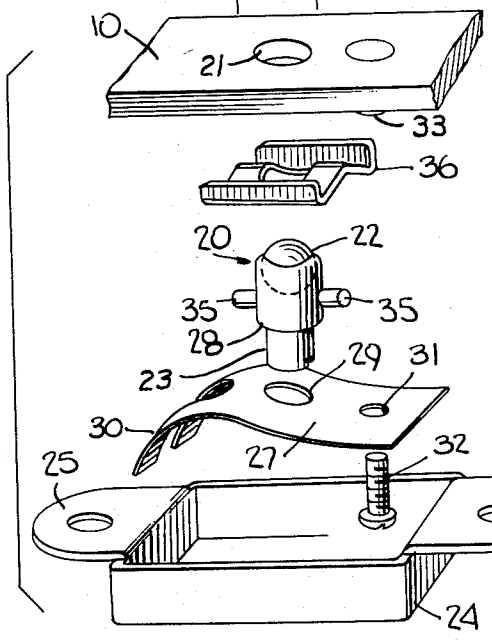

Fig. 10.

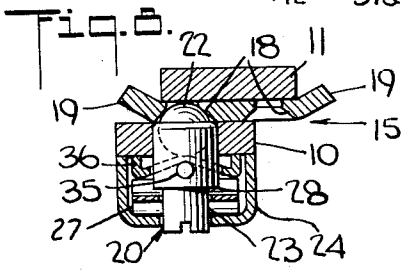

Fig. 8.

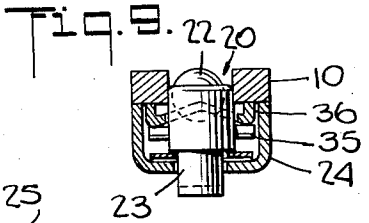

Fig. 9.

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United States Patent Office 3,259,936 Patented July 12, 1966

3,259,936

DOOR HOLDER AND CONTROL

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Filed May 5, 1964, Ser. No. 364,917
6 Claims. (Cl. 16—49)

My invention relates to a novel door control that is particularly adapted to be sold with a door closer, forming a universal control unit which will supply several functions in addition to that of closing a door.

More particularly, my novel control will utilize the main arm and forearm of a door closer for cushioning the opening movement of the door, for limiting the opening movement, and for holding the door open. My control is reversible, and need not be adjusted or modified whether it is to be used on a right-hand or a left-hand door. After the control is installed, its door holding action may easily be adjusted or made inoperative, whenever that is desired.

In my invention, I equip one of the two closer arms with a limit stop for pivotal extending movement of the arms, while connecting one arm through yielding means to the door or door frame, as the case may be. I so construct the stop that the two arms when extended will be in a particular angular relation to each other, regardless of the direction in which they rotate. Also, I arrange the yielding means to yield in a particular direction relatively to the door or door frame. The closer arms then will act with a cushioning effect to limit the opening movement of the door, whether the control be installed on a right-hand or on a left-hand door.

As a feature of my invention, I equip a pair of pivoted door closer arm with a stop pin that is mounted in the longitudinal axis of one arm, while forming a part of that arm with a pair of detent surfaces, one at each side of the arm axis. The other of the arms has a spring pressed plunger which will coact with one detent surface when that arm rotates against either side of the stop pin, so that the plunger may hold the door in open position regardless of the hand of the door.

As another feature, my invention utilizes novel means for controlling a door holding detent plunger. More particularly, there is a spring that is supported on a screw so as to press the plunger longitudinally to holding position. The screw can easily be rotated to adjust the spring pressure, and therefore the door holding pressure of the plunger. As a part of this feature, the spring pressed plunger also can be rotated manually. There are cam means coacting with the plunger when the plunger is rotated, causing it to be retracted and held against its spring pressure, so that the door holding action can easily be made effective or ineffective, as the user may wish.

I have thus outlined rather broadly the more important features of my invention in order that the detailed description thereof that follows may be better understood, and in order that my contribution to the art may be better appreciated. There are, of course, additional features of my invention that will be described hereinafter and which will form the subject of the claims appended hereto. Those skilled in the art will appreciate that the conception on which my disclosure is based may readily be utilized as a basis for the designing of other structures for carrying out the several purposes of my invention. It is important, therefore, that the claims be regarded as including such equivalent constructions as do not depart from the spirit and scope of my invention, in order to prevent the appropriation of my invention by those skilled in the art.

In the drawings:

FIG. 1 is a perspective view showing the novel door control of my invention when used on a right-hand door,

FIG. 2 is a plan view illustrating my control in its door-closed and door-open positions,

FIG. 3 shows the door-open position of parts of my control when it is utilized on a left-hand door,

FIG. 4 shows a perspective view on a larger scale,

FIG. 5 shows parts of my control in somewhat better detail,

FIG. 6 shows a section on the line 6—6 in FIG. 1,

FIG. 7 shows a section on the line 7—7 in FIG. 6,

FIG. 8 shows a cross section on the line 8—8 in FIG. 6,

FIG. 9 is somewhat like FIG. 8 but shows the retracted position of the door holding plunger, and

FIG. 10 shows an exploded view of parts of my invention.

Referring now more particularly to FIG. 1 of the drawings, the novel control of my invention utilizes a pair of arms **10**, **11** that are pivoted to each other by a pin **12**, those arms forming the main arm and forearm of a door closer **13** mounted on the door D. The main arm **10** rotates with the shaft of door closer **13**, as will be understood by those skilled in the art, and the forearm **11** is pivoted to the door frame F through a snubber **14** that I shall describe.

In the construction that I prefer, my novel door control includes a cam plate **15**, arranged as is well shown in FIGS. 4 and 5. Thus, the cam plate **15** is so mounted in position on an end portion of the forearm **11** as to extend beyond the pivot pin **12**. One end of cam plate **15** is secured by a rivet **16**, while the other end is held on pivot pin **12** between the arms **10**, **11** and acts as a spacer for the arms. The cam plate **15** then lies transverse to the axis of pivot **12**, and will move with the forearm **11** to position overlapping the main arm **10** as the arms move to extended position, shown in dotted lines in FIG. 2.

I equip the cam plate **15** with a stop pin **17** that is mounted at a point in the axis of the forearm **11**, and that extends into the path in which the main arm **10** rotates about pivot **12**. Each side of stop pin **17** is adapted to engage the arm **10** when the arms **10**, **11** move to a fully extended position, as indicated in FIG. 2 or FIG. 3, so as to limit the arms **10**, **11** to a particular angular relation regardless of the direction in which the arms may rotate about pivot **12**. Further, as perhaps best seen in FIG. 5, I form the cam plate **15** with a pair of detent openings **18** arranged at opposed sides of the longitudinal axis of arm **11**, there also being an inclined guide lip **19** at the outer side of each opening **18**.

Each detent opening **18** is adapted to coact with a spring pressed plunger **20** on the main arm **10**, and to describe that plunger I shall refer now to FIG. 6. The plunger **20** is mounted for movement in an opening **21** in the arm **10**, and has a front end portion **22** projecting at the upper side of the arm, and a rear end portion **23** extending at the lower side of the arm. In my preferred construction, the front end portion **22** comprises a ball retained in a recess in the body of plunger **20**, as by crimping the edge of the recess, and rotatable in the recess so as to move more easily on cam plate **15**.

The plunger **20** forms a part of an assembly that is mounted in a box-like housing **24**, well shown in FIGS. 6 and 7, having two end flanges **25** secured to the lower surface of main arm **10**. As shown, one of the flanges **25** is held behind the head of the pivot pin **12**, and the other flange **25** is secured by a rivet **26**. A leaf spring **27** is assembled in the houing **24**, a medial part of the spring pressing against a shoulder **28** on the plunger **20**, and having an opening **29** through which the rear portion **23** of the plunger extends. The spring **27** is formed with a curved and forked end portion **30** that rests upon the

inner surface of housing **24**, while the opposed end portion of spring **27** has an opening **31** that is engaged by a screw **32**. The screw **32** is threaded into a bushing **33** mounted on the main arm **10**, and has a head supporting the leaf spring **27** in such a way that rotation of the screw **32** will adjust the spring presure that is applied in a longitudinal direction to the plunger **20**. An opening **34** in the housing **24** will allow a screw driver to be inserted so that the screw **32** may easily be rotated.

It will thus be seen that the plunger **20** normally will be projected for engaging one of the openings **18** in the cam plate **15**. The plunger **20** has a cross pin **35** that will hold it assembled in the arm opening **21**, and that will be utilized for controlling the position of the plunger. Thus, referring to FIGS. 6 to 9, I assemble a cam washer **36** on the plunger **20** between the cross pin **35** and the main arm **10**. The cam washer **36** has a rectangular outline so that the washer can not rotate within the housing **24**, and is bent so as to have a cross section shaped like a broad V. When the plunger cross pin **35** lies in the narrow part of this V shape, as in FIGS. 6, 7 and 8, the plunger **20** may slide freely in a longitudinal direction, so that the spring **27** normally will hold the plunger **20** in its projected position while naturally allowing the plunger to yield.

The rear end portion **23** of plunger **20** is in aligned relation to an opening in the housing **24** and preferably extends outwardly through the opening, being easily accessible and formed with a slot so that plunger **20** may be rotated by a screw driver. By rotating the plunger **20** ninety degrees, the cross pin **35** will be placed in a transverse position which is shown in FIG. 9, the cam washer **36** then coacting with the cross pin **35** to hold the plunger **20** in retracted position.

From the description that I have thus far made, it will be seen that the spring pressed plunger **20** may coact with either of the detent recesses **18** for holding the arms **10**, **11** in an extended position, as in FIG. 2 or FIG. 3. Thus, the plunger **20** will be effective to hold the door open when the door is a right-hand door, as in FIG. 2, or a left-hand door, as in FIG. 3. In either case, the arms **10**, **11** will be in an angular relation that will enable the door D to be closed merely through pressure applied to the door, causing the plunger **20** to ride out of the particular detent opening **18** on cam plate **15**. Should the user wish to change the door holding pressure, as may be desirable under different operating conditions, he merely need adjust the screw **32**. Further, should he wish at any time to make the door holding action ineffective, he merely need rotate the plunger **20** to the FIG. 9 position.

I believe it will be understood that the stop pin **17** will act to limit the opening movement of the door, but to fully appreciate the limiting action it will be necessary first to consider the snubber **14** of my control. As shown in FIG. 5, the snubber **14** includes a soffit plate **37** that will be attached to a surface of the door frame F, as by screws **37***a*. The soffit plate **37** is equipped with a guide way **38** in which is a slide **39**. The slide **39** supports in pin **40** that extends outwardly through a slot **41** in the guide way **38**, and that forms a pivot for the forearm **11** of the door closer **13**. End blocks **42**, **43** are assembled in the opposed ends of the guide way **38**, and a coil spring **44** acts between the block **42** and the slide **39** so that the pivot pin **40** normally does not move and in effect connects forearm **11** to a fixed point on the door frame F.

Should the forearm **11** apply sufficient pressure, the pivot pin **40** naturally may move through yielding of spring **44**. Thus, the snubber **44** will cushion the action of the stop pin **17** when limiting the door movement. At this point, I call attention to the fact that the guide way **38** of the snubber **14** is directed at right angles to the door frame F. Thus, the direction in which the pivot pin **40** yields will bear the same relation to the arms **10**, **11** whether the installation is right-hand, as in FIG. 2, or left-hand, as indicated in FIG. 3, and the cushioning effect will be the same in either case.

I have thought it unnecessary to describe the door closer **13** in detail, because the closer may be of a conventional type having reversible operation that allows its use on a door of either hand. In the closer **13** that I actually show, the main arm **10** can be secured to either end of the closer shaft, and the closer inverted, so that the action of the main arm **10** can be reversed. Closers of that type are well known in the art, one example being shown in the patent to Check, No. 2,994,906.

It is conceivable, of course, that features of my invention may be utilized to good effect without a door closer, the arm **10** merely being pivoted to the door. Therefore, I do not wish actually to be limited to a control that comprises a door closer.

To review the operation of my novel door control, we may first consider the right-hand installation that is shown in FIG. 2. As the door D moves to the dotted line open position, the closer arms **10**, **11** will rotate relatively to each other, moving to an extended position as will be readily understood by those skilled in the art. In that position of the arms, the stop pin **17** will lie against one side of the arm **10**, limiting the arms **10**, **11** to a particular angular relation. It will be recalled that the pivot pin **40** on the snubber **14** normally will contribute a fixed pivot point on the door frame F, but when the main arm **10** moves against the stop pin **17**, that pin will stop the opening movement of the door and the snubber spring **44** will yield, allowing the pivot pin **40** to move somewhat, thus cushioning the movement of the door to open position.

In the dotted line position of the closer arms **10**, **11** in FIG. 2, the spring pressed plunger **20** will have moved over one of the lips **19** on the cam plate **15** so as to engage a corresponding detent opening **18** in the cam plate. Plunger **20** thereby will hold the arms **10**, **11** extended, and the door D in open position. Should it now be desired to close the door, the angular relation of the arms **10** and **11** will enable a closing pressure on the door to move the spring pressed plunger out of its detent opening **18**, after which the door closer **13** will act in a usual way for closing the door.

In some cases, a relatively strong door holding pressure may be required. That may easily be achieved by rotating the screw **32** so as to increase the longitudinal pressure that the spring **27** applies to the plunger **20**. Naturally, a strong holding pressure will require that more force be applied to the door to move it from open position. If desired, however, a rebound effect of the snubber spring **44** may be utilized to release the door, the door first being pressed in opening direction to compress snubber spring **44** somewhat.

Should it be desired at any time to make the door holding feature ineffective, that may very easily be done by rotating the spring pressed plunger **20** ninety degrees, causing the plunger to be held in retracted position.

When my control is installed on a left-hand door, the operation will be exactly the same as I have described in connection with FIG. 2, but the rotation of the arms will be in the opposed direction. That will cause the opposed side of stop pin **17** to engage the arm **10**, and the lunger **20** naturally will coact with the other of the detent openings **18**. I have illustrated the opposed rotation of the arms **10**, **11** in FIG. 3, which actually shows a mirror image of the arms in the door-open position of FIG. 2.

Whether utilized in a right-hand or left-hand installation, my novel control will operate very effectively as a unit, contributing the usual operation of a door closer, and in addition acting very effectively as a limit stop for the opening movement of a door, a door holder, and as a cushion for the movement of the door to open position. The door holding pressure is very readily adjustable, and the holding function may very readily be suspended

whenever that may be desired. All of these things I achieve through an extremely novel construction that will contribute universal operation, and that can easily be packaged and marketed as a unit, making it unnecessary to stock and to sell separate components having different specifications. I believe, therefore, that the very considerable value of my invention will be understood, and the the merits of my novel door control will be appreciated by those skilled in the art.

I now claim:

1. In a door control of the class described, a door closer adapted to be mounted on a door, a closer main arm and forearm for connecting the door closer to a door frame, each of said arms having a particular fixed length, there being a first pivot about which said arms rotate relatively to each other during opening and closing movements of the door, and a further pivot between the forearm and door frame, a stop portion on one of said arms for engaging the other arm as said arms rotate about the first pivot, opposed sides on said stop portion each effective to limit the relative rotation of the arms in one direction to an extended position for limiting the door opening movement, and means mounting said further pivot for yielding movement in a direction at right angles relatively to the door frame whereby to cushion the action of said stop portion while permitting effective door closer operation whether the closer is installed on a right-hand or left-hand door.

2. In a door control of the class described, a door closer adapted to be mounted on a door, a closer main arm and forearm for connecting the door closer to a door frame, each of said arms having a particular fixed length, there being a first pivot about which said arms rotate relatively to each other during opening and closing movements of the door, and a further pivot between the forearm and door frame, a stop portion on one of said arms for engaging the other arm as said arms rotate the first pivot, opposed sides on said stop portion each effective to limit the relative movement of the arms when said arms rotate in one direction to an extended position, detent means engaging between said arms to hold said arms extended when rotated in each direction, so as to hold the door open, and means mounting said further pivot for yielding movement in a direction at right angles relatively to the door frame whereby to cushion the action of said stop portion and detent means while permitting effective door closer operation whether the closer is installed on a right-hand or left-hand door.

3. In a door control of the class described having a pair of arms connected to a door and door frame and pivoted together to rotate into an extended position relatively to each other as the door moves to open position, a plunger mounted for longitudinal and rotating movements in an opening in one of said pair of arms, a forward end of said plunger adapted to project from a surface of said one arm for engaging a detent surface on the other arm when said arms are extended, a housing mounted in a longitudinal position on a rear surface of said one arm and enclosing a rearward portion of the plunger, a leaf spring mounted in said housing and having a surface engaging the plunger to press the plunger longitudinally in the arm opening so that the forward end of the plunger will coact with the detent surface for holding the door in open position, an opening in said housing whereby the plunger is accessible for manipulation to rotate the plunger, and cam means acting between said rear arm surface and the plunger when said plunger is rotated whereby to retract and to hold the plunger retracted so that the door may move freely relatively to open position.

4. In a door control of the class described having a pair or arms connected to a door and door frame, and a pivot about which said arms rotate into an extended position relatively to each other as the door moves to open position, said pivot being arranged inwardly from an end of one of said arms so that portions of said arms will move into opposed relation to each other when said arms extend, a housing mounted on one of said arm portions, a plunger arranged in said housing and having an end in position for engaging a detent surface on the other of said arm portions, a leaf spring assembled in a position transverse to the plunger in said housing, a part of said spring engaging the plunger for pressing the plunger against the detent surface for holding the door in open position, a screw engaging a part of said spring in position offset relatively to the plunger in the housing and controlling the spring pressure so that said screw when rotating will adjust the door holding effect of the plunger, a cam washer encircling the plunger and held against rotation in the housing, a part of said plunger with which said washer coacts upon rotation of said plunger whereby to retract and hold said plunger retracted, and said housing having an opening whereby the plunger is accessible for manipulation to rotate the plunger.

5. In a door control of the class described, a door closer adapted to be mounted on a door, a closer main arm and forearm for connecting the door closer to a door frame, said forearm being connected to the door frame through a pivot about which the forearm rotates between a position generally parallel to the frame when the door is closed, and a position extending at an angle to the frame when the door is open, a stop portion on one of said arms for engaging the other arm to limit the door movement when said arms rotate to their door open position, means mounting the forearm pivot for yielding movement in a direction substantially at right angles to the door frame, and including surfaces substantially holding said pivot against movement in a direction parallel to the door frame, so as to cushion the action of said stop portion when limiting the door opening movement while also enabling the door closer to act firmly when the door is near its closed position.

6. A construction as set forth in claim 5, in which the means mounting the forearm pivot include a soffit plate fixed to the door frame, a slide supporting the forearm pivot, a guideway supporting the slide for movement on the soffit plate in said direction substantially at right angles to the door frame, and a spring acting against said slide to press said slide and pivot toward a predetermined position on the soffit plate relatively to the door frame.

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