Aug. 29, 1961 M. KOTERMANSKI ET AL 2,997,735

CONTROL DEVICE FOR SWINGING DOORS

Filed April 8, 1958 2 Sheets-Sheet 1

Fig. 1

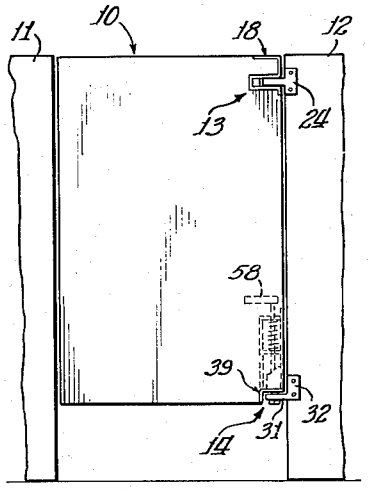


Fig. 2

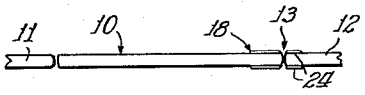


Fig. 9

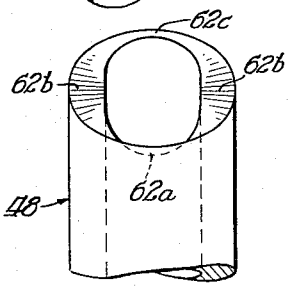


Fig. 10

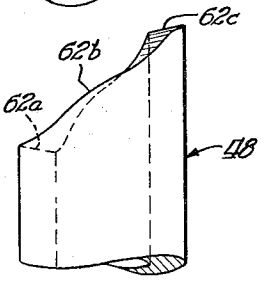


Fig. 3

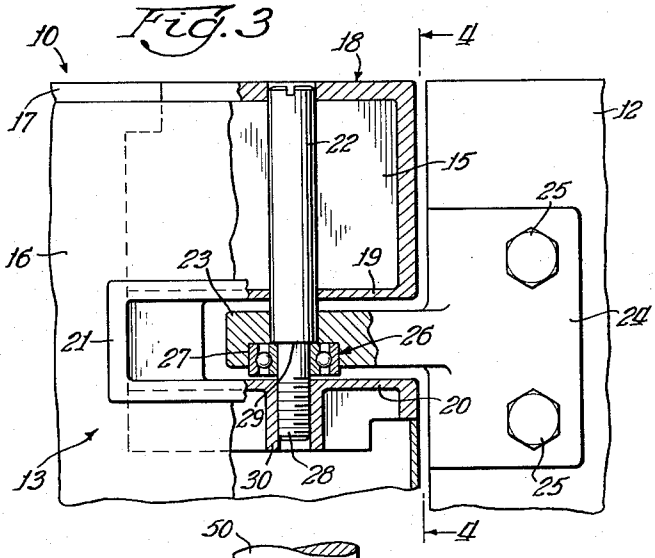


Fig. 4

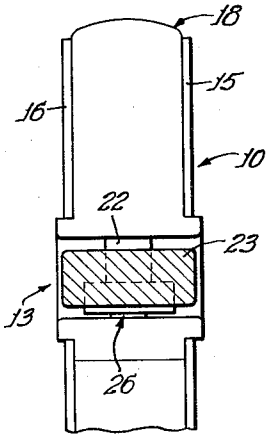
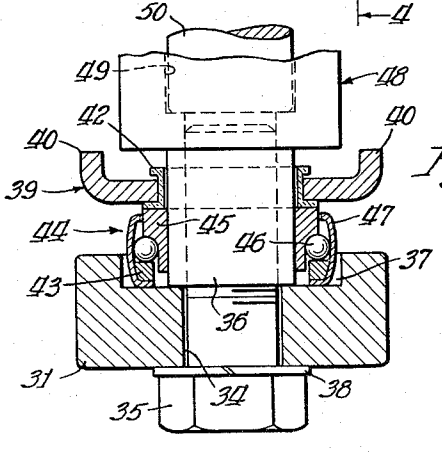


Fig. 8



Inventors:
Mitchell Kotermanski
and Warren K. Rutledge
By: H. J. Schmid Atty.

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Fig. 6

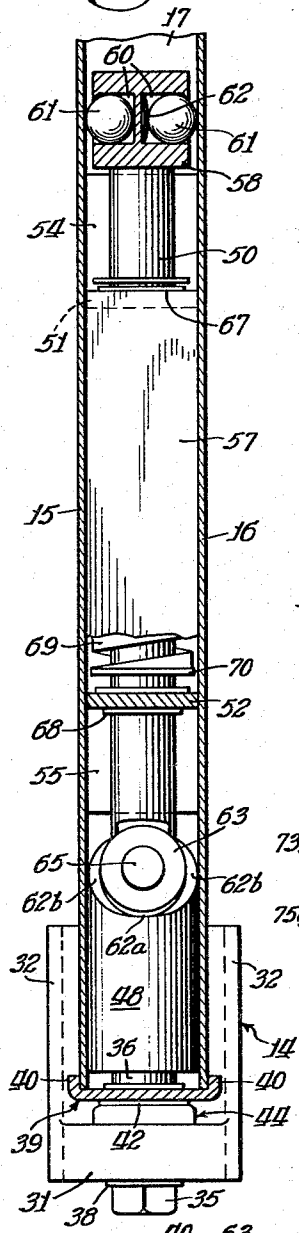


Fig. 11

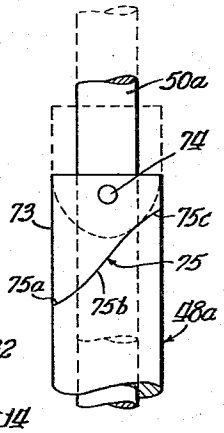
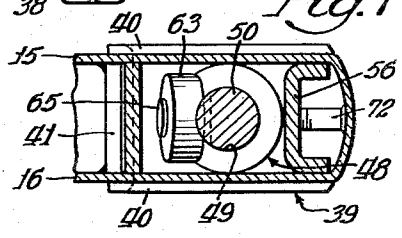


Fig. 5

Fig. 7



Inventors:
Mitchell Kotermanski
and Warren K. Rutledge
By: H. J. Schmid Atty

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CONTROL DEVICE FOR SWINGING DOORS

Mitchell Kotermanski, Berwyn, and Warren K. Rutledge, Maywood, Ill., assignors to Accurate Partitions, Inc., McCook, Ill., a corporation of Illinois

Filed Apr. 8, 1958, Ser. No. 727,175
17 Claims. (Cl. 16—182)

This invention relates to control devices for swinging doors and more particularly to an improved control device designed to be concealed within the door and to automatically control door movement to a desired open or closed position.

An object of the invention is to provide an improved swinging door control device concealable in the door and operative to swing the door to, and maintain the door in, any desired open or closed position.

Another object of the invention is to provide an improved control device for swinging doors operative to effect movement of the door to a desired open or closed residence position and which device may be quickly adjusted to provide movement of the door to another and optional position by a portion of the device readily accessible from the exterior of the door.

Another object of the invention is to provide an improved control device for swinging doors concealable within the door and operative to swing the door to a desired residence position without vertical movement of the door.

Another object of the invention is to provide an improved swinging door control device of the type described and embodying a co-operating spring, cam mechanism, and movable actuating member effective to move a swinging door to a selected open or closed position and to yieldingly maintain the door in the selected position.

Another object of the invention is to provide an improved control device for swinging doors and designed as a unitary assembly readily insertable in and removable from the door.

A specific object of the invention is to provide an improved swinging door control device of the type described and adapted to be concealed within the door, the device including a door-actuating member rotatable with the door during physical movement of the door from its residence position, a cam fixed to a door hinge bracket, a roller connected to the member and co-operating with the cam to vertically move the member to compress a spring, release of physical effort causing the compressed spring to rotate the member and thereby automatically swing the door to the selected open or closed position.

Other objects and advantages of the invention will become apparent from the following specification taken together with the accompanying drawings, in which:

FIG. 1 is an elevational view of a swinging door structure embodying a control device constructed according to the invention;

FIG. 2 is a top plan view of the swinging door structure illustrated in FIG. 1, the view showing the door located in its closed position by the control device.

FIG. 3 is an enlarged sectional view of the upper hinge assembly, portions of the door and upper hinge assembly being broken away to more clearly show the details of construction.

FIG. 4 is an enlarged vertical cross sectional view of the upper hinge assembly, said section being taken on line 4—4 of FIG. 3 looking in the direction of the arrows.

FIG. 5 is an enlarged elevational view of the lower hinge assembly and the control device, portions of the door and the hinge assembly being broken away to more clearly show details of construction.

FIG. 6 is an enlarged vertical view of the lower hinge assembly and the control device, portions of the door, hinge assembly and control device being shown in cross-section as viewed on line 6—6 of FIG. 5.

FIG. 7 is an enlarged fragmentary horizontal sectional view of the door and the control device taken substantially on line 7—7 of FIG. 5.

FIG. 8 is an enlarged fragmentary vertical view of the door, hinge assembly and control device taken substantially on line 8—8 of FIG. 5.

FIG. 9 is a front elevational view of a cam of the control device.

FIG. 10 is a side elevational view of the cam shown in FIG. 9.

FIG. 11 is a front elevational view of a modified cam adaptable for the door control device.

The improved control device of the present invention may be embodied in any swinging door structure and particularly with doors occupying substantially the entire width or, if desired, the entire area of an associated door frame. By way of example, there is shown a door structure including a door 10 disposed between two spaced door frame members 11 and 12 and occupying substantially the entire width of the door frame defined by the frame members 11 and 12. Swinging movement of the door on the frame member 12 is provided by upper and lower hinge assemblies 13 and 14.

While the door 10 may be formed of any size and shape and of any suitable material, the door is preferably made of metal and comprises spaced metal side panels 15 and 16 connected at their adjacent edges by metal strips 17 welded or otherwise suitably secured to the panel edges to provide a rigid unitary door construction.

As shown in FIGS. 1, 3 and 4, the upper rear corner of the door is reinforced and strengthened by a bracket 18 secured to the door, the bracket extending between the door panels and providing a corner closure having a neat and attractive appearance. Also, the bracket forms a portion of the hinge assembly 13, as each of the panels 15 and 16 of the door at the upper rear edge thereof are formed with aligned slots for receiving a horizontally extending portion of the bracket defined by spaced walls 19 and 20 and a connecting end wall 21 engaging and connected to the adjacent slot-defining edges of the panels. The bracket is provided with aligned openings in the upper horizontal wall and also the walls 19 and 20 thereof for receiving a hinge pin 22 extending through the openings and also a cylindrical opening, forming a bearing for the pin, in the horizontal arm 23 of a hinge bracket secured to the door frame member 12, the bracket having spaced vertically extending wings 24 disposed on opposite sides of and fixed to the frame member 12 by bolts 25 extending through the wings 24 and the frame member to securely mount the bracket on the frame member. The hinge assembly 13 further comprises a component radial thrust bearing 26 received within an annular recess 27 in the bracket arm 23 and having an outer ring fitting within and engaging the recess walls and its inner ring surrounding and engaging a reduced end portion 28 of the pin defined by a shoulder 29 positioned on the inner ring, the outer and inner rings providing a bearing raceway therebetween for ball bearings as shown in FIG. 3. The pin has its reduced portion 28 in threaded engagement with a cylindrical boss 30 extending downwardly from the wall 20 of the hinge bracket 18 to secure the pin to the bracket. It will be apparent that, as the hinge pin 22 is fixed to the door, and the bearing 26 pivotally supports the pin and thereby the door on the hinge bracket secured to the frame member 12, the hinge assembly 13 permits the door to swing freely relative to the door frame.

The lower hinge assembly 14 is shown in FIGS. 5, 6

and 8 and comprises a bracket having a horizontal arm 31 extending outwardly of the frame member 12, and underlying the door, and spaced wings 32 disposed on opposite sides of and secured to the frame member 12 by bolts 33 extending through the wings 32 and the frame member 12. The bracket arm 31 is provided with a bore 34 receiving a bolt 35 extending upwardly for threaded engagement with an interiorly threaded cylindrical member or nut 36 having its lower end seated on the bottom wall of a recess 37 of the bracket arm 31 and firmly secured to the bracket by the bolt 35 when the bolt 35 is tightened to clamp the bracket arm 31 between the head of the bolt 35 and the nut 36. To prevent relative movement of the bolt 35 and the member 36, a lock washer 38 is positioned on the bolt between its head and the bracket arm 31.

The lower rear corner of the door, adjacent the bracket 31, is defined by identically formed cutout portions of the spaced panels 15 and 16 providing an opening in the door corner covered by a closure cap 39 of L-section extending between and in complementary engagement with the spaced edges of the panels, the cap having side flanges 40 engaging the remote sides of the panels to prevent dust, and other foreign matter, from entry into the door while concealing the edge portions of the door panels engaged by the cap. As seen in FIG. 5, the closure cap 39 is securely fixed to the door by bolts threaded into a metal strip 41 extending between and welded to the panels 15 and 16.

Referring to FIG. 8, the cap 39 is provided with an opening receiving a split plastic ring or liner 42 through which the cylindrical member 36 extends, the ring having flanges engaging opposite sides of the cap 39 to retain the ring in the cap opening. The race ring 43 of a thrust bearing 44 surrounds the cylindrical member 36 and is positioned within a retainer ring 47 in the recess 37 of the bracket arm 31. The bearing 44 also includes a race ring 45 surrounding the cylindrical member 36 and engaging the bottom of the ring 42. The race ring 45 is rotatably supported on the race ring 43 by balls 46 to permit the race ring 45 to freely rotate on the fixed race ring 43. The race rings 43 and 45 and balls 46 are disposed within the retainer ring 47 forcibly engaged with the walls of the recess 37 of the bracket arm 31 by the balls to exert a clamping effect on the race 43 to prevent rotation thereof. It will be apparent that the cylindrical member 36 is fixed to the bracket of the hinge assembly 14 and affords a stationary pivot about which the door rotates for swinging movement, the bearing 44 rotatably supporting the door on the hinge bracket arm 31 and reducing frictional resistance to swinging movement of the door to any open position on opposite sides of the door frame or to a closed position. In addition, the location of the bearing-receiving recess in the bracket is effective to permit the door to be maintained in a desired closely spaced relation to the door frame members 11 and 12 in the closed position of the door. The hinge assemblies 13 and 14, as described, are effective to support the door and permit swinging movement of the door with respect to the door frame.

A control device embodying the invention is wholly contained and housed within the door body in the space between the door panels 15 and 16 and is effective to automatically return the door to an open or closed residence position after the door has been physically swung to another position. More particularly, the control device in the form of cam means which comprises a cam 48 which may be formed integral with the cylindrical member 36 or may be formed separately and welded to the top of the member 36. As the member 36 is secured to the bracket of the hinge assembly 14 fixed to the door frame, the cam is also stationary during swinging movement of the door. The cam 48 is cylindrical in shape to provide a guide bearing 49 receiving the lower end of an elongate member or a rod 50, the rod extending upwardly through aligned openings in two parallel arms 51 and 52 of a C-shaped member 53. The arms 51 and 52 of the member 53 have split plastic rings or liners 67 and 68 guidingly engaging the rod with flanges extending outwardly and engaging the adjacent edge portions of the openings in the arms 51 and 52. The member 53 forms a portion of a supporting frame structure for the rod 50 and, for this purpose, has outwardly and vertically extending terminal portions 54 and 55 welded to the back of a channel frame member 56 extending substantially the length of the rod 50 and having its lower end engaging and welded to the closure cap 39, the side flanges of the channel 56 providing sufficiently large areas engageable with the side flanges of the cap to insure adequate welds to the cap to securely hold the channel member 56 in fixed relation to the cap 39. To further insure correct positioning of the rod 50, a brace 57 in the form of a metal strip is welded at spaced points to the frame member 53 as shown in FIG. 5, the brace 57 extending downwardly and having an inturned end portion engaging and welded to the closure cap 39. It will be apparent that the C-shaped member 53, the channel member 56, brace 57, and cap member 39 provide a unitary frame for supporting the rod 50 relative to the cam 48 and hinge assembly 14 and in a position aligning the axis of the rod 50 with the axis of the bearing assembly 44 for rotation of the rod relative to the stationary cam by mechanism that will now be described.

The control device further comprises a radius bar or arm 58 mounted on the upper end of the rod 50, the bar 58 having an opening at one end receiving the end of the rod and a pin 59 extending through aligned openings in the rod and the bar 58 to secure the bar to the rod. As shown in FIG. 6, the outer end of the radius bar 58 is provided with pockets 60 in opposite sides thereof for receiving balls 61 engaging the adjacent sides of the panels 15 and 16, the edges of the pocket portions of the bar 58 being peened over to retain the balls within the pockets 60 while permitting free rolling movement of the balls on the panels during vertical axial movement of the rod by the bar during swinging movement of the door. A spring washer 62 is provided within one of the pockets 60 of the bar and is located between and in engagement with a ball 61 and a wall of the pocket to yieldingly urge the ball 61 in a direction outwardly of the pocket and into engagement with the door panel 16. The flexed spring washer 62 is effective to constantly urge the engaged ball 61 into contact with the side panel 16 and also to move the radius bar 58 toward the panel 15 to maintain the other ball 61 in constant engagement with the door panel 15. Thus, the spring pressure exerted by the washer 62 maintains the balls 61 in engagement with the side panels 15 and 16, but may yield upon any tendency for the ball bearings to bind upon the door panels to prevent any jamming or cocking action between the radius bar 58 and the door panels 15 and 16 during swinging movement of the door. This arrangement is also effective to insure that both balls 61 will be in engagement with the door panels despite variations occurring in the width of the space between the panels of doors of different thickness.

Referring now more specifically to the cam 48, the upper face of the cam presents a cam track having a depressed valley or dwell point 62*a* and inclined riser faces 62*b* extending therefrom and terminating adjacent the crown 62*c*. The cam track of the cam 48 is adapted to co-operate with another portion of the cam means of the control device comprising a cam follower in the form of roller 63 rotatably mounted on the rod 50 by a bearing pin 65 threaded into an opening extending through the rod and disposed at an upwardly inclined angle to the axis of the rod. As seen in FIG. 5, the pin 65 is formed with a shoulder 66 engaging the rod to provide a stop, after entry of the pin 65 into the opening in the rod, and to space the roller 63 from the rod to permit free rolling action of the roller along the cam track of the fixed cam 48 to vertically move the rod during rotation of the rod

by the radius arm 58 when the door is physically swung from its closed position to an open position. The cam 48 is mounted on the hinge bracket arm 31 so that its valley or dwell point 62*a* is oriented to engage the roller in the exemplary residence closed position of the door as shown in FIGS. 1 and 2.

The control device further comprises a helical spring 69 surrounding the portion of the rod 50 between the arms 51 and 52 of the C-shaped frame member 53. The upper flat end of the spring 69 is seated against the split plastic liner 67 and the lower end of the spring is positioned on and engages a split metal ring or washer 70 received within an annular groove 71 in the rod 50 so that the spring 69 is retained between the liner 67 and the ring 70 and is slightly compressed to constantly urge the rod 50 in a downward direction to insure engagement of the roller 63 with the cam track of the cam 48. Adjustment of compression of the spring to increase its force may be obtained by positioning the washer 70 in either one or the other of two annular grooves 71*a* and 71*b* in the rod 50 to provide satisfactory swinging movement of doors of heavy weight to the residence position.

In the operation of the device and assuming that the door 10 is physically swung from the closed residence position shown in FIG. 1 to an open position, the radius bar 58 will move with the door to rotate the rod 50 in the same direction of swinging movement of the door. As the cam 48 is fixed to the arm 31 of the stationary hinge bracket, the rotation of the rod will cause the roller 63 to move up the inclined cam face 62*b* of the cam 48 to move the rod 50 and bar 58 upwardly to compress the spring 69. Upon the release of physical swinging movement of the door to an open position, the compressed spring will move the rod 50 and the roller 63 downwardly, the roller traveling along the cam face 62*b* of the cam 48 and into the valley 62*a* of the cam. This movement of the cam roller 63 and consequent rotation of the rod 50 causes the radius bar 58 to exert pressure on the door to return the door to its closed position.

An important feature of the invention resides in the provision of the ball arrangement in the radius bar 58 and its co-operation with the door panels 15 and 16 affording a rolling ball action on the panels during vertical movement of the radius bar and rod relative to the door during swinging movement of the door. This ball arrangement is particularly effective for preventing any possibility of any binding or jamming action between the radius bar 58 and the side panels 15 and 16 of the door, as the balls 61 are free to rotate in any direction of relative movement between the radius bar and the door.

As it may be desirable to have the door automatically swing to and be maintained in a desired open residence position, this can be readily accomplished by rotating the exposed bolt 35 in a direction to release its clamping effect on the hinge bracket 31 to permit rotation of the door-position controlling cam, moving the door to the selected open residence position to rotate the cam and retightening the bolt to firmly secure the cam against rotation. More particularly, loosening the bolt 35 permits rotation of the cam 48 from a closed door to an open door-controlling position by the roller 63 as the compressive effort of the spring 69 on the rod and roller causes the roller, engaged with the valley portion of the cam, to rotate the cam, upon swinging of the door to its open residence position, so that tightening of the bolt will fix the cam 48 in its new location to render the control device effective to automatically move the door to the desired open position after the door is physically swung.

An important feature of the invention resides in the unitary structure of the control device which permits the control device to be inserted as a complete assembly within the small opening in the lower corner of the door by disposing the control device at an angle permitting entry of the radius bar 58 within the opening and thereafter rotating the control device upwardly and into the door with the closure cap 39 closing the opening in the door and being secured to the door by screws as shown in FIG. 5, screws 72 also being inserted in openings in the strip 17 and threaded into openings in the channel 56.

It will be seen from an inspection of FIG. 6 that the narrow width of the control device is particularly adapted to doors having closely spaced side panels 15 and 16. As the control device is completely concealed within the door, the desired ornamental appearance and smooth contours of the door are obtained, while preventing any possibility of dirt, or other extraneous matter, entering into the door to impair the operation of the door control device.

The assembled door and control device may be readily connected to the hinge structures 13 and 14 by positioning the lower end of the cylindrical member 36 and attached thrust bearing assembly 44 within the recess 37 in the hinge bracket arm 31 of the hinge assembly 14 and simultaneously positioning the bracket arm 23 and attached bearing assembly 26 of the hinge assembly 13 within the slot in the door bracket 18. Thereafter, the hinge pin 22 may be inserted within the aligned openings in the horizontal upper wall and portions 19 and 20 of the door bracket 18 and into the opening in the bracket arm 23 with the reduced portion 28 of the pin 22 extending through the inner race 29 of the bearing assembly 26, and thereafter rotating the pin to engage the threads on the pin with the threads on the boss 30 of the door bracket 18. The bolt 35 is then inserted within the opening 34 in the lower hinge bracket arm 31 for threaded engagement with the cylindrical pivot member 36, the door being rotated to and held in the desired open or closed residence position during tightening of the bolt 35 to insure the cam 48 being properly positioned to automatically return the door to the selected residence position upon physical swinging movement of the door.

FIGURE 11 illustrates a modified cam means or mechanism for the control device and comprises a stationary tubular cam member 48*a*, which may be suitably secured to a cylindrical pivot member, such as the member 36 in FIGS. 5 and 6, and in which is received the lower end of a rod 50*a* for axial and rotational movement relative to the cam member 48*a*. The cam mechanism further comprises a tubular cam member 73 through which extends the rod 50*a*, a pin 74 extending radially through the rod and cam member 73 to secure these parts together. The cam member 48*a* is provided with a cam track 75 including a valley or dwell point 75*a* and inclined riser faces 75*b* terminating adjacent the crown 75*c*, and in engagement with complementary surfaces on the cam member 73. In operation and when the door is physically swung from the exemplary closed residence position, the rod 50*a* will swing with the door and the cam member 73 will rotate relative the cam member 48*a* to the dotted line position shown in FIG. 11 to compress the spring and thereby apply a camming load on the cam member 73 sufficient to swing the door to the desired residence position during downward and rotary movement of the cam member 73 into full engagement with the cam track of the cam member 48*a*. If desired, the cam members 48*a* and 73 may be formed of a hard plastic material, such as nylon produced under the trade name "Zytel" by Du Pont.

While the invention has been described in connection with a specific embodiment thereof, it is to be understood that this is by way of illustration and not by way of limitation and the scope of the invention is defined solely by the appended claims.

What is claimed is:

1. A door control device including a stationary member adapted to be fixed to an exterior door hinge bracket, said stationary member extending within the door body, and providing a pivot for the door body for swinging movement of the door and also providing a hollow guide bearing; an element supported within and on the door

body and extending within said guide bearing for rotatable and axial movement relative to said stationary member during swinging movement of the door and having a radially extending portion operative to exert pressure on an interior portion of the door to swing the door; cam means on said member and on said element; and force means within the door body and co-operating with said cam means and energizable to move the radially extending portion of said element to thereby effect swinging movement of the door to a predetermined residence position.

2. A door control device including a stationary member adapted to be fixed to an exterior door hinge bracket, said stationary member extending within the door body, and providing a pivot for the door body for swinging movement of the door and also providing a hollow guide bearing; an element supported within and on the door body and extending within said guide bearing for rotatable and axial movement relative to said stationary member during swinging movement of the door and having a radially extending portion operative to exert pressure on an interior portion of the door to swing the door; cam means on said member and on said element and axially spaced from the radially extending portion of said element; and force means within the door body and co-operating with said cam means and energizable to move the radially extending portion of said element to thereby effect swinging movement of the door to a predetermined residence position.

3. A door control device including a stationary member adapted to be fixed to an exterior door hinge bracket, said stationary member extending within the door body, and providing a pivot for the door body for swinging movement of the door and also providing a hollow guide bearing; an element supported within and on the door body and extending within said guide bearing for rotatable and axial movement relative to said stationary member during swinging movement of the door and having a radially extending portion operative to exert pressure on an interior portion of the door to swing the door; cam means on said member and on said element and axially spaced from the radially extending portion of said element; and a coil spring surrounding and supported on said rotatable element and compressed, during swinging movement of said door from a predetermined residence position, to apply pressure on said cam means to automatically effect swinging movement of the door to the predetermined residence position.

4. A door control device including a stationary member adapted to be fixed to an exterior door hinge bracket, said stationary member extending within the door body, and providing a pivot for the door body for swinging movement of the door, said member providing a hollow guide bearing and also having a cam track; an elongate element supported within and on the door body and having its axis aligned with the pivotal axis of said stationary member and positioned within said guide bearing for rotational and axial movement relative to said stationary member during swinging movement of the door, said element having a radially extending portion operative to exert pressure on an interior portion of the door to swing the door; a cam follower in the form of a roller connected to and movable with said element and engaging the cam track of said member; and means supported on said element and applying a camming load on said roller to effect swinging movement of the door to a predetermined residence position.

5. A door control device including a stationary member adapted to be fixed to an exterior door hinge bracket, said stationary member extending within the door body, and providing a pivot for the door body for swinging movement of the door, said member having a cam track; an elongate rod element supported within and on the door body, said element having its longitudinal axis aligned with the pivotal axis of said stationary member and being rotatable and axially movable relative to said stationary member during swinging movement of the door, said element having a radially extending portion operative to exert pressure on an interior portion of the door to swing the door; a cam follower in the form of a roller connected to and movable with said element and engaging the cam track of said member; and a spring supported on said element and compressed, during swinging movement of said door from a predetermined residence position, to apply a camming load on said roller to effect swinging movement of the door to the predetermined residence position.

6. A door control device including a stationary tubular member adapted to be fixed to an exterior hinge bracket, said stationary member extending within the door body, and providing a pivot for the door body during swinging movement of the door, said tubular member having a cam track; a frame within and fixed to and movable with the door body; an elongate element supported in said frame and extending and rotatable and axially movable within said tubular member and having a radially extending portion operative to exert pressure on an interior portion of the door to swing the door; a cam follower in the form of a roller connected to said element and engaging the cam track of said tubular member; and means supported on said frame and operative on said element to apply a camming load on said roller to effect swinging movement of the door to a predetermined residence position.

7. A door control device including a stationary tubular member adapted to be fixed to an exterior hinge bracket, said stationary member extending within the door body, and providing a pivot for the door body for swinging movement of the door, said tubular member having a cam track; a frame within and fixed to and movable with said door body and having upper and lower spaced portions with aligned openings therein; an elongate element supported in the openings in the spaced portions of said frame for rotatable and axial movement relative to said tubular member and having one end extending within said tubular member and having a radially extending portion on the other end thereof operative to exert pressure on an interior portion of the door to swing the door; a cam follower in the form of a roller connected to said element and engaging said cam track; and means between said spaced portions of said frame and operative on said element to apply a camming load on said roller to move the radially extending portion of said element to effect swinging movement of the door to a predetermined residence position.

8. A door control device including a stationary member adapted to be fixed to an exterior door hinge bracket, said stationary member extending within the door body, and providing a pivot for the door body for swinging movement of the door, said member providing a guide bearing and also having a cam track; an elongate rod element supported within and on the door body and having its axis aligned with the pivotal axis of said stationary member and positioned within said guide bearing for rotation and axial movement relative to said stationary member during swinging movement of the door, said element having a radially extending portion operative to exert pressure on an interior portion of the door to swing the door; a cam follower in the form of a roller connected to and movable with said element and engaging said cam track; force means applying a camming load on said roller to effect swinging movement of the door to a predetermined residence position; and adjustable means for variably adjusting the force of said force means to apply different camming loads on said roller.

9. A door control device including a stationary member adapted to be secured to an exterior door hinge bracket, said stationary member extending within the door body, and providing a pivot for the door body for swinging movement of the door and also providing a

hollow guide bearing; an elongate rod member supported within and on the door body and extending within said guide bearing and rotatable with the door body and axially movable relative to said stationary member during swinging movement of the door, said elongate member having a radially extending portion operative to exert pressure on an interior portion of the door to swing the door; cam means on said members axially spaced from the radially extending portion of said elongate member; and means supported on said elongate member within the door body and co-operating with said cam means to apply pressure to said cam means and said elongate member to move the radially extending portion of said elongate member to thereby effect swinging movement of the door to a predetermined residence position; and means for varying the position of the cam means on one of said members to selectively adjust the residence position of the door.

10. A door control device including a normally stationary member adapted to be adjustably secured to an exterior door hinge bracket, said stationary member extending within the door body, and providing a pivot for the door body for swinging movement of the door and also providing a hollow guide bearing; an elongate element extending within said guide bearing and supported within and on the door body and rotatable relative to said stationary member during swinging movement of the door, said element having a radially extending portion operative to exert pressure on an interior portion of the door to swing the door; cam means on said member and on said element axially spaced from the radially extending portion of said element; a coil spring supported on and surrounding said element and compressed, during swinging movement of the door from a predetermined residence position, to apply pressure on said element and said cam means to automatically effect swinging movement of the door to the predetermined residence position; and means associated with said member whereby said member may be rotated from the exterior of the door body to selectively orient said cam means on said member to adjust the residence position of the door.

11. A door control device including a normally stationary member adapted to be adjustably secured to an exterior door hinge bracket, said stationary member extending within the door body, and providing a pivot for the door for swinging movement of the door, said member providing a tubular guide bearing and also having a cam track; an elongate rod element supported within and on the door body and having its axis aligned with the pivotal axis of said stationary member and having one end positioned in said guide bearing for rotation and axial movement of said element relative to said stationary member during swinging movement of the door, said element having a radially extending portion operative to exert pressure on an interior portion of the door to swing the door; a cam follower in the form of a roller connected to and movable with said element and engaging said cam track; means supported on said element and operative, during swinging movement of said door from a predetermined residence position, to apply a camming load on said roller to effect swinging movement of the door to the predetermined residence position; and means associated with said stationary member whereby said member may be adjusted from the door exterior to selectively rotate said member and its cam track and to secure the member to the hinge bracket to selectively adjust the residence position of the door.

12. A door control device including a normally stationary tubular member adapted to be adjustably connected to an exterior hinge bracket, said stationary member extending within the door body, and providing a pivot for the door body for swinging movement of the door, said tubular member having a cam track with an inclined cam portion and a valley portion; a frame within and secured to said door body and having upper and lower spaced portions with aligned openings therein; an elongate element supported in the openings in said spaced portions of said frame for axial and rotative movement relative to said stationary member during swinging movement of the door, said element having one end extending into said tubular member and its other end provided with a radially extending portion having pockets in opposite sides thereof; balls in said pockets; a spring in one of said pockets and disposed between and engaging the ball therein and a pocket wall and operative to move said balls into engagement with interior portions of the door body; a cam follower in the form of a roller connected to said element and engaging the cam track on said member; a coil spring between said spaced portions of said frame and surrounding said element; and means connected to said element and engaging one end of said coil spring to position the opposite end of said coil spring against said upper spaced portion of said frame, said coil spring being compressed by movement of said roller along said cam track and axial movement of said element in one direction during swinging movement of the door from a predetermined residence portion, said compressed coil spring being effective to apply pressure to said roller to axially move said element in the opposite direction to effect swinging movement of the door to a predetermined residence position; and means associated with an exposed portion of the stationary member whereby said member may be adjusted from the exterior of the door body to selectively orient the valley portion of the cam track and accordingly selectively adjust the residence position of the door.

13. A door control device including a normally stationary tubular member adapted to be adjustably connected to an exterior hinge bracket, said stationary member extending within the door body, and providing a pivot for the door body for swinging movement of the door, said tubular member having a cam track with an inclined cam portion and a valley portion; a frame within and secured to said door body and having upper and lower spaced portions having aligned openings therein; an elongate element supported for axial and rotative movement in the openings in said spaced portions of said frame relative to said stationary member during swinging movement of said door, said element having one end extending into said tubular member its other end provided with a radially extending portion having pockets in opposite sides thereof; balls in said pockets; a spring in one of said pockets and disposed between and engaging the ball therein and a pocket wall and operative to move said balls into engagement with interior portions of the door body; a cam follower in the form of a roller connected to said element and engaging the cam track on said member; a coil spring between said spaced portions of said frame and surrounding said element; stop means connected to said element and engaging one end of said coil spring to position the opposite end of said coil spring against said upper spaced portion of said frame, said coil spring being compressed during movement of said roller along said cam track and axial movement of said element in one direction during swinging movement of said door from a predetermined residence portion, said compressed coil spring being effective to apply pressure to said roller to axially move said element in the opposite direction and to rotate said element to effect swinging movement of the door to a predetermined residence position; means associated with the exposed portion of the stationary member whereby said member may be adjusted from the exterior of the door body to selectively orient the valley portion of the cam track and accordingly selectively adjust the residence position of the door; and means associated with said element and co-operative with said stop means for adjusting said stop means on said element to vary the compression of said spring.

14. A door control device including a stationary tubular member adapted to be connected to an exterior hinge

bracket, said stationary member extending within the door body, and providing a pivot for the door body for swinging movement of the door, said tubular member having a cam track with an inclined cam portion and a valley portion; a frame within and secured to said door body and having upper and lower spaced portions having aligned openings therein; an elongate element supported for axial and rotative movement in the openings in said spaced portions of said frame relative to said stationary member during swinging movement of said door, said element having one end extending into said tubular member its other end provided with a radially extending portion having pockets in opposite sides thereof; balls in said pockets; a spring in one of said pockets and disposed between and engaging the ball therein and a pocket wall and operative to move said balls into engagement with interior portions of the door body; a cam follower in the form of a roller connected to said element and engaging the cam track on said member; a coil spring between said spaced portions of said frame and surrounding said element; stop means connected to said element and engaging one end of said coil spring to position the opposite end of said coil spring against said upper spaced portion of said frame, said coil spring being compressed during movement of said roller along said cam track and axial movement of said element in one direction during swinging movement of said door from a predetermined residence portion, said compressed coil spring being effective to apply pressure to said roller to axially move said element in the opposite direction and to rotate said element to effect swinging movement of the door to a predetermined residence position; and means associated with said element and co-operative with said stop means for adjusting said stop means on said element to vary the compression of said spring.

15. A door control device including a stationary member adapted to be fixed to an exterior door hinge bracket, said stationary member extending within the door, and providing a pivot for the door for swinging movement of the door; an element supported within the door and rotatable relative to said stationary member during swinging movement of the door and having a radially extending portion operative to exert pressure on an interior portion of the door to swing the door; a plurality of balls rotatably supported in the sides of said radially extending portion of said element and projecting outwardly thereof for rolling engagement with interior portions of the door; cam means on said element and said member; and means within the door for applying a camming load on said cam means to effect swinging movement of the door to a desired residence position.

16. A door control device including a stationary member adapted to be fixed to an exterior door hinge bracket, said stationary member extending within the door, and providing a pivot for the door for swinging movement of the door; an element supported within the door and rotatable relative to said stationary member during swinging movement of the door, and having a radially extending portion operative to exert pressure on an interior portion of the door to swing the door; a plurality of balls rotatably supported in the sides of said radially extending portion of said element and projecting outwardly thereof for rolling engagement with facing interior portions of the door; a spring in said radially extending portion of said element and operative to urge at least one of said balls yieldably into engagement with one of said facing interior portions of the door and thereby to move said radially extending portion of said element to engage the other of said balls with the other facing interior portion of said door; cam means on said element and said member; and means within the door for applying a camming load on said cam means to effect swinging movement of the door to a desired residence position.

17. A door control device including a stationary tubular member adapted to be fixed to an exterior door hinge bracket, said stationary member extending within the door body and providing a pivot for the door body for swinging movement of the door and also providing a hollow guide bearing; an elongate rod element supported within and on the door body and having its longitudinal axis aligned with the axis of said stationary member and extending within said guide bearing of said stationary member for rotation and axial movement relative to said stationary member during swinging movement of the door and having a radially extending portion operative to exert pressure on an interior portion of the door to swing the door; cam means on said member and on said element and axially spaced from the radially extending portion of said element, the cam means on said member having a valley portion and inclined cam portions in complementary engagement with cam portions of the cam means on said element; and means to move the radially extending portion of said element to thereby effect swinging movement of the door to a predetermined residence position.

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