

H. G. VOIGHT.

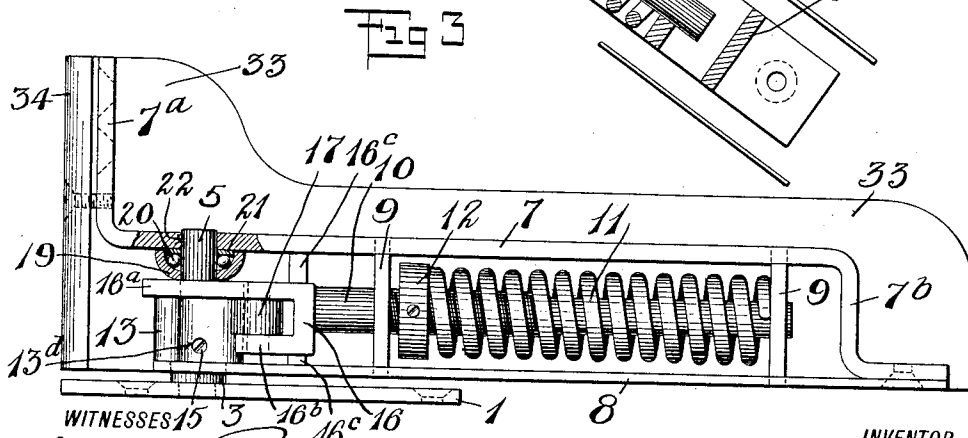
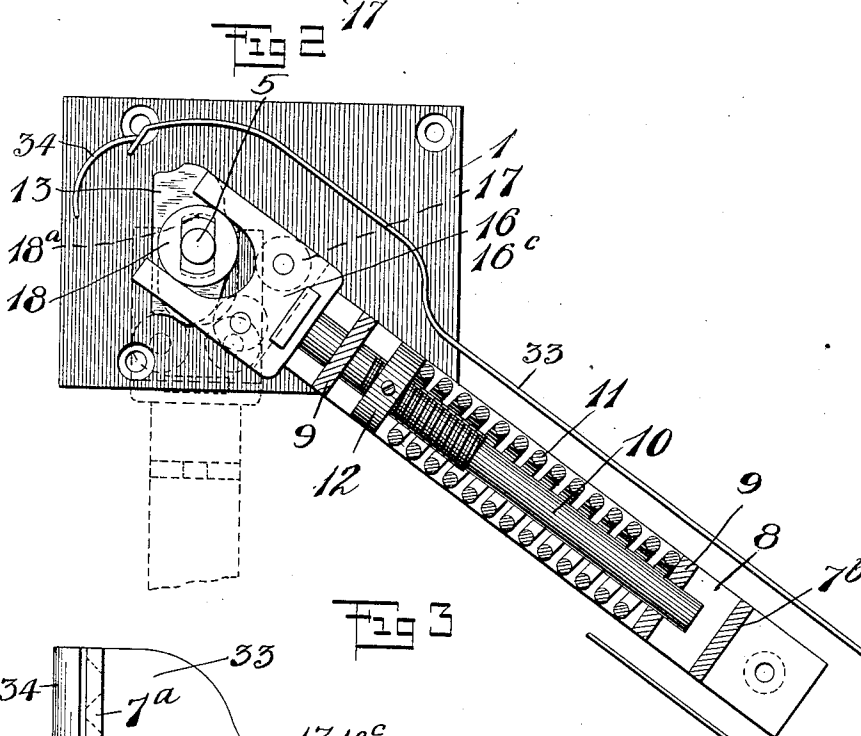
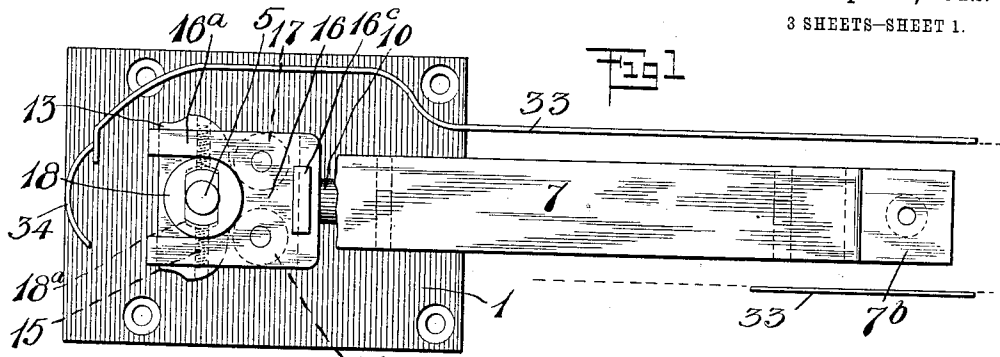
FLOOR HINGE.

APPLICATION FILED APR. 12, 1912.

1,039,618.

Patented Sept. 24, 1912.

3 SHEETS-SHEET 1.



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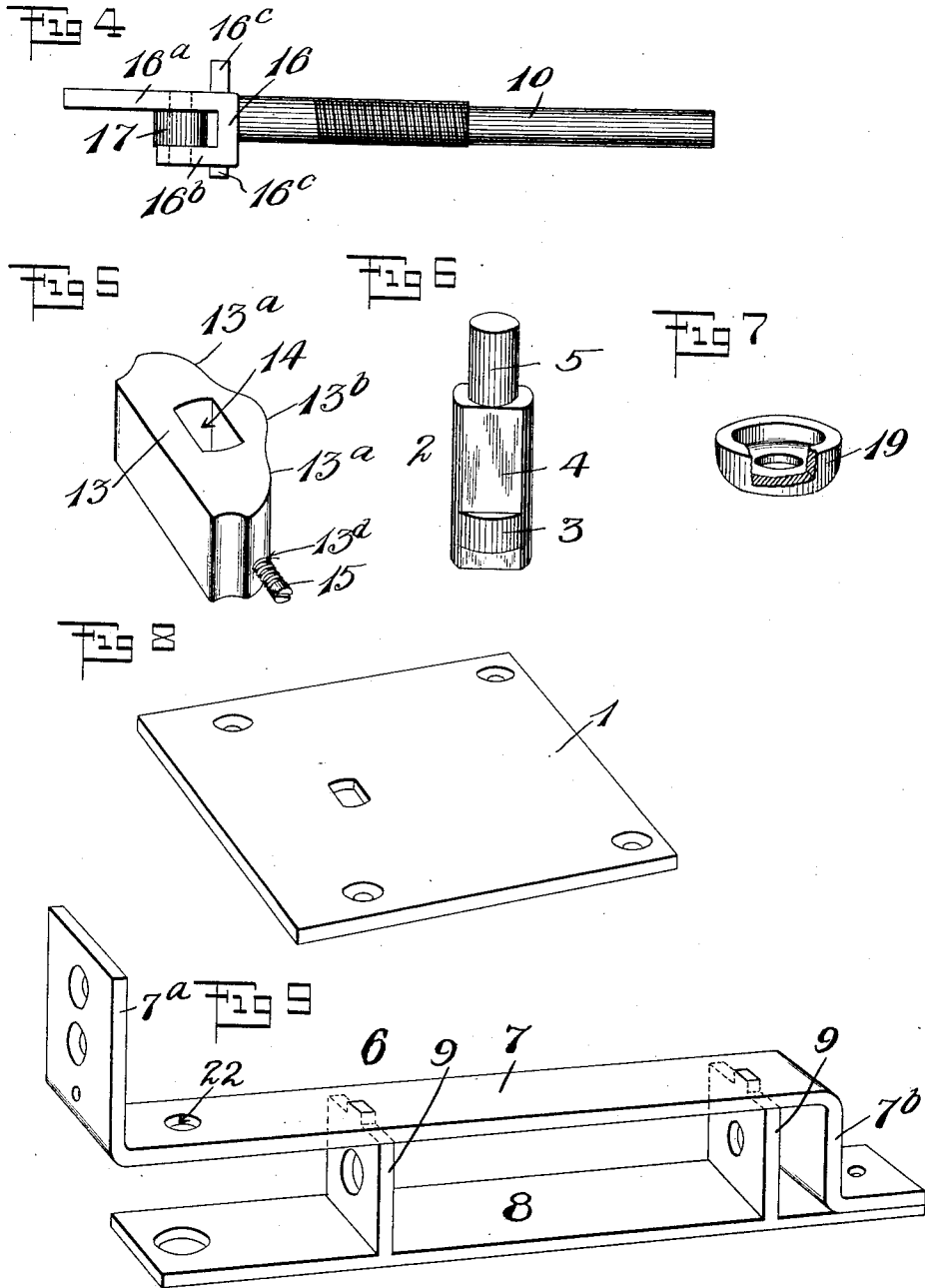
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3 SHEETS-SHEET 2.



WITNESSES

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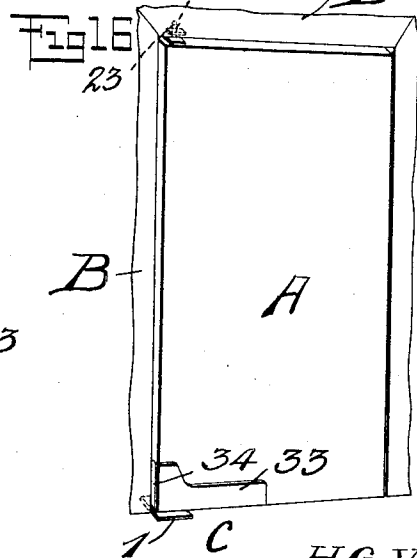
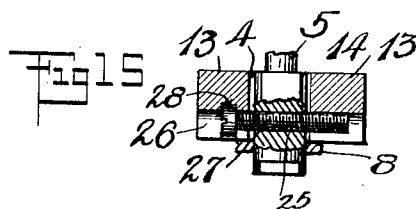
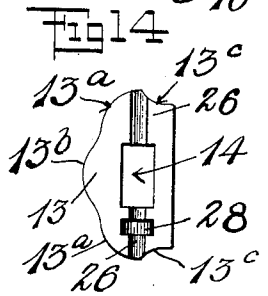
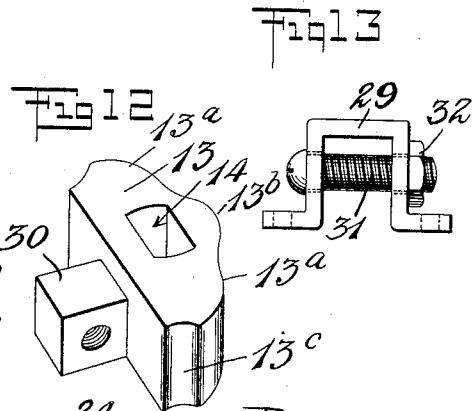
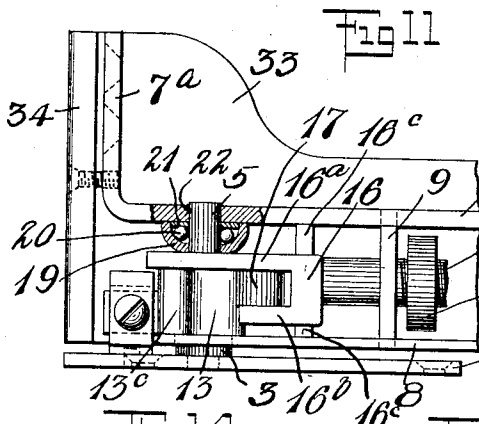
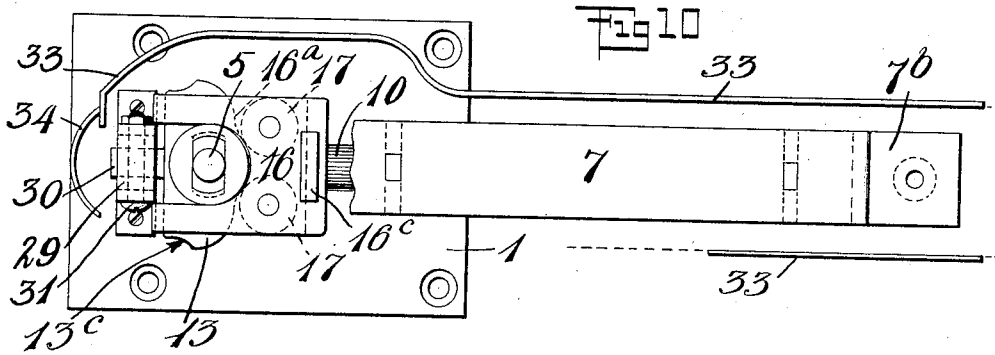
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3 SHEETS-SHEET 3.



WITNESSES

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UNITED STATES PATENT OFFICE.

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FLOOR-HINGE.

1,039,618.

Specification of Letters Patent.

Patented Sept. 24, 1912.

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To all whom it may concern:

Be it known that I, HENRY G. VOIGHT, a citizen of the United States, residing at New Britain, county of Hartford, State of Connecticut, have invented certain new and useful Improvements in Floor-Hinges, of which the following is a full, clear, and exact description.

This invention relates to floor hinges and particularly to a spring floor hinge especially useful in connection with swinging doors moving in either direction (such, for instance, as the entrance doors to so-called "butlers' pantries").

The hinge of my invention is adapted to releasably lock the door open in either extreme of its swing (*i. e.*, when extended outwardly at substantially right angles to its central line of closure); to automatically swing the door closed when released from locked position or when only partially swung open; and to check the closing movement of the door beyond central closed position and minimize the to and fro oscillation after reaching such position. Another important result attained is in adjustment means for accurately centering the door in compensation of inaccurate initial position.

A preferable embodiment of my invention, productive of these and other advantages, is illustrated in the accompanying drawings, in which:

Figure 1 is a top plan view of the floor hinge detached from the door, parts being broken away. Fig. 2 is a top plan view, partly in section, of the hinge detached from the door, showing in full lines the positions of the parts with the door partly opened, and in dotted lines when fully opened. Fig. 3 is a side elevation, partly in section, of the parts shown in Fig. 1. Figs. 4, 5, 6, 7 and 8 are views of structural details. Fig. 9 is a perspective view of the frame for the hinge parts carried by the door. Fig. 10 is a top plan view of the hinge detached, and with parts broken away, showing a modified form of adjusting means. Fig. 11 is a fragmentary view, in side elevation, of the parts shown in Fig. 10, parts being shown in section. Figs. 12 and 13 are views of details of construction of the modified adjusting means. Fig. 14 is a bottom plan view of a modified cam plate. Fig. 15 is a longitudinal section through the modified cam plate and pivot stud illustrating

a second modification of the adjusting means. Fig. 16 is a perspective view illustrating a swinging door provided with the floor hinge of my invention.

As a preface to the description of the details of construction, it might be stated that the door to which my floor hinge may be applied is pivotally supported at two points in vertical alinement, one support being in the form of a pivot pin at the top and inner end of the door engaging in a suitable socket formed in the top of the door casing, and the other and bottom support forming the subject matter of this invention.

Referring to the drawings by numerals: A designates a door to which my floor hinge is applied, B the door casing and C the floor or threshold of the door.

1 designates a floor plate suitably secured, as by screws, to the floor or threshold at a point adjacent the inner edge of the door. Secured at its base to this floor plate by riveting, welding, or other means, and extending vertically upward therefrom, is a pivot stud 2 having at its lower end above the floor plate 1, a hub portion 3, an intermediate elongated portion having squared sides 4, and an upper hub end 5.

The lower and inner end of the door A is cut away to receive a frame 6 fitted to the edges of the door at such cut-away portion, this frame comprising an upper bar 7 extending along the lower cut-away edge of the door, and having an upwardly extending flange 7^a and a downwardly extending flange 7^b joined at its end to a lower bar 8 by riveting or otherwise. This lower bar, at its rear end, is journaled on the lower hub end 3 of the pivot stud. Vertical webs 9 extend between and connect the upper and lower bars 7—8 of the frame, and serve as guides for a horizontally reciprocating plunger 10, having mounted thereon a coiled spring 11 located between the vertical webs 9 and bearing against an adjusting nut 12 threaded on the plunger and serving as an abutment for the spring, this nut being adapted to be adjusted to vary the spring tension on the plunger. A guide plate or cam 13 fits over the intermediate squared portion 4 of the pivot stud 2, its lower end resting against the upper face of the lower bar 8 of the frame. This cam plate is provided with a central elongated aperture 14 therein, having its squared sides engaging with the

squared sides 4 of the intermediate portion of the pivot stud, the aperture 14 extending beyond the ends of said intermediate squared portion and permitting relative movement between said cam plate and pivot stud. This cam plate is provided at its front edge with complementary cam faces 13^a separated by a central positioning protuberance 13^b. At its opposite ends and forming practically a continuation of the complementary cam faces 13^a, are locking recesses 13^c. Extending longitudinally of the cam plate, and centrally with respect to the elongated aperture therein, are threaded apertures 13^d adapted to receive adjusting screws 15 for the purpose to be hereinafter explained.

The reciprocating plunger 10 carries at its inner end a bearing bracket 16 having an upper arm 16^a with an inner forked end fitting around the pivot stud 2 and overlying and resting upon the top of the cam plate 13, and a lower and shorter arm 16^b terminating at a point adjacent the cam faces 13^a. The bracket, adjacent the junction line of these two arms, is provided with vertically extending guide flanges 16^c engaging with the upper and lower bars 7 and 8 of the frame. Pivotaly mounted at the inner end of the bracket, between the upper and lower arms thereof, are anti-friction rollers 17 which are normally pressed against the outer or cam edge of the cam plate 13 by the coiled spring 11. Seated over the pivot stud 2 at the upper end of its squared intermediate section, is a bearing washer 18 having therein an elongated recess 18^a extending beyond the adjacent ends of said intermediate stud section, the squared sides of said washer adjacent said recess engaging with the squared sides of this section of the stud and making the washer non-rotatable with respect thereto. This washer rests on top of the cam plate 13 and between the forks of the upper arm 16^a of the bracket and, being non-rotatable, its peripheral edges form a bearing surface for the forked end of the upper arm. The bearing bracket 16 therefore can move longitudinally but not transversely and therefore maintains its plunger in longitudinal alignment at all times. Resting upon this washer 18 and seated about the upper hub end of the pivot stud 2, is a ball race 19 containing anti-friction balls 20 held therein by a cap washer 21 resting against the under face of the upper bar 7 of the frame, which is apertured at 22 to rest over the upper hub end 5 of the pivot stud to thereby journal the door thereon. The door, at its upper inner end, is provided with a suitable pivot pin 23 in vertical alignment with the pivot stud 2 at its lower end, this pivot pin 23 engaging in a suitable socket 24 formed in the top of the door casing.

From the construction as described, it will

be evident that the cam plate 13 and bearing washer 18 are stationary, by reason of the engagement of the squared sides of their apertures with the squared sides of the intermediate portion of the pivot stud 2. The door with its frame 6 and the parts carried thereby turn on the stud as a pivot, the bracket 16 being forced inwardly against the guiding cam plate 13 by the coiled spring 11, the anti-friction rollers 17 of the bracket engaging with the cam edge of the cam plate 13. With this construction in mind, the operation of the device is as follows: As the door swings to open position in either direction, the anti-friction rollers are pressed against the cam edges which are so figured that the rollers, bracket and plunger are forced inwardly thereby to compress their spring, the plunger being maintained in longitudinal alignment in the frame by its guide bracket 16, and prevented thereby from transverse binding movement relative to the guiding webs 9 of frame 6. If the door is swung entirely open in either direction, one of the anti-friction rollers 17 will be brought over the far edge of cam surface 13^a and will snap into locking recess 13^c, thereby locking the door in open position. The complementary cam faces 13^a are so figured that when the door is only partially swung open or is moved inwardly by hand from open locked position, the pressure of these anti-friction rollers against the cam faces will be unequal, the least resistance being offered by the cam surface to the roller nearest the center of the cam. The outer roller will, therefore, act as a fulcrum, and the spring 11 being compressed, will exert its pressure in the direction of least resistance, and will return the door to closed position. The central protuberance 13^b intermediate the cam faces 13^a is designed for a two-fold purpose. In the first place, the anti-friction rollers 17 are mounted to be positioned on either side of this protuberance when the door is in its central closed position. The extent of this protuberance is such that it will not offer sufficient resistance to the passage of an anti-friction roller thereover to stop the closing movement of the door from either side, but will act as a check in that it tends to check the closing movement of the door and minimize the to and fro oscillation after the initial return to closed position. In addition, of course, it tends to maintain the anti-friction rollers in proper position relative to the cam, and, therefore, tends to maintain the door in central closed position.

It requires some little care to mount the hinge on the floor and door so that when assembled, the door will exactly center. A miscalculation of a sixteenth of an inch at the pivot end will throw the outer or swinging end of the door beyond the center line some little distance. In order, therefore, to

provide against inaccuracy or carelessness, and further, to do away with the necessity for such absolute nicety of calculation, I have made the cam plate 13 longitudinally adjustable relative to the pivot stud 2. This is permitted by the fact that the elongated aperture 14 in the cam plate extends beyond the ends of the elongated squared intermediate section 4 of the pivot stud. The screws 15 are inserted through the threaded apertures 13^a in the cam plate and are screwed up against the ends of the pivot stud 2. To adjust the cam plate relative to this pivot stud, it is only necessary to withdraw the end of the screw the required distance of adjustment from contact with one side of the stud, and move the cam plate over until the end of the screw again bears against the pivot stud 2, the opposite screw being tightened up against the opposite end of the pivot stud. This operation, it will be seen, will move the cam faces 13^a and their intermediate protuberance 13^b relative to the anti-friction rollers 17. This will cause more pressure to be exerted against one anti-friction roller than against the other, and the resulting compression of the coiled spring 11 will swing the door slightly to one side or the other, depending upon the direction of movement of the cam. It will be seen from this that such adjustment may be utilized to center the outer end of the door when, through miscalculation in mounting the same, its end has been thrown off center.

In Figs. 14 and 15, I have illustrated a modification of the adjusting device for said cam. This consists in providing the squared intermediate section of the pivot stud adjacent the lower hub portion 3 thereof, with a threaded aperture 25 adapted to receive a threaded adjusting screw 27. The under face of the cam plate 13 is formed with a groove 26 extending longitudinally thereof and of sufficient width and depth to completely contain the screw 27. This groove 26, adjacent one end, is formed with a lateral enlargement 28 adapted to receive the head of the adjusting screw so that when said screw is inserted in the pivot stud 2, and the cam plate 13 is seated thereover with the head of the screw resting in the lateral enlargement 28 of the groove, rotation of the screw moves the cam plate toward and from the pivot stud by means of the threaded engagement of the adjusting screw with said stud, the lateral enlargement in the groove preventing the screw from moving longitudinally of the cam plate.

In Figs. 10, 11, 12 and 13 I have illustrated a further modification of the adjusting means, consisting of a bracket 29 secured to the floor plate 1 at the extreme inner edge of the door and overlying a threaded lug 30

extending from the inner face of the cam plate 13 and lying within the bracket. An adjusting screw 31 is inserted through the side walls of the bracket and through the threaded lug 30 of the cam plate 13, its head bearing against one side wall of the bracket and its other end being provided with a nut 32, whereby the screw can rotate in the bracket but not move longitudinally relative thereto. Rotation of the screw will, therefore, move the threaded lug 30 and the cam plate 13 longitudinally of the pivot stud 2 to effect adjustment of the door as hereinbefore described.

The parts comprising the floor hinge that are mounted upon the door proper, are preferably concealed from view and the door given an ornamental finish by a metallic casing of sheet metal or other suitable material, such casing comprising side plates 33 secured to the sides of the door and extending around the inner end thereof, and an end plate 34 overlapping the ends of the side plates and itself secured to the upwardly extending ends 7^a of the upper bar of the hinge frame. These plates can easily be removed in case it is desired to effect adjustment of the door and serve to hide the hinge parts from view and give the door a highly ornamental finish.

In the foregoing, I have described a preferable form of floor hinge embodying my invention. I desire it understood, however, that the construction of the parts may be modified and varied within the spirit of the invention and of the appended claims.

What I claim is:—

1. In a device of the character described, in combination, a floor pivot, a guide carried thereby, a door journaled on said pivot, a part carried by said door bearing upon said pivot guide, means carried by said guide co-operating with said bearing part to releasably lock said door in opened position, means whereby said door is automatically returned to closed position when released from open locked position or when partly opened, said guide and bearing part co-operating to check the closing movement of said door and to centrally position the same when closed.

2. In a device of the character described, in combination, a floor pivot, a guide plate carried thereby, a door journaled on said pivot, a spring pressed bracket guided in and carried by said door, a bearing part carried by said bracket and held thereby in engagement with said guide plate, locking means carried by said plate adapted to co-operate with said bearing part to lock said door in opened position, a cam surface on said guide plate adapted to coöperate with said spring pressed bearing part to automatically return said door to closed position when released from open locked posi-

tion or when partly opened, and means for moving said guide plate transversely of its pivot to thereby adjust said door relative to its line of central closure.

6 3. In a device of the character described, in combination, a floor pivot, a guide plate carried thereby, a protuberance centrally of said guide plate, cam surfaces on said guide plate on either side of said protuberance, a door journaled on said pivot, a spring pressed bearing bracket carried by said door having complemental anti-friction rollers engaging said cam surfaces and normally spanning said protuberance, and means carried by said guide plate at opposite ends thereof adapted to engage said anti-friction bearings as the door is swung open in either direction, and releasably lock said door opened, said cam surfaces co-operating with said anti-friction rollers to automatically return said door to closed position when released from open locked position or when partly opened in either direction and said protuberance engaging said rollers and acting to check the closing movement of the door and to centrally position the same.

4. In a device of the character described, in combination, a floor pivot, a guide plate carried thereby, a protuberance formed centrally of one side of said guide plate, cam surfaces formed on said guide plate on either side of said protuberance, a door journaled on said pivot, a spring pressed bearing bracket carried by said door having anti-friction bearings engaging said cam surfaces, means carried by said guide plate at opposite ends thereof adapted to engage said anti-friction bearings as the door is swung open in either direction, and releasably lock said door opened, said cam surfaces co-operating with said anti-friction rollers to automatically return said door to closed position when released from open locked position or when partly opened in either direction, and means for moving said guide plate transversely of its pivot and relative to said anti-friction bearings to vary the pressure of said cam surfaces against said spring pressed bracket and thereby adjust the door toward or from its line of central closure.

5. In a device of the character described, in combination, a floor pivot, a guide plate carried thereby, a protuberance formed centrally of one side of said guide plate, cam surfaces formed on said guide plate on either side of said protuberance, a door journaled on said pivot, a spring pressed bearing bracket carried by said door having anti-friction bearings engaging said cam surfaces, locking recesses formed in said plate at opposite ends thereof adapted to engage an anti-friction bearing as the door is swung open in either direction and re-

leasably lock said door opened, said cam surfaces co-operating with said anti-friction rollers to automatically return said door to closed position when released from open locked position or when partly opened in either direction, and said protuberance co-operating with said anti-friction bearings to check the closing movement of the door and centrally position the same.

6. In a device of the character described, in combination, a floor pivot, a guide plate carried thereby, a door journaled on said pivot, a longitudinally movable spring pressed bearing part carried by said door, a cam surface carried by said guide plate positioned to be engaged by said spring pressed bearing part and co-operating therewith to move the same longitudinally upon opening movement of the door and to automatically return the door to closed from open position, means for guiding said bearing part during longitudinal movement and maintaining said part in uniform alinement with said door, and means for moving said guide plate transversely of its pivot to co-operate with the spring pressed bearing part and effect adjustment of said door relative to its line of central closure.

7. In a device of the character described, in combination, a stationary floor pivot, a guide plate mounted thereon and provided with cam surfaces, a door journaled on said pivot, a longitudinally movable plunger guided in and carried by said door, a bearing bracket carried by and moving with said plunger, spring means normally actuating said plunger to hold its bearing bracket in contact with said cam surfaces, said cam surfaces co-operating with said bracket and plunger as the door is opened to move the same longitudinally of the door against the force of said spring means whereby the door is automatically returned to closed from open position, fixed guiding means carried by said floor pivot guiding and maintaining said bracket and plunger in uniform longitudinal alinement relative of said door, and means for moving said guide plate transversely of its pivot to thereby co-operate with said bearing bracket and plunger to effect adjustment of the door relative to its line of central closure.

8. In a device of the character described, in combination, a stationary floor pivot, a guide plate mounted thereon and provided with cam surfaces, a door journaled on said pivot, a longitudinally movable plunger guided in and carried by said door, a bearing bracket carried by and moving with said plunger and provided with anti-friction bearings, spring means normally actuating said plunger to hold its bearings in contact with said cam surfaces, a stationary bearing washer carried by said floor pivot engaging and longitudinally guiding said bearing

bracket and plunger and preventing relative transverse movement thereof, said cam surfaces cooperating with said bracket and plunger as the door is opened to move the same longitudinally of the door against the force of said spring means whereby the door is automatically returned to closed from open position.

9. In a device of the character described, in combination, a floor pivot, a guide plate provided with an elongated aperture therein seated over said pivot with its apertured portion thereabout, a door journaled on said pivot, a spring pressed bearing part carried by said door, means carried by said guide plate cooperating with said bearing part to return said door to closed from opened position and means whereby said guide plate may be adjusted transversely of its pivot to thereby effect adjustment of said door relative to its line of central closure.

10. In a device of the character described, in combination, a floor pivot, a guide plate provided with an elongated aperture therein and seated on said pivot with its apertured portion thereabout and of greater length than the diameter of said pivot, a door journaled on said pivot, a cam surface formed on said guide plate, a spring pressed bearing part carried by said door and en-

gaging said cam surface, said cam surface cooperating with said bearing part to automatically return the door to closed from opened position, and means whereby said guide plate and cam may be adjusted transversely of said pivot to thereby effect adjustment of said door relative to its line of central closure.

11. In a device of the character described, in combination, a floor pivot, a guide plate provided with an elongated aperture therein seated over said pivot pin with its aperture thereabout and extending therebeyond, a door journaled on said pivot, complementary cam faces formed on said guide plate, a spring-pressed bracket carried by said door, complementary bearing faces carried by said bracket and held thereby in engagement with said cam faces, said cam faces cooperating with said bearing and bracket to automatically return the door to closed from opened position, and screw operated means for moving said guide plate and its cam faces transversely of said floor pivot to thereby cooperate with said bearing faces and swing the door relative to its line of central closure for adjustment purposes.

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Witnesses:

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