

F. CLYMER & J. DEGEN.

REVOLVING DOOR.

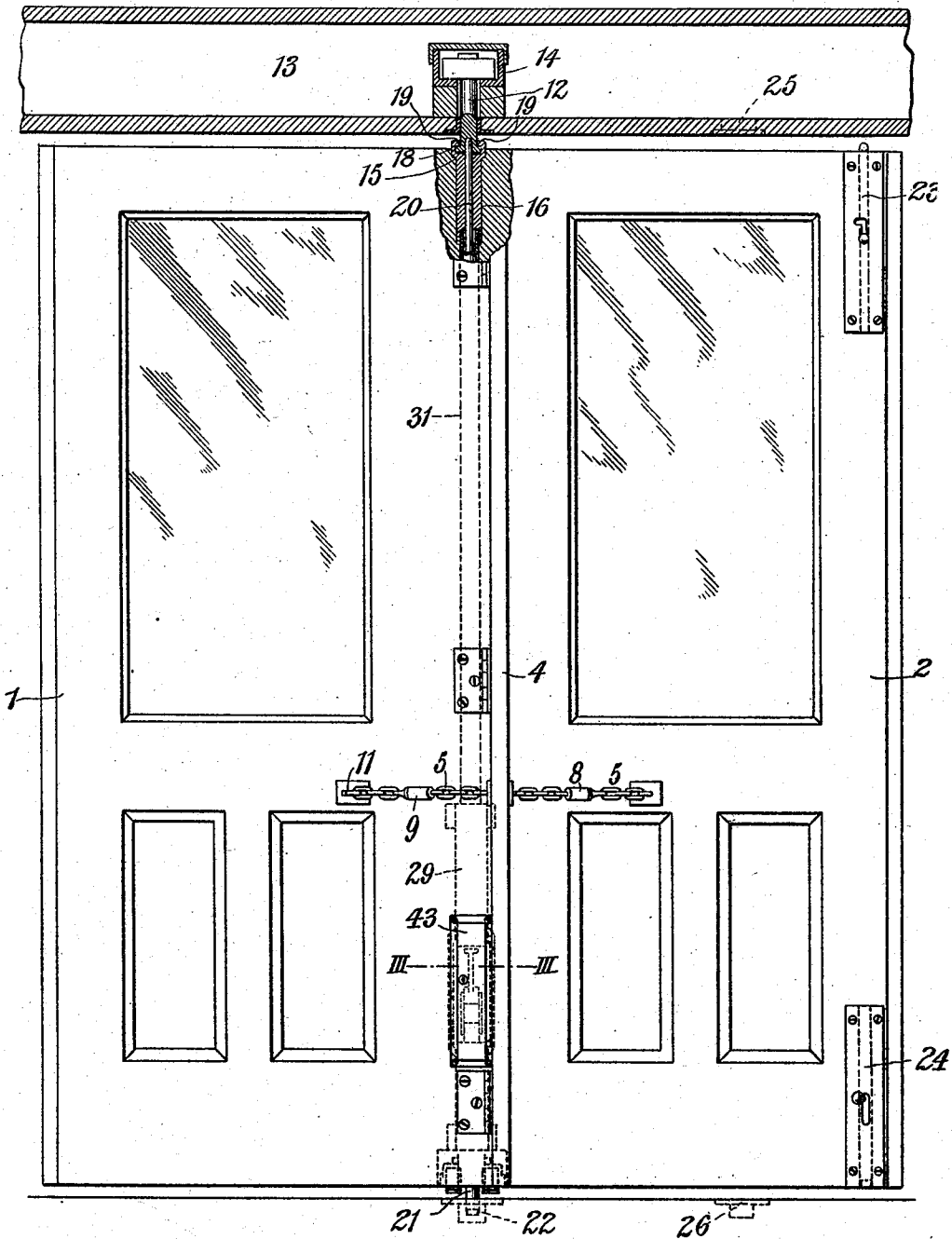
APPLICATION FILED SEPT. 20, 1907.

941,619.

Patented Nov. 30, 1909.

3 SHEETS—SHEET 1.

Fig. 1



Witnesses:
Raphael Vetter
Ed. Dunham

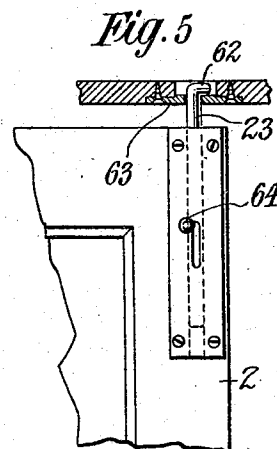
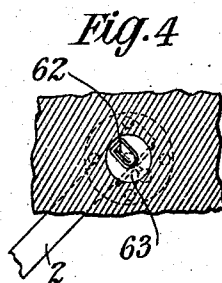
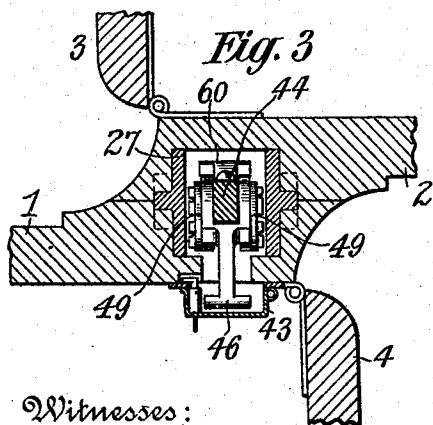
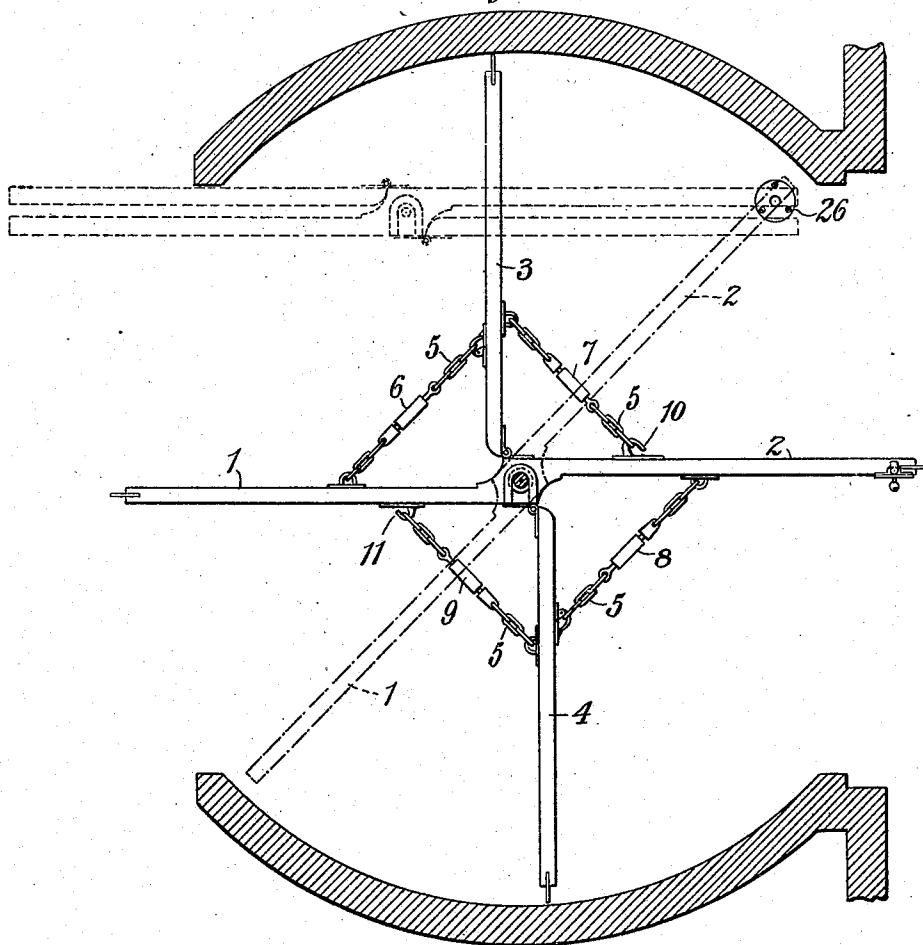
Inventors
F. Clymer and J. Degen
By their Attorneys *Kerr, Page & Cooper*

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3 SHEETS—SHEET 2.

Fig. 2



Witnesses:
Raphael Ketter
A. L. Dunham.

Inventors
F. Clymer and
J. Degen
By their Attorneys
Kerr, Page & Cooper

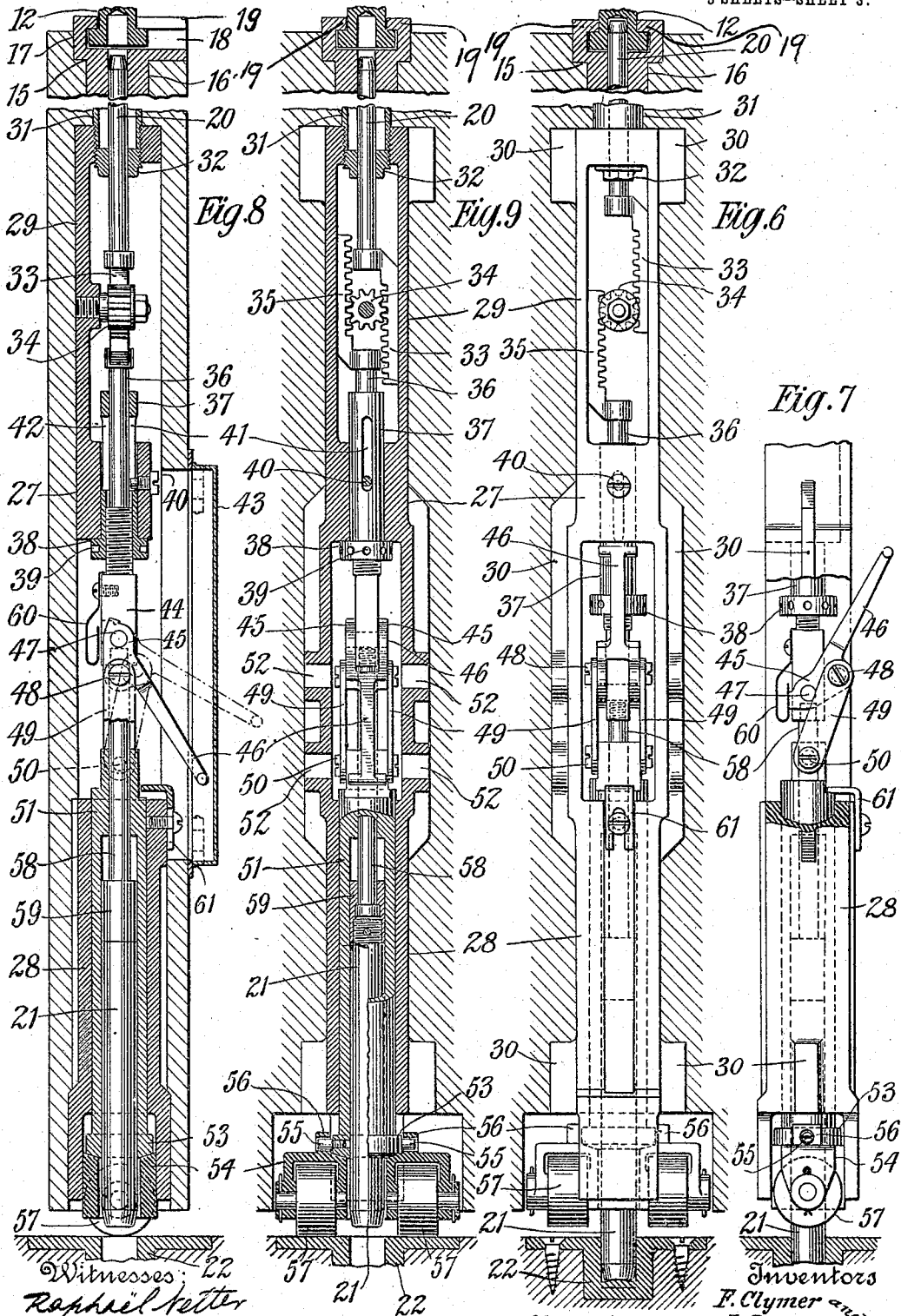
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3 SHEETS—SHEET 3.

941,619.



UNITED STATES PATENT OFFICE.

FREDERICK CLYMER, OF BELMAR, AND JULIUS DEGEN, OF TRENTON, NEW JERSEY,
ASSIGNORS TO UNITED REVOLVING DOOR COMPANY, OF TRENTON, NEW JERSEY, A
CORPORATION OF NEW JERSEY.

REVOLVING DOOR.

941,619.

Specification of Letters Patent.

Patented Nov. 30, 1909.

Application filed September 20, 1907. Serial No. 393,780.

To all whom it may concern:

Be it known that we, FREDERICK CLYMER, a citizen of the United States, residing at Belmar, in the county of Monmouth and State of New Jersey, and JULIUS DEGEN, a citizen of the Swiss Republic, residing at Trenton, in the county of Mercer and State of New Jersey, have invented certain new and useful Improvements in Revolving Doors, of which the following is a specification, reference being had to the drawings accompanying and forming part of the same.

Our invention relates to so-called "revolving" doors, more particularly doors of the general type described in the sole application of Frederick Clymer, Sr. No. 334,388, filed Sept. 13, 1906. In that type the upper pivot devices on which the door revolves can be disconnected by an operation involving a vertical and a lateral movement of the door, to permit the door, with its wings collapsed, to be moved to the side of the housing in which it revolves.

Our present invention is directed more particularly to the mechanism for locking the pivot-devices, for effecting the vertical movement of the door, and for supporting the door during its lateral movement to the side of its housing.

The chief objects of our invention, briefly stated, are to provide improved devices or mechanism for the purposes stated, whereby the operations of moving the door to the side of the housing and restoring the door to its revolving position will be simplified; to make the mechanism compact and of a nature permitting it to be made at reasonable cost; and withal to provide mechanism which shall be thoroughly reliable in operation.

To these ends the invention consists in the novel feature of construction and combinations of elements set forth in the appended claims.

The invention will be readily understood from a more or less detailed description of a convenient embodiment, and for this purpose we have selected for illustration herein the form which exhibits what we consider the best mode of applying the invention.

This preferred embodiment is illustrated in the annexed drawings, in which—

Figure 1 shows the door in side elevation, with the top of the housing in section and the side walls of the housing removed. Fig. 2 is a plan view of the door with the side walls of its housing in horizontal section; also showing the door, in dotted lines, collapsed and swung to the side of the housing. Fig. 3 is a horizontal section on line III—III of Fig. 1. Fig. 4 is a sectional plan view of the upper bolt on which, as a pivot, the door is swung to the side of the housing. Fig. 5 shows the bolt in side elevation, the roof or top of the housing being in section to show the engagement of the bolt therewith. Fig. 6 is a detail view, in front elevation, showing the mechanism, at the axis of the door, for lifting the door and supporting it during its lateral movement to the side of the housing, for locking the upper pivot devices against accidental disengagement when the door is in its revolving position, and for advancing and retracting the lower pivot-bolt into and from its socket in the floor of the housing. Fig. 7 is a side view of the same, with the upper parts broken away. Fig. 8 is a central vertical section on a plane at right angles to the plane of Fig. 6, and Fig. 9 is a central vertical section on a plane at right angles to that of Fig. 8.

As shown in Figs. 1 and 2, the door comprises a pair of wings, 1, 2, rigidly secured together, and a pair of folding wings 3, 4, hinged to the former. The folding wings are maintained in their radial positions by chains 5, in which are turnbuckles 6, 7, 8, 9, by which any slack in the chains can be taken up and the whole structure made rigid, as will be readily understood. When the door is to be collapsed the diametrically opposite turnbuckles 7 and 9 are loosened sufficiently to permit their chains to be disengaged from the hooks 10, 11, respectively, whereupon the wings 3, 4 can be folded upon the "permanent" or nonfolding wings 1, 2.

Like the door shown in the Clymer application before referred to, the present door

is preferably suspended from the top of the housing, that is, the weight of the door, or at least the major part of its weight, is supported from the housing roof, and for the purpose we prefer to employ the upper suspending and pivoting devices shown in that application. These comprise two parts, a pivot member 12 depending from the roof or top 13 of the housing and mounted in a suitable bearing 14; and a socket member 15 mounted in the door. The latter is a simple casting, consisting of a tubular shank 16, and a head 17 provided with a slot 18 open at the top and one side and having overhanging flanges 19. This slot engages the head of the pivot-member 12 and the flanges 19 rest on said head, so that the door is suspended on the latter. It will now be seen that the door, with its hinged wings folded upon the permanent wings, can be disengaged or disconnected from the roof of the housing by a lateral movement sufficient to cause the socket-member 15 to pass out of engagement with the pivot-member. Slidable vertically in the shank of the socket-member is a locking bolt 20, entering an aperture in the head of the pivot-member. It is evident that until this bolt is retracted the two members mentioned are securely locked together and accidental disengagement thereof prevented.

The lower pivot of the door is a sliding bolt 21, adapted to be projected into a socket 22 in the floor of the housing when the door is in its revolving position, and to be retracted from said socket when the door is to be moved to the side of the housing. The door being collapsed and disengaged from its upper and lower pivotal connections with the roof and floor, it can be carried bodily to the side of the housing, to the position indicated in dotted lines in Fig. 2. A convenient method for the purpose is to swing the door laterally on an axis near an edge of a side wall of the housing. To permit such movement we provide at the top and bottom of a wing near the edge thereof, for instance the permanent wing 2, upper and lower pivot bolts 23, 24, respectively, normally retracted when the door is in its revolving position, as shown in Fig. 1. When the collapsed door is to be moved to the side of the housing these bolts are projected into sockets 25, 26, in the roof and floor respectively, whereupon the door can be swung on the said bolts as pivots, as will be readily understood.

For the purpose of lifting the door slightly to facilitate disengagement of the socket member 15 from the depending member 12, retracting the bolts 20 and 21, and supporting the collapsed door during its movement to the side of the housing, our invention provides mechanism of simple and

convenient operation. In fact, our mechanism for the purpose, the actuation of a single lever serves to retract the bolts, lift the door, and bring into action a supporting device which carries the weight of the door during its lateral movement. The preferred form of this mechanism is clearly illustrated in Figs. 3, 6, 7, 8, and 9, and will now be described. Referring to the figures just mentioned, 27, is an elongated casing, the lower portion 28 of which is tubular and the upper portion 29 in the form of a frame open at one side. This casing is anchored securely at the axis of the door near the bottom thereof, pins or lugs 30 being provided on the casing for that purpose,—see Fig. 6. Extending from the shank 16 of the socket member to the top of the casing 27 is a tubular member 31, in the present instance a simple piece of gas pipe, screwed into the shank and casing as shown. The locking bolt 20 extends downward through this pipe, through a guide-nut 32 at the bottom of the latter, and into the interior of the frame 29 which forms the upper portion of the casing 27. At its lower end the bolt 20 carries an offset rack 33, in mesh with a pinion 34, mounted on a stud secured in the back of the frame. Meshing with the pinion on the side thereof opposite to the rack 33 is another rack, 35, like the first but inverted. This second rack is secured to the top of a short rod 36 on which is screwed a sleeve 37 capable of sliding movement in the lower part of the frame 27. This sleeve terminates with a head 38 below the frame, which head is provided with peripheral apertures 39, to be engaged by a spanner or other suitable tool for the purpose of adjusting the sleeve on the rod 36, as will be readily understood. To maintain the sleeve in adjusted position and still permit the same to reciprocate in its guide in the lower portion of the frame, a screw 40 is provided in the frame, extending into a vertical slot, as 41 or 42, in the sleeve. On withdrawing the screw the sleeve may be turned on its rod until another slot is presented to the screw. The fineness of adjustment of course depends upon the number of such slots, but we find that two diametrically opposite slots, as shown, give sufficient fineness of adjustment. To permit ready access to the screw 40 and the adjusting head 38, as well as to other parts hereafter described, a hinged closure 43 is provided, over an opening in the door.

The rod 36 terminates at its lower end in a flattened portion 44, embraced by the arms 45 of a short operating lever 46, said arms being pivoted to the flattened portion at the point 47. Pivoted at their upper ends to an offset portion of the lever, at the point 48, are two links 49, which at their lower ends

are pivoted at the point 50 to the upper end of a sleeve 51, slidable in the tubular portion 28 of the casing 27. To accommodate the operating lever and permit its movement the central portion of the casing is open, at its front at least, as shown; and to afford access to the link pivots 48 and 50, before the casing is placed in the door, the sides of the casing are provided with apertures 52, in positions opposite to these pivots when the operating lever is in its lowermost position, as shown in Fig. 9.

The sleeve 51 terminates at its lower end with a convex head 53, bearing on the correspondingly concave face of a yoke 54, which is connected to the said head by means of two screws 55, fitting loosely in ears 56 on the top of the yoke. In the yoke on opposite sides of the axis of the sleeve are two rollers 57, the shafts of which are in alinement, as shown. To prevent the yoke 54 from turning and thereby exerting strain on the links 49 to which the sleeve 50 is connected, the bottom of the tubular portion 28 of the casing is made to embrace the yoke closely on opposite sides of the axes of rollers 57, as clearly shown in Figs. 7 and 8. Screwed into the lower end of the flattened portion 44 of the rod 36 is a rod 58, connected at its lower end to the top of the bolt 21 by a suitable coupling 59, to permit turning movement of the rod 58 and bolt 21 relative to each other.

It will be observed from Fig. 8 that the axes of the rollers 57 are parallel with the lateral opening of the socket in the socket-member 15 at the top of the door, so that the rollers, when brought down against the floor as hereafter described, will afford a rolling support for the door in its lateral movement; at the same time the lateral opening of the said socket is arranged away from the housing wall to which the door is to be moved, as clearly shown in Fig. 2.

The operation of the mechanism illustrated in Figs. 6 to 9 will now be described. When the door is in its revolving position, the parts of the mechanism are in the positions shown in Figs. 6 and 7, with the bolts 20 and 21 projecting into their sockets, the sleeve 51, yoke 54, and rollers 57 elevated, and the lever 46 in its uppermost position, the lever being retained securely in that position by a stiff spring 60, carried by the part 44 and bearing firmly against flat faces on the rear ends of the lever-arms 45. Pressure being applied from above on the lever 46 the latter turns on its pivot 47, depressing the links 49 and sleeve 51 until the rollers 57 strike the floor. Further movement of the sleeve and rollers being prevented the lever now turns on the link pivot 48, raising the rod 58, and bolt 21 out of its sockets 22. The rod 36 is also raised, and

its rack 35 rotates the pinion 34, causing the rack 33 to be lowered, and with it the bolt 20 from its aperture in the pivot member 12. The sleeve 37 being so adjusted on the rod 36 that the head 38 strikes its abutment, that is, the bottom of the frame 29, when the bolts 20 and 21 have cleared the sockets which they engage, further upward movement of the rods 36 and 58, relative to the door, is prevented; and since further downward movement of the sleeve 51 is prevented by reason of the rollers bearing on the floor, continued downward movement of the lever, on 48 as its fulcrum, will raise the entire door, the weight of the latter being borne directly by the head 38 of sleeve 37 and therefrom by the rollers 57. The parts are preferably so proportioned that when the lever is in its lowermost position as in Fig. 8, and the door raised, the center of pivot 48 will be either behind or in the line joining the centers of pivots 47 and 50, so that the weight of the door will have no tendency to throw the lever upward and so permit the door to fall. When the lever is raised from its lowermost position the operation of the mechanism is as follows: First, the door is lowered until its weight rests upon the upper pivot-member 12, whereupon the sleeve 51 is raised until a shoulder thereon engages an overhanging stop adjustably mounted on the tubular portion 28 of the casing 27; then the lever, turning on the pivot 48, throws the bolt 21 into its socket 22, and through the instrumentality of racks 33, 35, and pinion 34, throws the bolt 20 into its socket in the pivot member 12, restoring the parts to the positions shown in Figs. 6 and 7.

The operation of moving the door to the side of the housing will now be readily understood. The door is turned till the bolts 23, 24, are in register with their sockets 25 and 26, and the bolts projected thereinto; the wings 3, 4, are then folded upon the wings 1, 2; the door or closure 43 is now opened and the lever 46 depressed, withdrawing the bolts 20 and 21 from their sockets, throwing the rollers 57 down against the floor, and raising the door sufficiently to clear the pivot member 12. The door can now be swung on bolts 23, 24 as pivots, to the position shown in dotted lines in Fig. 2, the weight of the door being borne by the rollers 57. To facilitate the rotation of the rollers, to prevent binding on account of their moving on different axes, they may be made slightly conical, with the smaller toward the pivot-bolts 23, 24. The rollers can accommodate themselves to any slight inequalities of the floor, the loose connection of the yoke 54 to the head 53, and the curved bearing faces of the two, permitting slight oscillation of the yoke in the plane of the

roller pivots, as will be readily understood. To restore the door to its revolving position the operations above described are simply reversed. In order to prevent the upper
 5 bolt, 23, from being retracted when the door is at the side of the housing, we form the bolt with a laterally extending portion 62 at
 10 the top thereof. The escutcheon plate 63 (see Figs. 4 and 5) has an elongated aperture to receive the lateral portion of the bolt,
 15 and said plate is so located that the aperture will register with the lateral portion or hook only when the door is in its revolving position, as shown in Fig. 4. Hence when the
 20 door is swung on bolts 23, 24, the hook 12 will pass out of register with the aperture in the plate and will prevent the bolt 23 from being withdrawn. Rotation of the bolt
 25 itself is prevented by the edges of the slot through which its handle 64 projects.

As previously stated, the devices herein specifically shown and described constitute merely the preferred form of the invention, which is capable of other embodiments with-
 25 out departure from its proper scope.

What we claim is:

1. The combination of a revolving door, upper and lower sliding bolts at the axis thereof, operating mechanism common to
 30 said bolts to actuate the same, and means for lifting the door, actuated by the same mechanism, as set forth.

2. The combination of a revolving door, upper and lower sliding bolts at the axis of
 35 the door, means for lifting the door, and an operating lever operatively connected with said bolts and said lifting means to actuate the same, as set forth.

3. The combination of a housing, a revolving door therein adapted to be collapsed to
 40 the side of the housing, pivot-devices connecting the door to the roof of the housing and adapted to be disengaged to permit the collapse of the door, means for locking the
 45 said pivot devices against disengagement, a roller support for the door during its movement to the side of the door, and actuating mechanism common to said locking means
 50 and said support, to unlock the pivot devices and throw the support into operation, as set forth.

4. The combination of a revolving door, upper pivot-devices therefor, adapted to be
 55 disengaged by an operation involving lateral movement of the door, a locking bolt normally locking said pivot-devices against disengagement, a support for the door during
 60 such lateral movement, and actuating mechanism common to said locking bolt and said support, to retract the former and to throw the latter into operation, as set forth.

5. The combination of a revolving door, upper pivot-devices therefor, adapted to be
 disengaged by an operation involving lateral

65 movement of the door, a bolt normally locking said pivot devices against disengagement, a bolt constituting the lower pivot for
 70 the door and adapted to be retracted to permit the lateral movement of the door, a roller-support for the door during such lateral movement, and manually actuated
 means for retracting said bolts and for throwing said support into operation, as set forth.

6. The combination of a revolving door, pivot-devices therefor adapted to be dis-
 75 engaged by an operation involving vertical and lateral movement of the door, means for locking said pivot-devices against disengagement, means for lifting the door, and
 80 operating mechanism common to said locking means and said lifting means, as set forth.

7. The combination of a revolving door, pivot-devices therefor adapted to be dis-
 85 engaged by an operation involving vertical and lateral movement of the door, means for locking said pivot-devices against disengagement, means for lifting the door and
 90 supporting the same during its lateral movement, and operating mechanism common to said locking means and said lifting means, as set forth.

8. The combination of a revolving door, pivot devices therefor adapted to be dis-
 95 engaged by an operation involving lateral movement of the door, means for locking said pivot-devices against disengagement, a normally retracted roller support adapted
 100 to be brought into engagement with the floor to support the door during its lateral movement, and manually actuated operating mechanism common to the locking means
 105 and the roller support, to unlock the said pivot-devices and bring the roller support into engagement with the floor, as set forth.

9. The combination of a revolving door, pivot-devices therefor adapted to be dis-
 110 engaged by an operation involving lateral movement of the door, a sliding bolt extending into said pivot-devices to lock the same against disengagement, a normally re-
 115 tracted roller support for the door to support the same during its lateral movement, and operating mechanism common to the locking bolt and the roller support, to retract the
 former and advance the latter, as set forth.

10. The combination of a revolving door, a sliding pivot bolt therefor at the axis of
 120 the door, a sliding member at the axis of the door near the bottom thereof, bearing a roller at its lower end, and manually operated means common to the bolt and sliding
 member to actuate the same, as set forth.

11. The combination of a revolving door, 125 a casing at the axis thereof, a sliding member in the casing carrying a roller, a sliding bolt at the axis of the door, and a lever op-

eratively connected with said bolt and sliding member to actuate the same, as set forth.

12. The combination of a revolving door, a casing at the axis thereof, a tubular sliding member or sleeve in the casing adapted to be projected below the door to engage the floor, a sliding bolt extending through said sleeve, and a lever operatively connected with the bolt and sleeve to actuate the same, as set forth.

13. The combination of a revolving door, a casing at the axis thereof, a sliding sleeve in the casing adapted to be projected below the door to engage the floor, a sliding bolt extending through the sleeve, a second sliding bolt at the axis of the door, oppositely disposed to the first bolt, a lever operatively connected with the first bolt and the sleeve to actuate the same, and means for connecting the first bolt with the second to actuate the latter from the former, as set forth.

14. The combination of a revolving door, a casing at the axis of the door, a sliding sleeve in the casing adapted to be projected below the door to engage the floor, a sliding bolt in the sleeve carrying a rack, a lever connected with the sleeve and the bolt to actuate the same, a second bolt at the axis of the door, sliding in said casing and having a rack opposite to the rack on the first bolt, and a pinion in mesh with both racks, as set forth.

15. The combination of a revolving door, a sliding member at the axis of the door near the bottom thereof and carrying a roller adapted to bear on the floor below the door when the said member is depressed, a bolt sliding axially through said member and adapted to engage the floor below the door, a lever pivoted to one of said sliding elements and pivotally connected with the other, and a stop for limiting the movement of one of said sliding elements, as set forth.

16. The combination of a revolving door, a sliding member at the axis of the door near the bottom thereof and carrying a roller adapted to bear on the floor below the door when the said member is depressed, a bolt sliding axially through said member, adapted to engage the floor below the door and having a rack at its upper end, a lever pivoted to one of said sliding elements and pivotally connected with the other, a second sliding bolt, at the axis of the door at the top thereof and having a rack arranged opposite to the rack on the first bolt, a pinion in mesh with both said racks, as set forth.

17. The combination of a revolving door, a sliding member at the axis of the door near the bottom thereof adapted to be projected below the door to engage the floor, a bolt sliding axially through said member, a lever pivoted to one of said sliding elements and pivotally connected with the other, and ad-

justable stops for limiting the movements, of the said sliding elements, as set forth.

18. The combination of a revolving door, a casing at the axis of the door, a sliding sleeve in the lower part of the casing adapted to be projected below the door to engage the floor, a sliding bolt in said sleeve, a lever connected with the bolt and the sleeve to actuate the two, and adjustable stops cooperating with the casing and the bolt and sleeve to limit the movements of the bolt and sleeve, as set forth.

19. The combination of a revolving door, a casing at the axis thereof, a sliding sleeve in the lower portion of the casing adapted to be projected below the door to engage the floor, a sliding bolt in the sleeve, having a rack at its upper end above the sleeve and in the upper portion of the casing, a lever pivoted to said bolt and pivotally connected with the sleeve, a sliding bolt at the axis of the door in the upper portion thereof and having at its lower end a rack opposite to the rack on the first bolt, a pinion meshing with both racks, and stops for limiting the movements of the sleeve and the first mentioned bolt, as set forth.

20. The combination with a housing, and a door revolving therein, adapted to be collapsed to the side of the housing, of a sliding bolt carried by a wing of the door at the top thereof, the roof of the housing being provided with a socket to receive said bolt, whereby the bolt can act as a pivot on which the collapsed door can be swung from its revolving position to the side of the housing, and means for preventing withdrawal of the bolt from its socket when the door is at the side of the casing and permitting withdrawal only after the door is swung toward its revolving position, as set forth.

21. The combination with a housing, and a door revolving therein, adapted to be collapsed to the side of the housing, of a sliding bolt, carried by a wing of the door at the top thereof and having a lateral extension above the said wing, the roof of the housing being provided with a socket to receive the bolt, whereby the bolt can act as a pivot on which the collapsed door can be swung to the side of the housing and a plate over said socket, having an elongated aperture to admit the lateral extension of the bolt, said plate being arranged so that its aperture is in register with the lateral extension of the bolt when the door is in its revolving position and out of register when the door is collapsed to the side of the housing, as set forth.

22. The combination with a casing, of a revolving door, pivot devices connecting said door and casing, means for maintaining said devices in operative pivotal connection, means for lifting the door, and means common to

6
said locking means and lifting means for
operating the same.

23. The combination with a casing, of a
revolving door, pivot devices connecting said
5 door and casing, means for maintaining said
devices in operative pivotal connection,
means for lifting the door, and means com-
mon to said locking means and lifting means
for simultaneously operating the same.
- 10 24. The combination with a casing, of a

revolving door, a pivot bolt detachably con-
necting said door and casing, a lifting de-
vice, and means common to said bolt and
device for operating the same.

FREDERICK CLYMER.
JULIUS DEGEN.

Witnesses:

CHARLES A. COMP,
T. A. MORRIS.