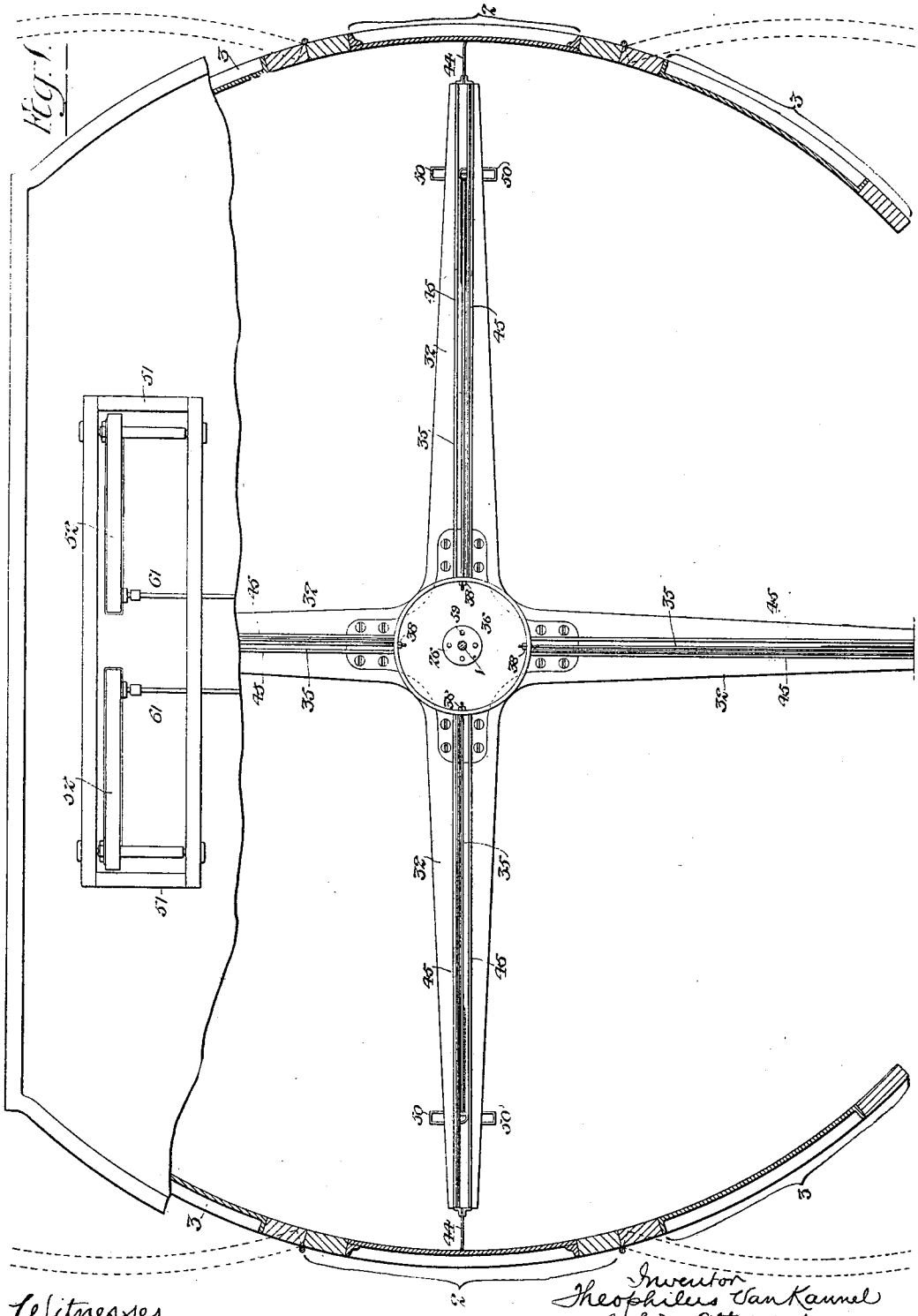
No. 656,062. Patented Aug. 14, 1900.

T. VAN KANNEL.

REVOLVING DOOR.

(No Model.) (Application filed Oct. 2, 1899.) 6 Sheets—Sheet 1.



Witnesses
Frank T. A. Graham. Robert S. Blake

Inventor
Theophilus Van Kannel
by his attorneys
Howson & Howson

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 656,062. Patented Aug. 14, 1900.

T. VAN KANNEL.

REVOLVING DOOR.

(Application filed Oct. 2, 1899.)

(No Model.) 6 Sheets—Sheet 2.

Fig. 14.

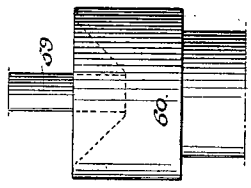


Fig. 2.

Witnesses
Frank L. A. Graham.
Robert S. Blake

Inventor
Theophilus Van Kannel
by his Attorneys
Howson & Howson

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 656,062. Patented Aug. 14, 1900.

T. VAN KANNEL.

REVOLVING DOOR.

(Application filed Oct. 2, 1899.)

(No Model.) 6 Sheets—Sheet 3.

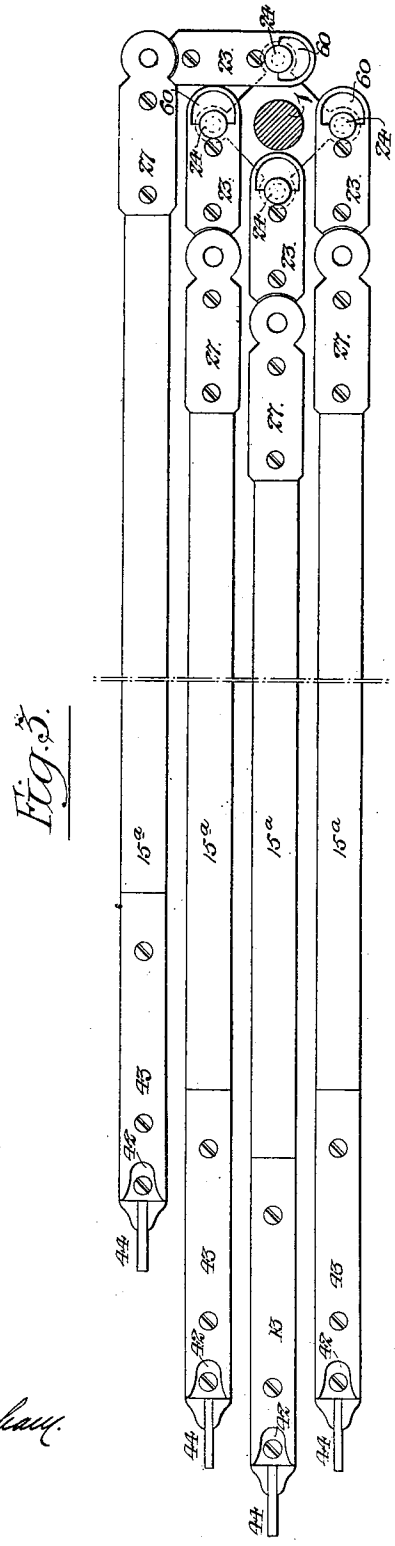


Fig. 3.

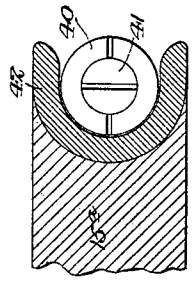


Fig. 5.

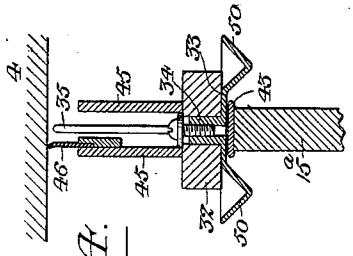


Fig. 4.

Witnesses
Frank F. H. Graham.
Robert L. Blake.

Inventor
Theophilus Van Kannel
by his attorneys
Howson & Howson

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 656,062. Patented Aug. 14, 1900.

T. VAN KANNEL.

REVOLVING DOOR.

(Application filed Oct. 2, 1899.)

(No Model.) 6 Sheets—Sheet 4.

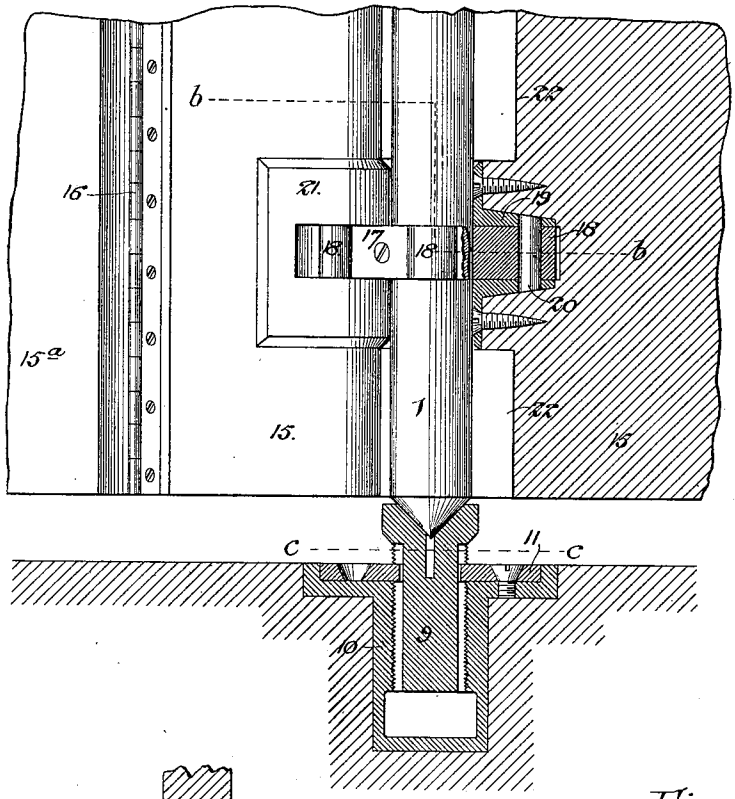


Fig. 6.

Fig. 7.

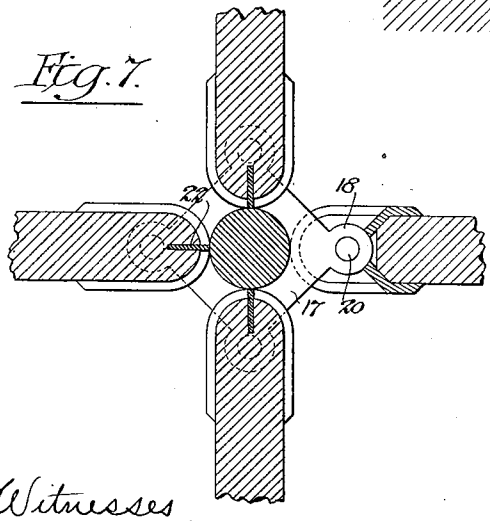
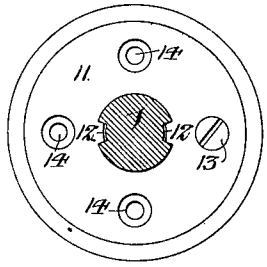


Fig. 8.



Witnesses
Frank L. A. Graham.
Robert S. Blake.

Inventor
Theophilus VanKannel
by his attorneys
Howson & Howson

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 656,062. Patented Aug. 14, 1900.

T. VAN KANNEL.

REVOLVING DOOR.

(Application filed Oct. 2, 1899.)

(No Model.) 6 Sheets—Sheet 5.

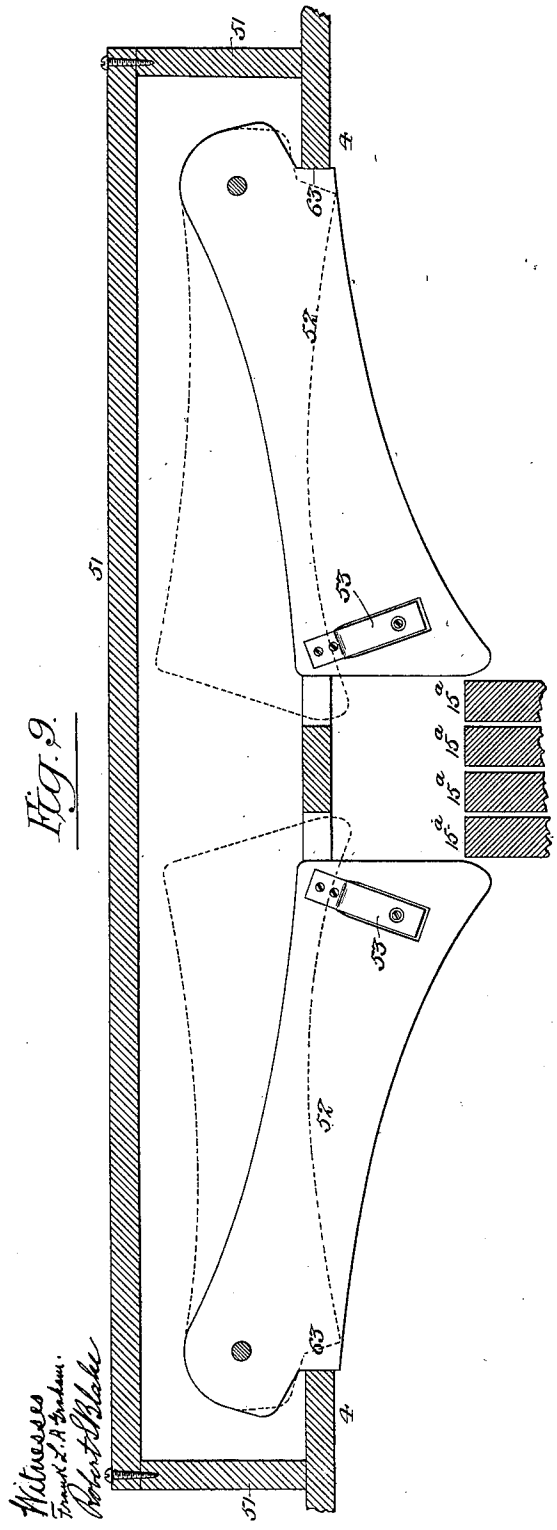


Fig. 9.

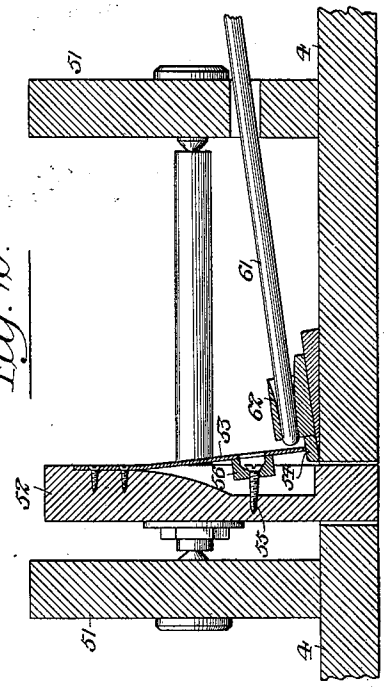


Fig. 10.

Witnesses
Frank L. A. Graham.
Robert H. Blake.

Inventor
Theophilus VanKannel
by his Attorneys
Howson & Howson

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 656,062. Patented Aug. 14, 1900.

T. VAN KANNEL.

REVOLVING DOOR.

(Application filed Oct. 2, 1899.)

(No Model.) 6 Sheets—Sheet 6

Fig. 12.

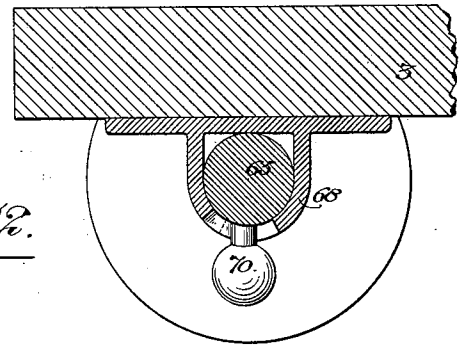


Fig. 11.

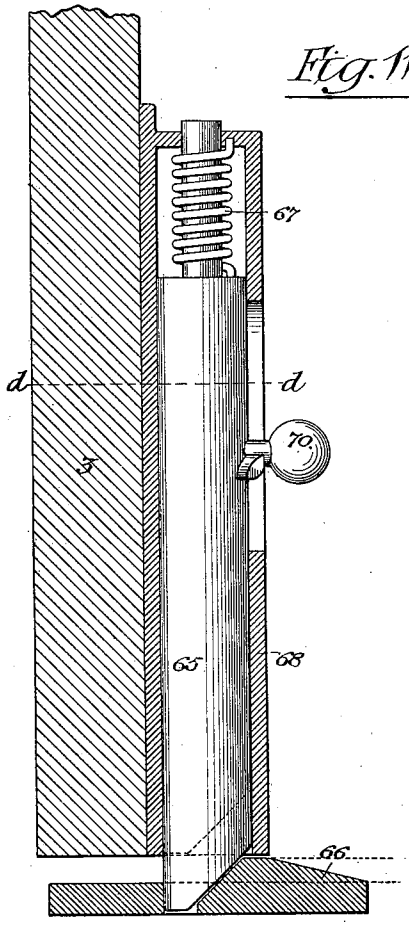
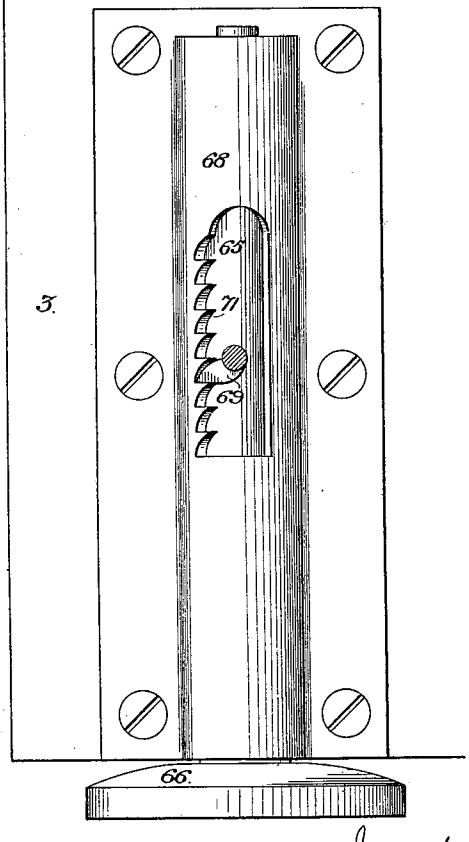


Fig. 13.



Witnesses
Frank L. A. Graham.
Robert L. Blake

Inventor
Theophilus Van Kannel
by his Attorneys
Howson & Howson

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

THEOPHILUS VAN KANNEL, OF NEW YORK, N. Y., ASSIGNOR TO THE VAN KANNEL REVOLVING DOOR COMPANY, OF CHARLESTON, WEST VIRGINIA.

REVOLVING DOOR.

SPECIFICATION forming part of Letters Patent No. 656,062, dated August 14, 1900.

Application filed October 2, 1899. Serial No. 732,347. (No model.)

To all whom it may concern:

Be it known that I, THEOPHILUS VAN KANNEL, a citizen of the United States, and a resident of New York city, New York, have invented certain Improvements in Revolving Doors, of which the following is a specification.

My invention consists of certain improvements in that class of revolving doors which have a series of radiating wings rotating in a casing, the object of my present invention being to so construct the wings and casing of such a door that they will yield to the rush of a panic-stricken crowd, the end portions of the casing swinging outward and the wings of the door all being pushed to the front, so as to provide a wide and unobstructed passage on each side of the center of the door structure.

In the accompanying drawings, Figure 1 is a plan or top view of the rotating structure of the door and its casing, part of the latter being shown in section and the end portions of the same being shown by full lines in their normal condition and by dotted lines in their spread condition. Fig. 2 is a longitudinal section, on a larger scale, of part of the upper portion of the door structure and casing. Fig. 3 is a view showing the position of the wings of the rotating portion of the door when said wings have been swung outwardly into line with each other. Fig. 4 is a transverse section on the line *a a*, Fig. 2. Fig. 5 is an enlarged section of a locking device forming part of the rotating door structure. Fig. 6 is a view, partly in vertical section and partly in elevation, showing the lower pivot for the rotating structure of the door and one of the hinges whereby the wings of the door are mounted upon the central post. Fig. 7 is a sectional view on the line *b b*, Fig. 6. Fig. 8 is a sectional plan view on the line *c c*, Fig. 6. Fig. 9 is a longitudinal section of a locking device whereby the wings of the door are held in position side by side when pushed forward, as shown in Fig. 3. Fig. 10 is a transverse section of the same, but showing the locking-lever in the elevated or inoperative position instead of in the dropped or operative position illustrated in Fig. 9. Fig 11 is a view, partly in section and partly in elevation, of a locking-bolt for normally retaining in position the pivoted end portion of the casing. Fig. 12 is a sectional plan view of the same on the line *d d*, Fig. 11. Fig. 13 is a front view of the same; and Fig. 14 is a detached view, on an enlarged scale, of part of a cam attachment carried by each of the wings of the door.

The central vertical shaft or post of the door is represented at 1, the fixed portions of the casing at 2, the swinging end portions of the casing at 3, and the ceiling of the casing structure at 4.

The upper end of the post 1 is pivoted upon the conical end of a screw 5, which is adapted to a threaded block 6, forming part of an arched structure 7, which is secured to the central portion of the ceiling 4 of the fixed casing of the door, a lock-nut 8 serving to secure the screw 5 in position after adjustment.

The lower end of the central post 1 is pivoted in a conical recess in the upper end of a screw 9, which is adapted to a threaded opening in a socket 10, let into the floor-plate of the door, the upper portion of said socket being expanded for the reception of a plate 11, which has wings 12 entering recesses in the sides of the screw 9, so that by turning said plate 11 the screw can be raised or lowered, so as to support the rotating portion of the door structure at any desired height above the floor-level, a screw 13, adapted to one of a series of openings 14 in the plate 11 and to a threaded opening in the socket-casing 10, serving to secure the plate in position after adjustment, and thereby securely lock the screw 9.

Each of the wings of the door consists of two parts 15 and 15^a, the part 15 being adjacent to the post 1 and hinged thereto, so as to be capable of swinging in either direction around the same, and the part 15^a being hinged to the part 15. The latter hinge is shown at 16 and is of the character known as a "piano-hinge," the adjoining edges of the two portions of the wing being beveled and one hinge-plate being secured to the forward bevel of one portion of the wing, while the other hinge-plate is secured to the rear bevel

of the other portion of the wing, so that the portion 15ª of the wing can swing in either direction in respect to the portion 15. The hinges whereby the portion 15 of each wing is hung to the central post 1 are shown in Figs. 6 and 7, as many of these hinges being employed as the height and weight of the door may suggest.

The hinge-block 17, which is secured to the post 1, has as many projecting lugs 18 as there are wings, four of these being shown in the present instance. Each lug 18 fits snugly at top and bottom to a casing 19, let into a recess in the inner face of the portion 15 of the wing and carrying the hinge-pin 20, which passes through an opening in the lug 18. The casing 19 forms part of a strap 21, which embraces the rounded inner end of the portion 15 of the wing and is secured thereto. Strips of felt 22, inserted in sawkerfs in the edge of the portion 15 of the wing, bear against the central post 1 and serve to close the gaps which would otherwise be caused by the interposition between the central post and the wings of the projecting straps 21. At the top of each wing the portion 15 has a plate 23, with pin 24 in line vertically with the hinge pin or pins 20 of said portion of the wing, said pin 24 being adapted to a socket on the under side of a bar 25, projecting radially from a hub 26, which is secured to and rotates with the post 1. The portion 15ª of each wing has at the top a plate 27, with pin 28 adapted to an opening in the depressed portion of the plate 23, said pin 28 being in line with the pintle of the hinge 16. The plate 25 carries a tubular casing 29, in which is adapted to slide vertically a bolt 30, with conical lower end adapted to a conical recess in the top of the plate 27, immediately above the pin 28, said bolt 30 being acted upon by a coiled spring 31, whereby it is normally depressed, but can be forced upward when lateral pressure is exerted upon the hinge 16.

Secured to and projecting from each of the radial bars 25 is an arm 32, which is of a tapering form, as shown in Fig. 1, said arm being gradually reduced in width from the inner to the outer end, so that while it offers a rigid resistance to lateral strain it is capable of a certain amount of vertical flexibility—that is to say, its outer end can be forced upward to a limited extent. To the under side of each arm at the outer end of the same is secured a plate 33, which has a stud 34, adapted to an opening in the bar and connected by a rod 35 to a flanged plate 36, mounted upon a block 37 at the inner end of the arm, tension being imparted to the rod 35 by means of a nut 38, which can be locked in position after adjustment by means of a locking-plate 39. Hence said rod 35 serves to truss the arm 32 and prevent any sagging of the outer end of the same.

At the outer end of the plate 33 is a depending split lug 40, having a central countersunk opening for the reception of the bevel-headed screw 41, which is adapted to a threaded opening in the plate 33, so that by the adjustment of this screw the split lug 40 can be expanded or permitted to contact. The lug 40 fits snugly in a recess or pocket 42 at the outer end of a plate 43, which is secured to the top of the outer end of the portion 15ª of each wing. Hence the latter is normally locked to the arm 32. Both the wing and the arm 32 are provided with projecting strips 44, of felt or equivalent material, for making contact with the casing as the door is revolved, and on the back of each arm 32 are projecting cleats 45, to one of which is secured a strip 46, of felt or equivalent material, which makes contact with the ceiling portion 4 of the casing structure of the door.

In the ordinary use of the door pressure is exerted upon the outer end of the wing, and under such conditions of use the wing is rigidly secured to the arm 32 by reason of the locking-lug 40, the two practically moving as a unit around the axis of the center post 1. In case, however, of a panic-stricken rush against the door pressure will be exerted upon the hinge 16, the result being that the bolt 30 will be forced out of engagement with the recess in the plate 27 and the wing of the door will be permitted to turn on the hinge-pins 20 and 24 of the inner section 15 of the wing, the hinged portion 16 folding, which will have the effect of drawing inward the outer portion of the section 15ª of the wing until the pocket 42 of the plate 43 leaves the lug 40, whereupon the whole wing will swing around upon the hinges 20 24 until it lies alongside of that wing of the door which is pointing outwardly or toward the street-opening of the door-casing, as shown in Fig. 3. Wings on opposite sides of the door might, however, be simultaneously released in this way and thrown forwardly against the radially-projecting outer wings, in which case it will be difficult, if not impossible, to impart pressure to said outer wings in the line of the hinges 16, so as to cause the contraction of the wings necessary to release them from the locking-lugs 40. Hence I provide each of the plates 33 with projecting beveled lugs 50, as shown in Fig. 4, so that the wing of a door approaching an arm 32 from either side will act upon this beveled lug, so as to force upward the outer end of said arm 32 until its locking-lug 40 is withdrawn from the pocket in the plate 43 of the wing corresponding with said arm, so as to release the latter and permit it to swing forward.

When all of the wings of the door have been swung to the front and lie side by side, it is advisable to retain them in this central position, so that the excess of pressure upon one side of the series of wings will not cause the swinging of the entire series to the other side, so as to block egress through that side, it being the main object of my invention to provide a perfectly free and wide passage on

each side of the central post when the wings have been thrown to the front, as shown in Fig. 3. In order, therefore, to effect the locking of the wings in this central position, I mount upon the forward portion of the ceiling structure 4 of the fixed casing of the door a box or frame 51, as shown in Fig. 1, and in said box or frame I hang two locking-levers 52, pivoted at their outer ends and free to swing downwardly at their inner ends through suitable openings in the ceiling structure 4. Normally these locking-levers are held in an elevated position by engagement of projecting spring-plates 53 thereon with a supporting-block 54 on the top of the ceiling structure 4, as shown in Fig. 10, a set-screw 55 engaging with a block 56 on the spring-plate, so as to limit the extent of projection of the same.

Hung to the ring 7, which surrounds the central opening of the ceiling structure 4, is a lever 57, one arm of which is provided with a weighted ring 58, which is normally supported upon one or more of a series of vertically-movable rods 59, guided in the hub 26 on the center post 1 of the door, the lower ends of these rods resting in pockets 60 at the inner ends of the top plates 23, which are secured to the sections 15 of the wings. The side walls of these pockets are inclined or beveled, as shown in Fig. 14, so that movement of the portion 15 of either wing upon its hinges 20 24 in either direction will cause a lift of the corresponding rod 59 and will consequently lift the weighted ring 58 and impart swinging movement in the direction of the arrow, Fig. 2, to the lever 57. To the said lever is connected a pair of rods 61, the outer ends of which are adapted to act in conjunction with the spring-plates 53 of the locking-levers 52, each rod being guided in a bearing 62 on the supporting-block 54 of its respective spring-plate, as shown in Fig. 10. When, therefore, the lever 57 is operated by the raising of one of the rods 59, the rods 61 will thrust the spring-plates 53 from their bearings on the block 54 and will thus permit the locking-levers 52 to fall to the position shown in Fig. 9, in which position they will engage the series of wings which have been swung around to the central position and will retain them in that position.

The under side of each of the locking-levers 52 is beveled, so that a wing of the door swinging around into the central forward position after the lever has been dropped will raise the lever sufficiently to pass under it, the lever then dropping back into the locking position. The descent of each lever is limited by contact of a shoulder 63 thereon with the end of the slot formed in the ceiling-plate of the fixed casing, as shown in Fig. 9.

In order to permit of the swinging outward of the end sections of the fixed casing of the door when said end sections are subjected to undue pressure, such as would be caused by the rush of an excited crowd, each of the said end sections 3 is provided with a vertically-movable bolt 65, having a beveled lower end engaging with a correspondingly-beveled face upon the keeper-plate or retainer 66, which is secured to the floor. The bolt 65 is acted upon by a coiled spring 67, which is both a torsion and expansion spring, and therefore tends not only to push the bolt 65 downward in the casing 68, but also imparts to said bolt turning movement in order to maintain a projecting lug 69 upon the stem of the knob 70 constantly in contact with the toothed edge 71 of a slot formed in the casing 68 for the play of said knob-stem. The beveled face at the lower end of the bolt 65 is on the outer side of the same, and the downward pressure of the spring 67 upon the bolt is such that any ordinary outward pressure upon the end sections 3 of the fixed casing of the door will not be sufficient to release the bolt from the retaining influence of the keeper-plate 66; but any excessive pressure upon either end section of the casing will cause the bolt to slide upward in its guide, so as to be released from the control of the keeper, and the end section of the casing can then swing outwardly, as shown by dotted lines in Fig. 1. As the bolt 65 rises its lug 69 engages with successive notches 71, so that the bolt is retained in the elevated position, and thus prevented from scraping along and marring the surface of the floor. When the end section of the casing has been restored to its proper position, the bolt can be readily dropped into locking position again by simply giving it a partial turn to free its lug 69 from engagement with the notches 71.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. The combination, in a revolving door, of a structure having wings mounted so as to be revoluble around a central axis in fixed radial relation thereto, said wings having also independent hinges so disposed that all of the wings may be folded and lie side by side so as to project in one direction from the center.

2. The combination in a revolving door, of a structure mounted so as to rotate about a central axis, a series of wings mounted so as to swing independently of their joint rotating movement about said axis, and self-releasing locking devices, whereby said wings are normally retained in fixed radial relation to said central axis.

3. The combination in a revolving door, of a series of wings mounted so as to rotate about a central axis, each of said wings being hinged so that the series may be folded side by side and may project in one direction from the general axis of rotation, and means for locking said wings in position when they have been swung apart from each other.

4. The combination, in a revolving door, of a structure mounted so as to rotate around a

central axis, wings each pivoted so as to swing independently of their joint rotating movement about the central axis, and locking means for engaging each wing with the structure which rotates around said central axis, one of the elements of said locking means being movable to release the wing, when the wings swing independently of their joint axial rotation.

5. The combination, in a revolving door, of a structure mounted so as to rotate about a central axis, and radiating wings, each locked to said rotating structure but capable of swinging independently of the same when released therefrom, said wings being capable of radial expansion and contraction for the purpose of engaging them with or disengaging them from the structure which rotates around said central axis.

6. The combination in a revolving door, of a structure mounted so as to rotate about a central axis, radiating wings, each comprising an inner and outer portion hinged together, the inner portion having an axis of rotation independent of the central axis, and the outer portion being provided with means whereby it can be locked to the rotating structure.

7. The combination in a revolving door, of a structure mounted so as to rotate about a central axis, radiating wings each mounted so as to swing independently of their joint rotation about the central axis, means for locking said wings to the rotating structure, and means whereby lateral pressure exerted upon the inner portion of either wing will automatically unlock the same.

8. The combination in a revolving door, of a center post, with radiating wings normally locked to said center post but mounted so that they will be automatically unlocked therefrom, and swung forwardly to project side by side when pressure is exerted upon them in other than a normal direction.

9. The combination in a revolving door, of a structure mounted so as to rotate about a central axis, wings, each composed of two parts hinged together so as to bend or fold in either direction, and locking devices whereby said wings are normally secured to said rotating structure in fixed relation to the axis of rotation, said locking devices of each wing being constructed for automatic release when the wing is bent or folded at its hinge.

10. The combination in a revolving door, of a structure mounted so as to rotate about a central axis, radiating wings each composed of inner and outer parts hinged together, and locking devices engaging with the wings in line with the hinges between the inner and outer parts of the same, said wings being free to swing independently of their joint rotation about the central axis when unlocked.

11. The combination in a revolving door, of a structure mounted so as to rotate about a central axis, radiating wings each composed of inner and outer parts hinged together, and self-releasing locking devices engaging with the wings in line with the hinges between the inner and outer parts of the same, said wings being free to swing independently of their joint rotation around the central axis when thus released.

12. The combination in a revolving door, of a structure mounted so as to rotate about a central axis, wings each composed of two parts hinged together, and means for locking said wings to the structure which rotates with the post, one of said locking devices being in line with the hinge between the two parts of the wing and the other at the outer end of the wing, said wings being free to swing independently of their joint rotation about the central axis when unlocked.

13. The combination in a revolving door, of a center post, a series of radiating arms mounted upon and rotating therewith, and each tapered or reduced in width from the inner toward the outer end, and radiating wings each mounted so as to be free to swing on an axis independent of that of the post, and normally locked to one of said arms, but capable of being automatically released therefrom.

14. The combination in a revolving door, of a center post, a series of radially-projecting arms mounted thereon, truss-rods extending from the inner to the outer portion of each arm, and radiating wings each mounted so as to be free to swing on an axis independent of that of the post, and normally locked to one of said arms but capable of being automatically released therefrom.

15. The combination in a rotating door, of a structure mounted so as to rotate about a central axis, and having a series of depending lugs at its outer portion, and a series of radiating wings each constructed for radial expansion and contraction and each having an open-ended pocket for the reception of one of said depending lugs.

16. The combination in a revolving door, of a structure mounted so as to rotate about a central axis, and provided with a series of expansible and contractible depending lugs at its outer portion, and radiating wings each constructed for radial expansion and contraction and having an open-ended pocket for the reception of one of said lugs.

17. A revolving door in which are combined a center post, radiating arms mounted upon and rotating therewith, wings normally locked to said arms but free to swing independently thereof when released therefrom, and means whereby the swinging of one wing against another will automatically release the latter from the control of its arm.

18. The combination in a revolving door, of wings mounted so as to project radially from and rotate about a central axis and so as to be capable of swinging around in order to project side by side in the same direction from said axis, and locking devices for preventing lateral movement of the series of wings when they are thus adjusted side by side.

19. The combination in a rotating door, of

wings mounted so as to project radially from and rotate about a central axis and so as to swing around in order to project side by side in the same direction from said axis, and locking devices for preventing lateral movement of the series of wings when they are thus adjusted side by side, said locking devices consisting of a pair of weighted levers depending one on each side of the series of wings and each capable of being lifted by the swinging wing as the latter moves beneath it.

20. The combination in a revolving door, of a structure mounted so as to rotate about a central axis, a series of radiating wings normally locked to said structure so as to rotate therewith but each capable of swinging independently thereof when released therefrom whereby they may all be caused to project side by side in one direction, means for locking the series of wings when they are thus projected, and means whereby the swinging movement of the wings independently of their rotating movement is caused to render said locking device operative.

21. The combination in a revolving door, of a structure mounted so as to rotate about a central axis, of a series of radiating wings normally locked to said structure but capable of swinging independently thereof when released therefrom, whereby they can all be swung around so as to project in the same direction side by side, levers for locking the series of wings when they are thus projected, a support whereby said levers are normally held out of locking position, and tripping mechanism for the levers operated by the wings when they swing independently of their rotating movement.

22. The combination of a revolving door having radiating wings mounted so as to be swung around side by side, locking-levers for engaging the series of wings when thus adjusted, plates carried by the levers and normally resting upon supports whereby the levers are held in operative position, and means for pushing the plates from said support so as to permit the levers to drop.

23. The combination in a revolving door, of a structure mounted so as to rotate about a central axis, radiating wings normally locked to said structure but capable of swinging independently thereof when released therefrom so as to project side by side in the same direction, a locking device for retaining the series of wings in this position, cams carried by the wings, and a tripping device for the locking-levers acted upon by said cams when the wings swing independently of their rotating movement.

24. The combination in a revolving door, of a structure mounted so as to rotate about a central axis, radiating wings normally locked to said structure but self-releasing therefrom when subjected to pressure in other than a normal direction, said wings being mounted so as to swing independently of the said rotating structure when thus released, whereby they can project side by side in the same direction, locking devices for maintaining them in this position, and means whereby said locking devices are rendered operative by the swinging of the wings after they have been released from the rotating structure.

25. The combination in a revolving door, of a structure mounted so as to rotate about a central axis, radiating wings normally locked to said structure but self-releasing therefrom when subjected to pressure in any but a normal direction, means whereby said wings are permitted to swing around into position side by side when thus released, locking-levers for retaining the series of wings when thus adjusted, supporting devices whereby said locking devices are normally held out of locking position, a lever having rods for tripping said supporting devices, rods carried by the rotating structure so as to act upon said lever, and cams carried by the wings of the door and adapted to act upon said rods when the wings swing independently of their rotating movement.

26. The combination of the rotating structure of a revolving door, with a casing having hinged end portions retained by means of bolts which are self-releasing from their retainers when excessive outward pressure is exerted upon said end portions of the casing.

27. The combination of the rotating structure of a revolving door, with a casing having hinged end portions retained by bolts which are self-releasing from their retainers when excessive outward pressure is exerted upon said end portions of the casing, and means for retaining the bolts in the retracted position after their release from the control of the retainers.

28. The combination of the swinging outer portion of the door-casing with a retaining-bolt therefor having a beveled end, a keeper-plate for engaging with said beveled end of the bolt, a lug projecting from the bolt and adapted to engage with notches in the bolt-guide, and a spring acting upon the bolt so as to both depress and turn it.

29. The combination of the center post of the rotating structure of a revolving door, with a pivot-screw therefor, a threaded socket with which said screw engages, a plate mounted on said socket and having a lug for engaging with a slot in the screw, and means for securing said plate in different positions of circumferential adjustment.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

THEOPHILUS VAN KANNEL.

Witnesses:
FRANK E. BECHTOLD,
JOS. H. KLEIN.