H. W. DYER.

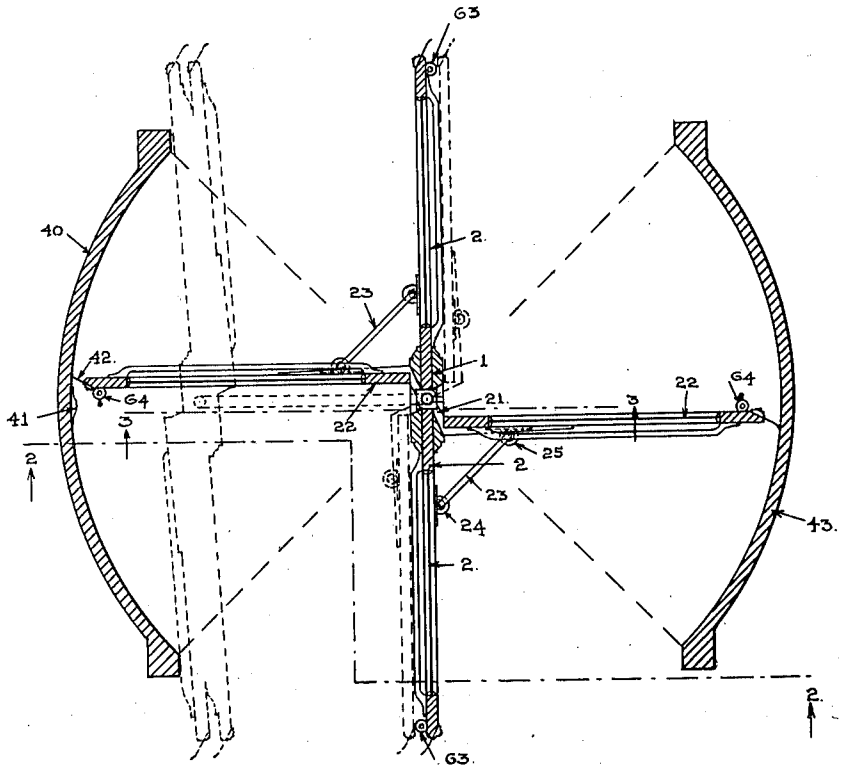
REVOLVING DOOR.

APPLICATION FILED DEC. 4, 1907.

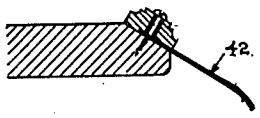
1,053,483.

Patented Feb. 18, 1913.

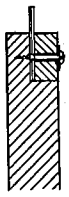
3 SHEETS—SHEET 1.



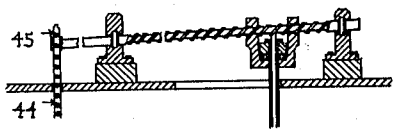
·FIG-1·



·FIG-10·



·FIG-9·



·FIG-11·

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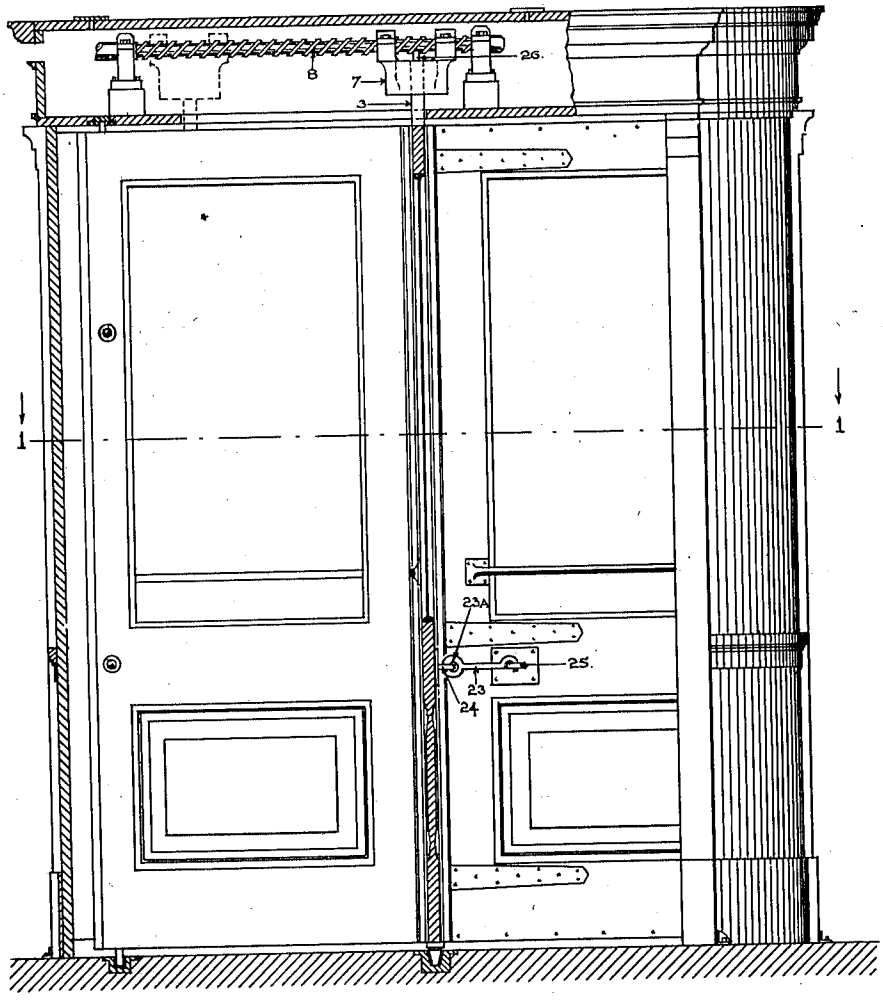
3 SHEETS—SHEET 2.



·FIG·2·

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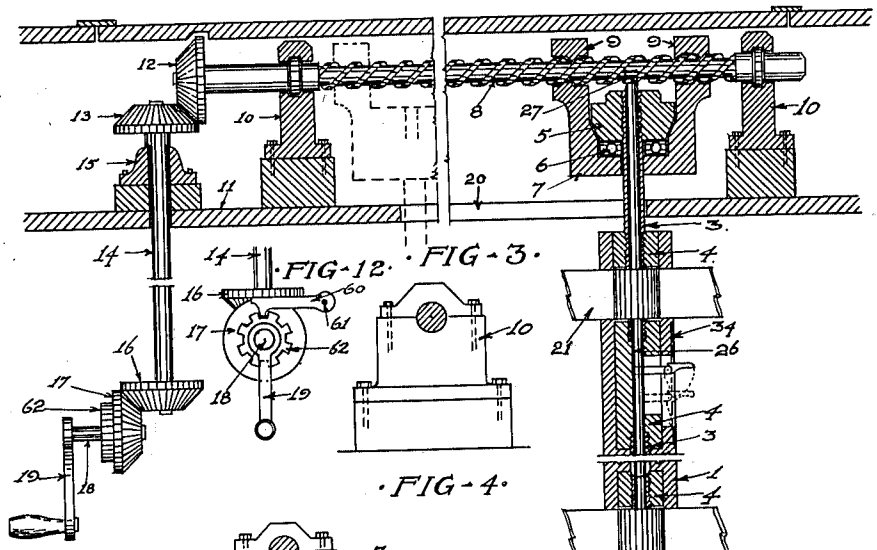
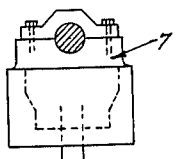
3 SHEETS—SHEET 3.

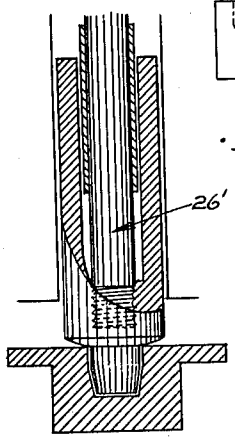


·FIG-12· ·FIG-3·

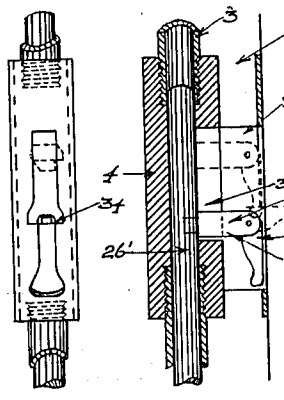
·FIG-4·



·FIG-5·



·FIG-6·



·FIG-7· ·FIG-8·

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UNITED STATES PATENT OFFICE.

HARRY W. DYER, OF EAST ORANGE, NEW JERSEY, ASSIGNOR TO THE DYER REVOLVING DOOR COMPANY, A CORPORATION OF ARIZONA.

REVOLVING DOOR.

1,053,483. Specification of Letters Patent. Patented Feb. 18, 1913.

Application filed December 4, 1907. Serial No. 405,015.

To all whom it may concern:

Be it known that I, HARRY W. DYER, a citizen of the United States, residing at East Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Revolving Doors, of which the following is a full, clear, and exact description.

My invention relates to revolving doors of the type in which the door comprises a plurality of wings extending radially or substantially so, and in which the wings are hinged with respect to each other, so that they may be folded, thus affording a free passageway whenever desired, and in which the door when folded may be moved to one side of the passage, if desired, so as to leave the same entirely free for substantially its entire width.

My invention has for its object the provision of improved means for supporting and hinging the wings with respect to each other and for bracing and locking the wings when in open position; also improved means for rotatably supporting the door and for carrying the door from its operative or rotary position to one side, so as to leave the passageway free and for returning the door to its operative position; also the provision of means for retarding the rotary movement of the door, so as to prevent it from attaining a dangerous velocity when rotating; and finally the provision of improved details of construction, as hereinafter set forth and claimed.

Reference is hereby made to the accompanying drawings, of which,

Figure 1 is a horizontal section on line 1—1 of Fig. 2. Fig. 2 is a front elevation partly in section on line 2—2 of Fig. 1, and showing a door constructed in accordance with my invention and adjacent parts of the structure of the doorway to which the door is applied. Fig. 3 is an enlarged section on line 3—3 of Fig. 1. Fig. 4 is a detail side view of one of the bearings which support the rotary screw shaft for imparting a movement of translation to the door. Fig. 5 is a similar view of the carriage which moves upon said screw shaft and upon which the door is rotatably supported. Fig. 6 is a detail section of the shoe for centering the lower end of the door supporting tube. Figs. 7 and 8 are detail views of the mechanism for operating the central rod by which the door may be locked against translation. Figs. 9 and 10 are detail views showing the vertical and horizontal edges of the radial wings with the weather strips applied thereto. Fig. 11 is a detail section illustrating a modification in the arrangement of the rotary screw shaft for supporting and moving the door. Fig. 12 is a detail face view of the means for locking the screw shaft against rotation.

In all the views, corresponding parts are designated by the same reference characters.

The door shown comprises a body 1 formed with a pair of oppositely disposed wings 2, 2 and rotatably supported by a central axis in the form of a sectional tube 3. Embedded within the body 1 of the door are a series of blocks 4, preferably of metal, and within said blocks are threaded the ends of the sections of the tube 3, whereby the weight of the door is applied to the said tube, and through the tube to the block 5 which forms a part of the roller bearing 6 carried by the carriage 7. The carriage 7 is mounted upon a horizontal shaft 8 formed with a screw thread which engages a corresponding female screw formed within the upwardly projecting arms 9 of the carriage 7, so that a rotary movement of the shaft 8 will impart a movement of translation to the carriage 7 and the door which is carried thereby. The shaft 8 may be either horizontal as shown in Fig. 3, or slightly inclined, as shown in Fig. 11. In either case, it is mounted in suitable bearings 10, which may be of any suitable type, such as plain or roller bearings, said bearings being mounted upon a suitable support 11. Any suitable means may be provided for causing a rotation of the shaft 8, and I have shown for this purpose a bevel gear 12 mounted on said shaft and meshing with a similar gear 13 secured to a vertical shaft 14 journaled in a bearing 15, and provided at its lower end with a bevel gear 16 which meshes with a similar gear 17 mounted on a horizontal shaft 18 and adapted to be operated by a crank 19.

Locking means for holding the shaft 8 against rotation are preferably provided, and may be of any suitable form. I have shown for this purpose a dog 60, pivoted at 61 and adapted to be brought into or out of engagement with a ratchet 62 fixed to the shaft 18. The locking of the shaft 8

will hold the door against translation when in any position, as, for instance, when folded and at one side of the doorway. The support 11 is provided with a slot or opening 20 through which the door supporting tube 3 passes. Upon the section of the tube 3 and between the blocks 4 are placed hinge members 21 which rotate freely upon the tube 3 and carry wings 22. Any desired number of hinge members may be used, three being shown in the drawing. These hinge members are preferably formed somewhat like the letter Z, as shown in Fig. 1, whereby the door, when the wings are folded, occupies very little space, being substantially flat, as indicated in dotted lines in said figure. The wings may be locked in this position by any suitable means such as a vertical bolt 64 carried by one wing which will engage a staple 63 carried by the adjacent wing.

In order to lock the wings together and brace the same when in operative position, hooks 23 are provided, one end of which is formed with an eye 23^A which engages a staple 24 secured to the wing 2, and the other end of the hook engages a staple 25 carried by the wing 22.

The door supporting tube 3 is locked in its normal or operative position, and in its inoperative position by upper and lower vertically movable rods 26 and 26′. Means are provided for raising and lowering the said rods when desired, and for locking the same in either position. In Fig. 3, the upper rod is shown in its elevated position, the upper end occupying a socket 27 formed in the shaft 8, and the lower rod is in its lowered position, so that the end of the hollow shoe 28 within which the end of said rod is threaded, engages a socket 50 in the block 29 which is sunk in the floor. The bottom of the shoe 28 is preferably formed with a stud for engaging said socket 50, as shown. The door therefore cannot be moved from either its operative or inoperative position, unless the rods 26 and 26′ be moved longitudinally, so as to withdraw the ends of the same from the sockets formed respectively in the shaft 8 and block 29. The means for accomplishing this result is illustrated in Figs. 3, 7 and 8, and comprises a recess or slot 30 formed within the body 1 and a similar but smaller recess 31 formed within the block 4. Within the rod 26′ is set a piece 32 which extends through the slots 30 and 31. The outer end of said piece 32 is forked, and within the same, a lever or hand member 33 is hinged by a knuckle joint, so that when in its vertical position, it occupies the slot 30 and lies entirely within the body 1 of the door. In the position shown in full lines in Fig. 8, the lower end of the member 33 rests upon the bottom of the slot 30 and thereby supports the rod 26′. When the member 33 is brought out into a horizontal position, it serves as a handle for lifting the rod 26′, and when in its elevated position, (shown in dotted lines) it holds the rod 26′ in an elevated position, by reason of the lower end of the member 33 resting upon shoulders 34 formed in the side walls of the slot 30. The construction of the device for raising and lowering the upper rod 26 is identical with the structure which has been described for the operation of the lower rod 26′.

In order that the door when in its operative position may not attain such speed as to be dangerous to a person attempting to enter the building, a retarding device may be applied to the doorway, or the doorway itself may be so formed as to retard the door. In Fig. 1, the vertical member 40 of the door casing is shown as being curved in an arc of a circle whose center is concentric with the axis of the door, and a strip 41 is applied to the inner surface thereof in such position, that, as the door rotates, the weather strip 42 carried by the edge of each of the radial wings will frictionally engage the said strip and thereby retard the door. If desired, additional strips similar to 41 may be provided at different points along the casing 40. The casing 43 shown on the opposite side of Fig. 1 is curved so as to form the arc of an ellipse, the center of which coincides with the axis of the door, and whose shortest axis extends from the center of the casing across the doorway. The forward and rear edges of the casing 43 are preferably at the same distance from the center of the door as the edges of the weather strips 42 when unrestrained. On account of the elliptical form of the casing, however, the distance from its inner surface to the axis of the door gradually diminishes from its edges toward its center, and thereby causes a frictional engagement of the weather strip with respect to said casing, said resistance increasing toward the center of the casing and then decreasing from the center toward the rear edge of the casing.

In the structure of Fig. 11, the screw shaft 8 which supports the carriage 7 from which the door is suspended, is inclined downward from right to left, so that when the door has been folded and the locking rods 26 and 26′ withdrawn from engagement with the holding sockets, the weight of the door will cause the shaft 8 to rotate, and the door will be caused to move by gravity from the extreme right hand position to its extreme left hand position. The degree of inclination of said shaft is exaggerated in the drawing. With a heavy door and a readily movable screw shaft, it may be very slight. In order to cause the door to return to its initial position, the shaft 8 will be rotated by any suit-

able means such as the chain 44 which passes over the sprocket 45 carried by the end of the shaft 8. After the door has reached its initial or operative position, the locking rods 26 and 26′ may be operated to hold the same against translation.

Obviously the inclination of the shaft 8 may be reversed so that it will slope downward from left to right. In this case, in order to move the door from operative position to one side of the doorway, it is necessary to impart rotation to the shaft 8, and suitable locking means are provided for holding the door in its inoperative position, such as sockets similar to the sockets 27 and 50. In this structure, the inclination of the shaft 8 will be sufficient to cause the door to travel by gravity from its inoperative to its operative position, whenever the locking rods 26 and 26′ are withdrawn from their sockets.

While I have shown the carriage 7 supported by the screw 8, and prefer this construction, it will be obvious that the carriage may be provided with rollers running on a fixed support and the screw 8 used only as a translating device for moving the carriage without supporting it.

Having now described my invention, what I claim is:

1. A door comprising radial wings, a carriage upon which said door is rotatably mounted and an inclined rotary screw upon which said carriage is supported, the inclination of said screw being sufficient to allow the carriage to descend by gravity.

2. A revolving door comprising radial wings, a carriage, means for rotatably supporting said door upon said carriage, an inclined rotary screw upon which said carriage is supported, the inclination of said screw being sufficient to allow said carriage to descend by gravity, and means for locking said carriage in its elevated position.

3. A revolving door comprising a central supporting member 3, wings rigid therewith, a Z-shaped hinge member rotatable thereon, and radial wings 22 secured to the opposite ends of said hinged member.

4. A revolving door comprising a body 1 having wings 2 rigid therewith, Z-shaped hinge members 21 rotatable with respect to said body, and wings 22 secured to opposite ends of said hinge members.

5. A revolving door comprising vertical tube sections, blocks of increased cross section secured to said tube sections, a plurality of hinge members applied to and rotatable upon said tube sections immediately above said blocks so as to be supported thereby, and a wing secured to said hinge members.

6. A revolving door comprising vertical tube sections, blocks of increased cross section secured to said tube sections, a body recessed so as to receive and rest upon some of said blocks, wings rigid with said body, hinge members applied to said tubes above others of said blocks so as to be supported thereby, and a wing secured to said hinge members.

In witness whereof, I subscribe my signature, in the presence of two witnesses.

HARRY W. DYER.

Witnesses:
WALDO M. CHAPIN,
REUBEN R. GREENE.