

J. S. MITCHELL & F. M. OVERHOLT.

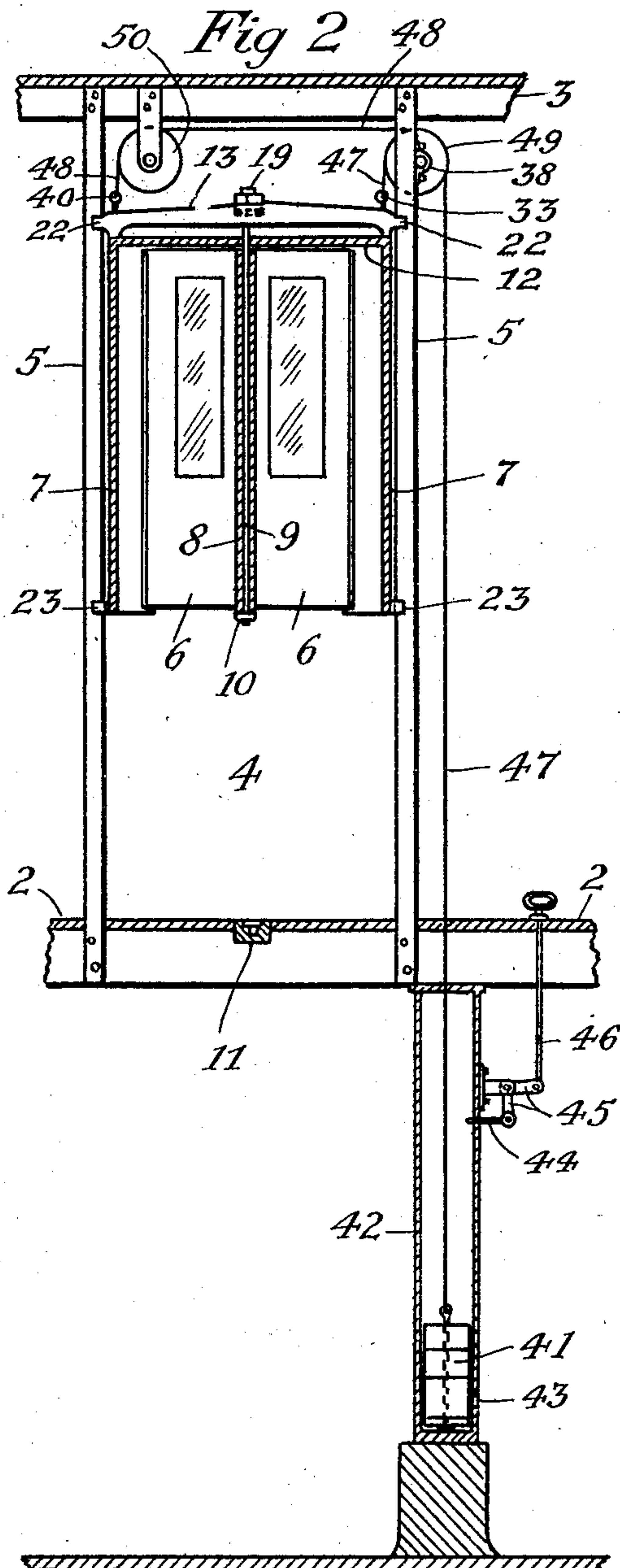
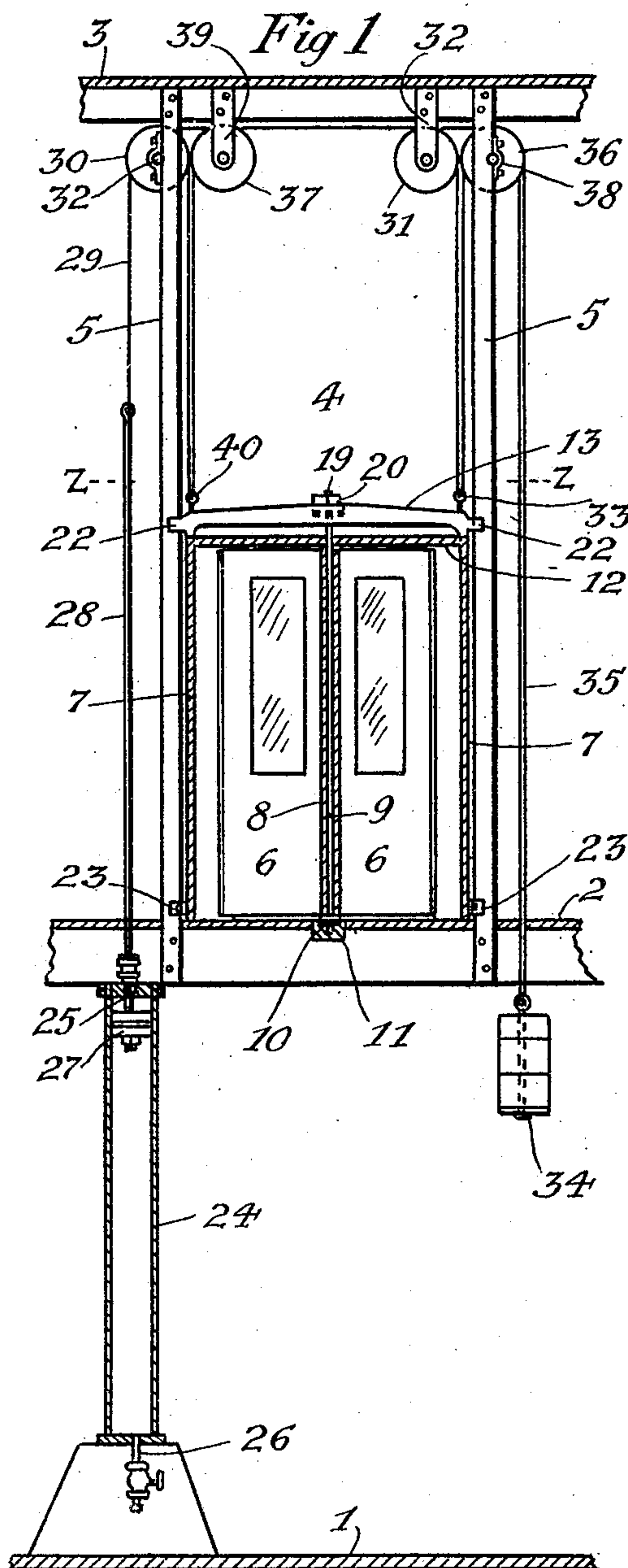
REVOLVING DOOR.

APPLICATION FILED NOV. 26, 1906.

929,235.

Patented July 27, 1909.

2 SHEETS—SHEET 1.



Witnesses.
Geo. Lagard.
H. A. Bowman.

Inventors;
John S. Mitchell.
Francis M. Overholt.
 By *P. V. Gunkel*
 their Attorney.

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Fig. 3

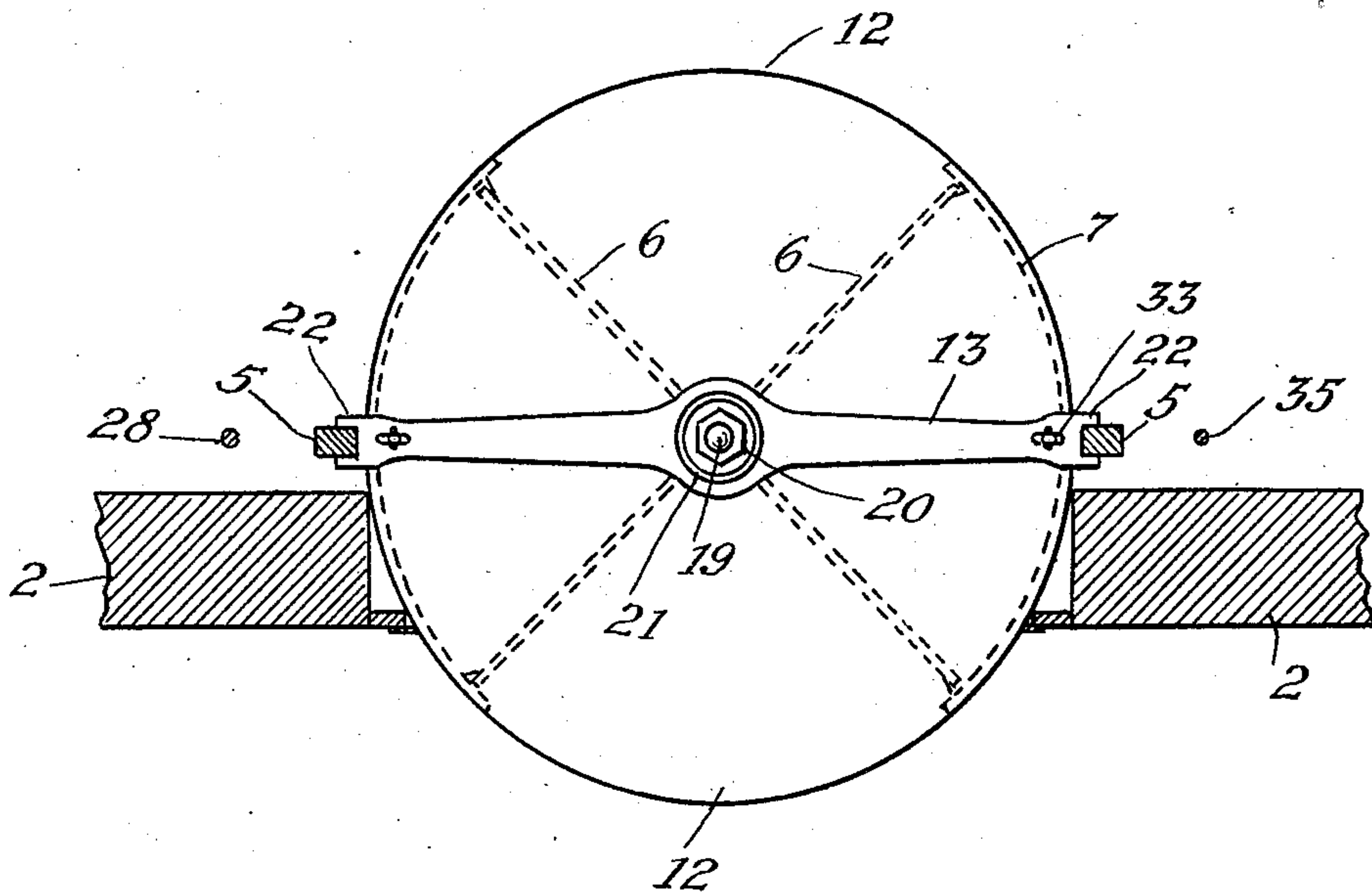
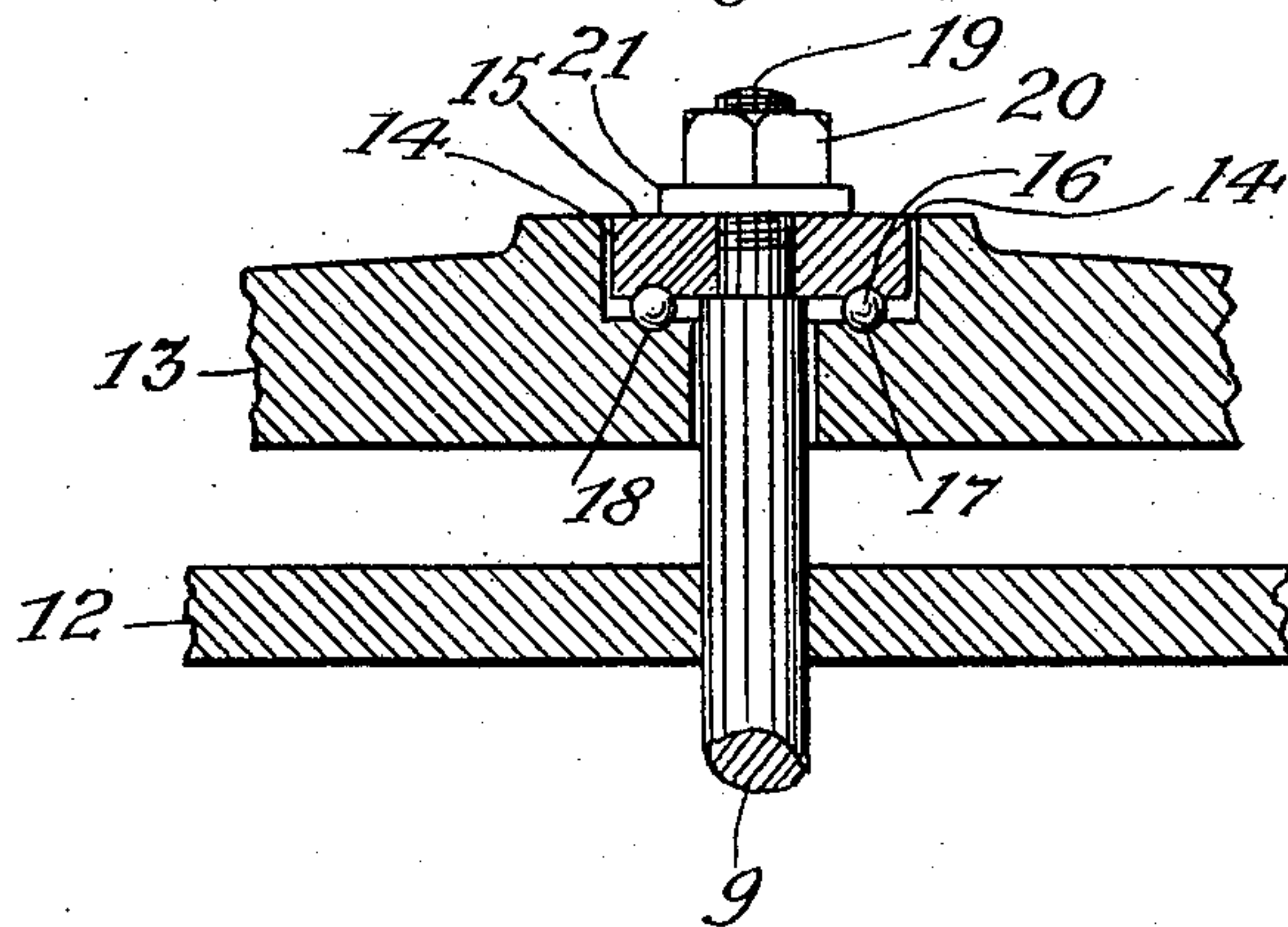


Fig. 4



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UNITED STATES PATENT OFFICE.

JOHN S. MITCHELL AND FRANCIS M. OVERHOLT, OF MINNEAPOLIS, MINNESOTA.

REVOLVING DOOR.

No. 929,235.

Specification of Letters Patent.

Patented July 27, 1909.

Application filed November 26, 1906. Serial No. 345,058.

To all whom it may concern:

Be it known that we, JOHN S. MITCHELL and FRANCIS M. OVERHOLT, citizens of the United States, residing at Minneapolis, county of Hennepin, and State of Minnesota, have invented certain new and useful Improvements in Revolving Doors, of which the following is a specification.

Our invention relates to revolving doors, and particularly to the provision of means for the removal of such doors from the passage-ways of the door openings in which they operate.

The object of the invention is to enable a revolving door, which may be of the ordinary construction, to be quickly and conveniently raised bodily out of the door-way when desired, and again lowered to its original operative position, at the will of an operator. So far as we are informed the only means heretofore used or proposed for freeing the passage-way in which a revolving door is located, is by employing folding or jointed wings that are collapsible or movable in horizontal direction; and that there has not heretofore been used or proposed a construction the object of which was to lift the door bodily upward out of the door-way.

Our improvements are illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation of a revolving door provided with our improvements, shown in position in a building; Fig. 2 is a similar view showing the revolving door raised out of working position to clear the door-way; Fig. 3 is a horizontal section on the line $z-z$ of Fig. 1; and Fig. 4 is a detail of the ball-bearing on which the door revolves.

In the drawings 1 designates the basement floor, 2 the ground or first floor, 3 the second floor, of a building, and 4 the first floor door-way. At opposite sides of the door-way are upright posts 5 which serve as guides for the door. The door is composed of the usual revoluble wings 6 (three or four) operating within opposite segmental casing members 7. The wings 6 are preferably attached to a tube or sleeve 8 secured to and which turns with the axis or spindle 9. At the lower end of the spindle is secured a plate 10 on which the sleeve 8 rests, and by means of which the sleeve and door-wings may be lifted when the spindle is raised. The lower ends of the sleeve and spindle extend into a socket in a

plate 11 that is secured to the floor 2. Over the door is a circular plate 12, which serves as a cover or roof for the door, and to which the casement sections 7 are secured in any suitable way. On this plate is a bridge-tree 13, from which the spindle 9 is revolubly suspended. The preferable means of suspension is a ball-bearing which may be constructed by providing a recess 14 in the top of the bridge-tree, a disk 15 adapted to rotate in the recess, circular grooves 16 and 17 in the bridge-tree and disk, and balls 18 in the ball-race thus formed. A threaded narrow portion 19 of the spindle extends through the disk, and a nut 20 and washer 21 on the projecting spindle end hold the parts in operative connection. In this way the door wings and their spindle are so suspended that they may be easily revolved. If desired the weight may be distributed between such suspending devices and the step or socket in the lower plate 11 in which the spindle seats, while the door is in normal position.

From the construction described it is apparent that the door as a whole, with its casements, is capable of being lifted out of the door-way. To guide it in such movement the ends of the bridge-tree 13 have projections 22 which engage the posts 5 and slide thereon as guiding devices. Similar guides 23 may be attached to the lower portions of the casement sections 7, to serve in conjunction with the guides 22 in directing the vertical movements of the structure along the posts as ways.

For raising and lowering the door structure we may employ any suitable form of hoisting apparatus. In Fig. 1 we have shown a hydraulic cylinder and in Fig. 2 a weight. In the former the cylinder 24 is provided with the usual controllable pipe connections 25 and 26, respectively, for introducing water under pressure above or below the piston 27. To the piston-rod 28 is attached a cable 29 which runs over guide-pulleys 30 and 31 mounted on suitable supports 32 at the floor above, and has its other end attached to an eye-bolt 33 on the bridge-tree 13. A counter-balance weight 34 may be employed for facilitating the raising and lowering of the structure. A cable 35 attached to the weight runs over guide-pulleys 36 and 37, the former pulley having a bearing 38 on a post 5 and the latter in a hanger

39; and the cable end is attached to an eye-bolt 40 on the end of the bridge-tree opposite the eye-bolt 33.

As illustrated in Fig. 2, the structure may be raised by means of a weight 41. This weight is preferably arranged to operate in an upright cylinder 42, wherein it may fit somewhat closely. A vent 43 in the side of the cylinder near the bottom permits the escape of air and the closed space below serves as a cushion to avoid jarring the structure. The weight is normally held in suspension in the upper portion of the cylinder by an arm 44 extending within the cylinder and connected without to an angular lever 45. This lever may be operated to withdraw the arm and permit the weight to descend, by means of a rod 46, or cord, or other device, which can be operated from the floor above, or any desired part of the building. To the weight 41 are connected cables 47 and 48 which run over guide-pulleys 49 and 50, having bearings respectively, in a box 38 on a post 5 and in a hanger from the floor 3, and the ends of the cables are attached, respectively, to the two eye-bolts 33 and 40.

The operation is probably obvious. The parts being in the positions shown in Fig. 1, by admitting water under pressure into the hydraulic cylinder between the piston and the adjacent upper cylinder end, the consequent movement of the piston will serve to raise the door structure to clear the doorway; and by then admitting water to the lower end of the cylinder the door will be lowered to its usual position.

In Fig. 2 the door is shown in its elevated position. If then it be lowered, by manual operation or otherwise, to operative position, the lifting weight 41, which will then be at its upper position, can be engaged and supported by the arm 44, and thereafter released when desired by rocking the lever 45. In this way we provide a means for entirely removing the revolving door, and its casements, from the door-way whenever it is desired to do so, to permit free ingress or egress.

Having described our invention, what we claim and desire to secure by Letters Patent is—

1. A revolving vertically movable door comprising a top or cover, curved vertical segments attached to said top and depending therefrom within the door opening, a bridge tree extending across said top, and vertical guideways for said tree, a sleeve, a series of wings mounted thereon and free to revolve therewith, a spindle fitting loosely within said sleeve and attached at its upper end to the middle portion of said tree and concentric with said top and having means at its lower end whereon said sleeve is supported, and means for raising said door bodily to clear the opening.

2. A revolving vertically moving door comprising a bridge tree and vertical guideways therefor, a door axis or spindle depending from said tree, a non-rotating top and side casing connected to said tree and vertically movable therewith, a series of wings inclosed by said casing, and supported by said spindle and adapted to move vertically therewith and also having a revolving movement independently of said top and casing, and means attached to said bridge tree for raising it and said spindle and the parts attached thereto to clear the door opening.

3. A revolving vertically moving door comprising a bridge tree and vertical guideways therefor, on each side of the door opening, a door axis or spindle having bearings at its upper end in the central portion of said tree and depending therefrom and a step or socket provided in the floor within the door opening to receive the lower end of said spindle, a non-rotating top and side casing attached to said tree and vertically movable therewith, a sleeve loosely mounted on said spindle, and means provided on the lower end of said spindle for supporting said sleeve, a series of wings mounted on said sleeve and free to revolve therewith, within said side casing, and means attached to said bridge tree for raising it and the door to the upper part of said guideways.

4. A revolving vertically moving door comprising a non-rotating top and a side casing connected thereto, and vertical guideways between which said top and casing are movable, a door axis or spindle depending from said top, a series of wings inclosed by said casing and supported by said spindle and adapted to move vertically therewith and also having a revolving movement independently of said top and casing, and means connected to said top for raising it and said spindle and the parts attached thereto to clear the door opening.

5. A revolving vertically moving door comprising a bridge tree and vertical guideways therefor, a door axis or spindle, a non-rotating top and side casing vertically movable with said bridge tree, a series of wings inclosed by said casing and supported by said spindle and adapted to move vertically therewith and also having a revolving movement independently of said top and casing and means attached to said bridge tree for raising it and said spindle and the parts attached thereto, to clear the door opening.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses this 22d day of November, 1906.

JOHN S. MITCHELL.

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Witnesses:

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