Jan. 9, 1951 H. G. E. NORDIN 2,537,418

REVOLVING DOOR

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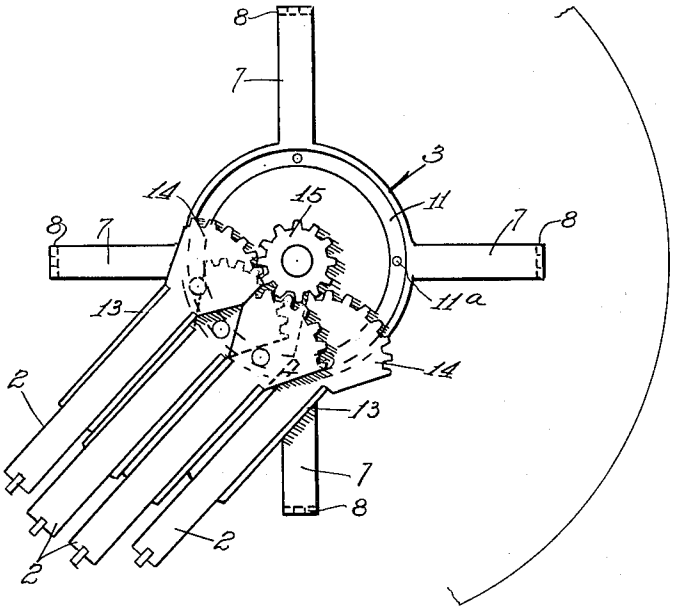


Fig 1

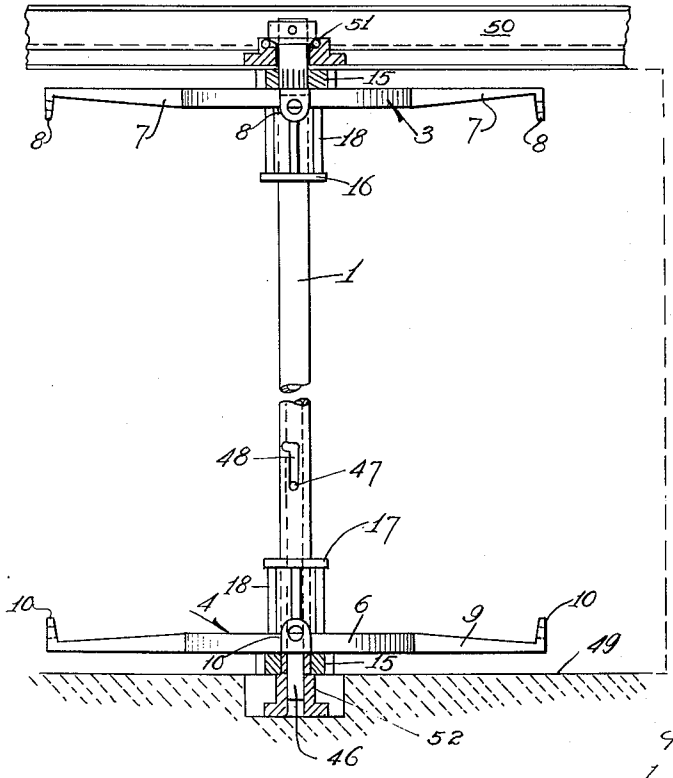


Fig. 2.

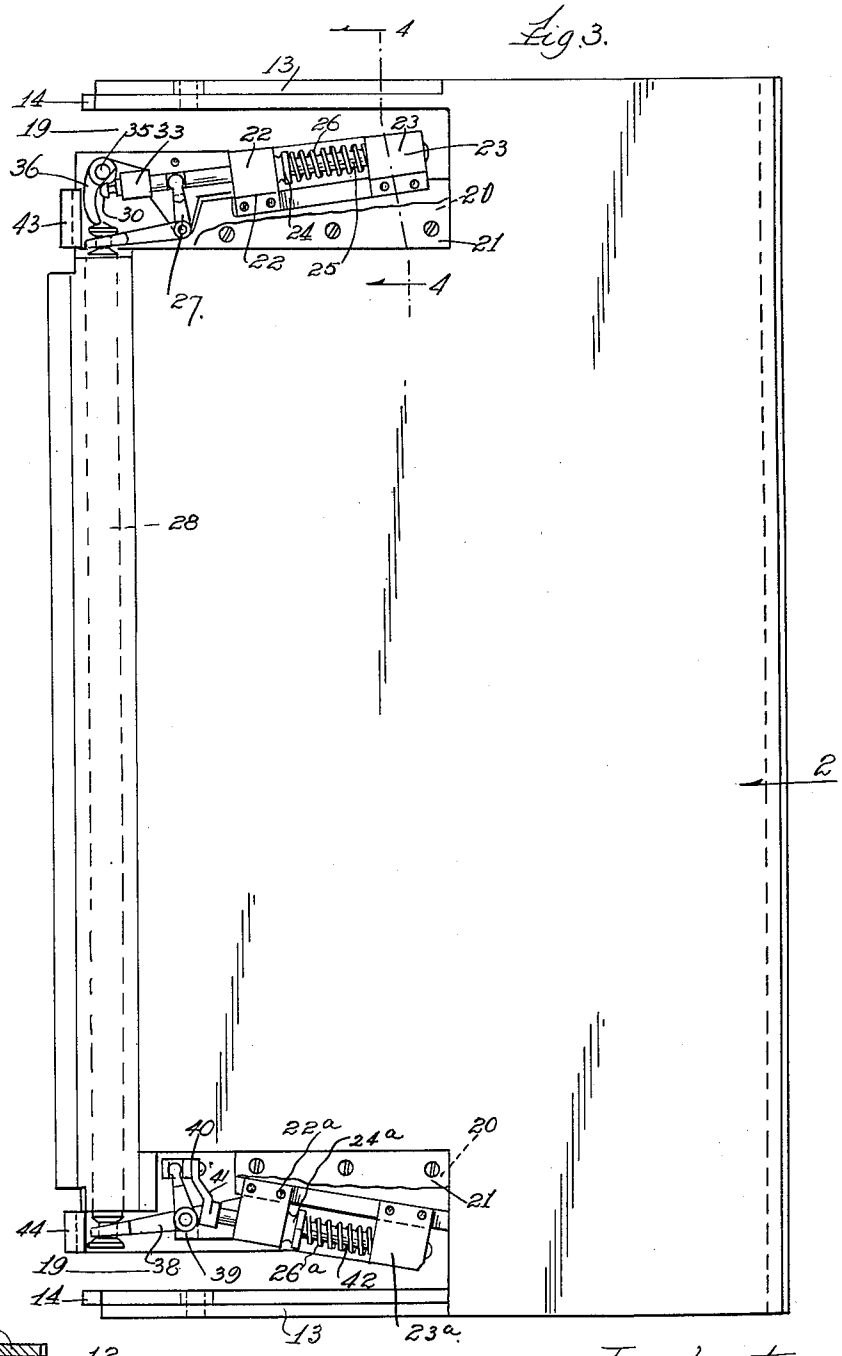
Inventor.
Holger G. E. Nordin.
by H. J. Sanders
Attorney.

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Fig. 3.



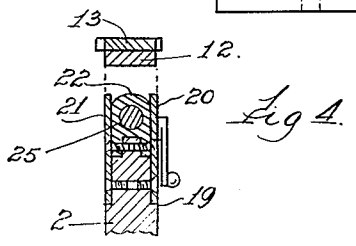


Fig 4.

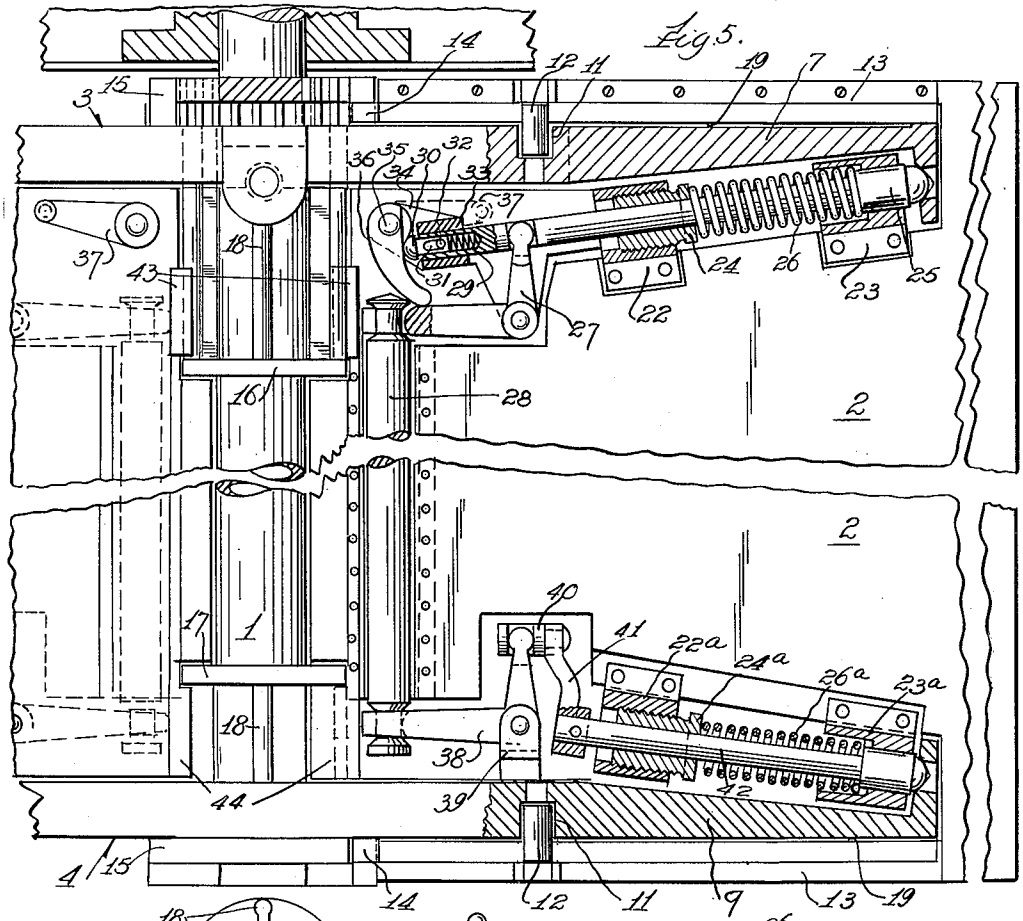
Inventor:
Holger G.E. Nordin
by H.J. Sanders
Attorney.

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Fig. 5.



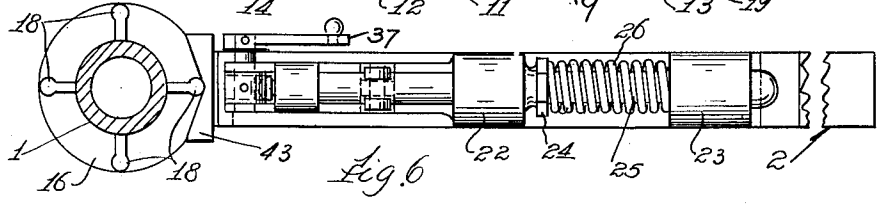


Fig. 6

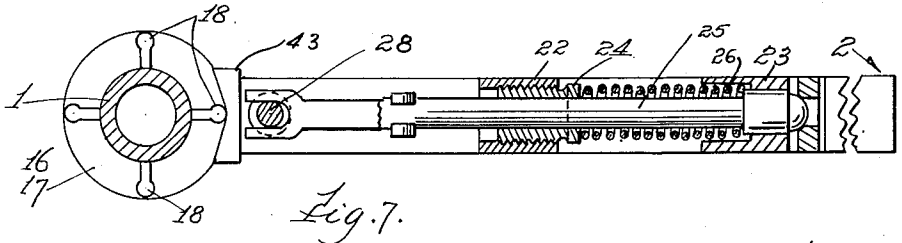


Fig. 7.

Inventor:
Holger G.E. Nordin.
by H.J. Sanders
Attorney.

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UNITED STATES PATENT OFFICE

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REVOLVING DOOR

Holger G. E. Nordin, Chicago, Ill.

Application January 15, 1945, Serial No. 572,799½

2 Claims. (Cl. 20—18)

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This invention relates to improvements in revolving doors and among its objects is one to provide a door that is so designed, constructed and assembled as to be panic proof at all times thereby making it safe in use in public places and elsewhere where such doors are generally used.

A further object is to provide doors of this general type wherein jamming of the doors and blocking of a passageway is at all times avoided thus, in addition to the safety features provision is made to insure the continuous efficient operation of the structure with the minimum risk of damage and resultant inconvenience.

A still further object is to provide revolving doors wherein with great pressure applied in a common direction against opposite doors the same will each yield partially but sufficiently to provide a passageway between each door and the wall of the door-opening. A still further object is to provide door release means at the top and bottom of each door which means are connected in such manner that the applied pressure is substantially equally distributed over the door to prevent undue stress and strain at one point or over any partial door area. A still further object is to provide a revolving door wherein the several panels or wings may be collapsed into inoperative or nested position readily for cleaning, repair of the structure or for other purpose, and as readily reassembled.

A still further object is to provide a revolving door of few parts, simple in construction, durable in use and efficient in operation, designed also to obtain other advantages and results as may be brought out in the following description, particularly pointed out in the claims and illustrated in the accompanying drawings which form a part of this patent and wherein:

Fig. 1 is a top plan view of a revolving door embodying the instant invention, the wings or panels being shown in nested or inoperative position.

Fig. 2 is a view of the door, minus the wings or panels, in operative position.

Fig. 3 is an enlarged view of one panel showing the locking or control means, the escutcheon plates being partly broken away.

Fig. 4 is a detail vertical cross sectional view through Fig. 3 on the line 4—4.

Fig. 5 is an enlarged fragmentary view of the door, partly in section, showing one of the wings or panels in locked position.

Fig. 6 is a plan view of the panel locking mechanism and,

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Fig. 7 is a view of the same in longitudinal section.

Like reference characters denote corresponding parts throughout the several views.

The reference numeral 1 denotes a central vertical, preferably tubular shaft or support which is mounted for rotation in any manner well known to this class of doors, preferably upon roller bearings. The door panels, ordinarily four in number, are denoted generally by the reference numeral 2 and are of counterpart formation, said panels being normally disposed radially from said shaft and movable therewith in the usual manner but capable of independent movement by the improved mechanism forming an essential feature of the instant invention. Included in said mechanism are a pair of spider plates 3, 4 received upon said shaft 1 adjacent its ends and including central circular or disc like portions, said plate 3 having arms 7, four in number, extending radially therefrom and having downturned perforated ends 8, said arms being spaced equidistant from each other about said plate; said lower plate 4 having similar arms 9 extending therefrom in like manner and having upturned perforated ends 10, said upper and lower arms being disposed respectively in common vertical planes.

Each spider plate is formed with an annular recess 11, said recesses being upon relatively remote or outward plate faces, said recesses receiving the travelling guide pins 12 carried by span arms 13 secured to said panels, the inner ends of said span arms being widened and terminating in toothed segments 14 in mesh with the large gears 15, one fast upon each end of said shaft 1, perforations 11a being also formed in recess 11 to facilitate pin removal when desired or necessary.

The several span arms at opposite ends of said panels are located at different distances from their respective spider plates or in stepped relation so that in nested position, clearly shown in Fig. 1, they do not interfere with each other. Arranged upon said shaft 1 in equal spaced relation to said spider plates 3, 4 are the discs 16, 17 each connected to a spider plate by four pins 18, the pins of each disc being spaced regularly from each other about the outer edge of the disc face and normal thereto.

Secured to the lateral faces of the panels at the cut-out portions 19 are the escutcheon plates 20, 21 between which is located the locking mechanism, said cut-outs being formed at the top and bottom inner portions of each panel and similar

locking means provided between each pair of plates. Secured to one escutcheon plate at the top of each panel are a pair of sleeve bearings 22, 23, the bearing 22 being threaded to receive the nut 24 through which and through both bearings the bolt 25 extends that in one position extends through the perforation in the downturned end 8 of an arm 7, an expansion coil spring 26 upon said bolt abutting said nut 24 and the head 25 yieldingly retaining said bolt in extended position. Said bolt 25 at its inner end is recessed for engagement by one end of the bell crank lever 27 fulcrumed to said escutcheon, the opposite end of said bell crank engaging the reduced upper end of a connecting rod 28 movably carried by said panel.

Referring again to said bolt 25 one end thereof is deeply recessed to receive a small expansion coil spring 29 abutting one end of said recess and the inner end of the pin 30, said pin having an elongated perforation 31 receiving a stop pin 32 carried by a bearing 33 arranged upon one escutcheon plate and having ears 34 supporting a shaft 35 of the detent 36 abutting one end of connecting rod 28 so that in one position of said detent clearly shown in Fig. 3 said connecting rod is retained in depressed position, said detent being yieldingly restrained by said spring 29.

Arranged upon said shaft 35 upon the opposite side of said panel is the handle 37 which may be moved manually to retract said spring and so position said detent relative to said connecting rod as to permit a raised position thereof. The structure here set up provides a cushion for said bolt and its connections to facilitate effective operation thereof.

The lower end of connecting rod 28 is engaged at its recessed portion by a bell crank lever 38 supported in a bracket 39 carried by said door panel, the opposite end of said lever being connected by coupling 40 to a link 41 operatively engaging a bolt 42 that extends through nut 24a adjustably carried by the bearing 22a spaced from a bearing 23a, a spring 26a received upon said bolt engaging said nut and the head of bolt 42, said bolt in extended position engaging the upturned perforated end of said arm 9. Carried by the panel at its top and bottom inner edge portions are the plates 43, 44 recessed for nesting engagement with said pins 18 thus in effect forming a hinge for the panel. In ordinary use of the door a light pressure against any panel will rotate the door, the springs 26, 26a of each panel yieldingly retaining the bolts 25, 42 in operative engagement with the span arms 7, 9; the nuts 24, 24a being used to vary the tension of said springs. Pressure upon said panels is evenly distributed by the locking mechanisms arranged along top and bottom sections thereof, said mechanisms being connected by said connecting rods 28, said span arms being permanently secured by pins 12 to the recessed portions 11 of said spider plates. The operative position of the rods 28 in their raised position which through their connection to bolts 25, 42 retains same in extended span arm engaging position.

In the event that a sudden excessive pressure or major impact is received upon a panel, or panels, the pressure of springs 26, 26a is overcome and their bolts retracted and disengaged from said span arms permitting said panels with their locking mechanisms to get out of line or operative position, the segmental portions 14 of arms 13 moving about the gears 15 and the plates 43, 44 moving about their respective pins 18, a passageway then being set up between the outer edges of said panels and the door casing or jamb so that passage is unhindered. The panels are, however, secured by pins 12 to the spider plates and, when desired, the panels may be readily restored manually to normal position. The detents 36 may be positioned by means of their handles 37. When it is desired to position the door panels for non-use as in the summer time the bolts 25, 42 may be manually retracted by means of the handle 37 depressing said connecting rods 28, and since the segmental arms are disposed in stepped relation upon the gears 15 the panels may be readily disposed in nested position. The pins 12 now solely secure said panels to the central structure. The central shaft 1 is formed with a bayonet slot 48 in which is disposed the handle 47 of pin 46 that extends downwardly beyond the level of the floor 49. For removal of the door this pin may be raised by its handle to clear the floor. In operation the door structure is supported in bearing 51 and, held in vertical operative position by said pin 46 then supported in bearing 52, the door operating in the usual tract 50 which is a space provided in structures built to accommodate revolving doors and forms no part of the instant structure.

What is claimed is:

1. In a revolving door, a central shaft, spider plates fast upon said shaft adjacent the ends thereof recessed annularly upon their relatively remote faces, discs upon said shaft in equal spaced relation to said spider plates, pins connecting said discs and spider plates, perforate arms carried by said spider plates equidistant one from the other, gears fast upon the ends of said central shaft, door panels normally disposed radially of said shaft, recessed plates carried by said panels normally engaging said pins, span arms secured to said panels having toothed segmental portions engaging said gears, pins carried by said span arms engaging said spider plate recesses, terminally recessed connecting rods adjustably carried by said panels, escutcheon plates carried by said panels, spring-pressed bolts carried by said escutcheon plates yieldingly in locking engagement with said perforate arms, bell crank levers carried by said escutcheon plates engaging the recessed portions of said connecting rods, said bell crank levers connected to said spring-pressed bolts, detents carried by certain of said escutcheon plates engaging said connecting rods and locking same in predetermined positions thereof, spring-actuated means connecting said detents and said spring-pressed bolts yieldingly retaining said detents in locking engagement with said connecting rods, and release means for said detents.

2. In a revolving door, a central shaft, spider plates fast upon said shaft adjacent the ends thereof recessed annularly upon their relatively remote faces, discs upon said shaft in equal spaced relation to said spider plates, pins connecting said discs and spider plates, perforate arms carried by said spider plates equidistant one from the other, gears fast upon the ends of said central shaft, door panels normally disposed radially of said shaft, recessed plates carried by said panels normally engaging said pins, span arms secured to said panels having toothed segmental portions engaging said gears, pins carried by said span arms engaging said spider plate recesses, terminally recessed connecting rods ad-

justably carried by said panels, escutcheon plates carried by said panels, spring-pressed bolts carried by said escutcheon plates yieldingly in locking engagement with said perforate arms, bell crank levers carried by said escutcheon plates engaging the recessed portions of said connecting rods, said bell crank levers connected to said spring-pressed bolts, and manually releasable locking means for said connecting rods operative in a predetermined position of said rods, said locking means connecting said rods and said spring-pressed bolts.

HOLGER G. E. NORDIN.

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