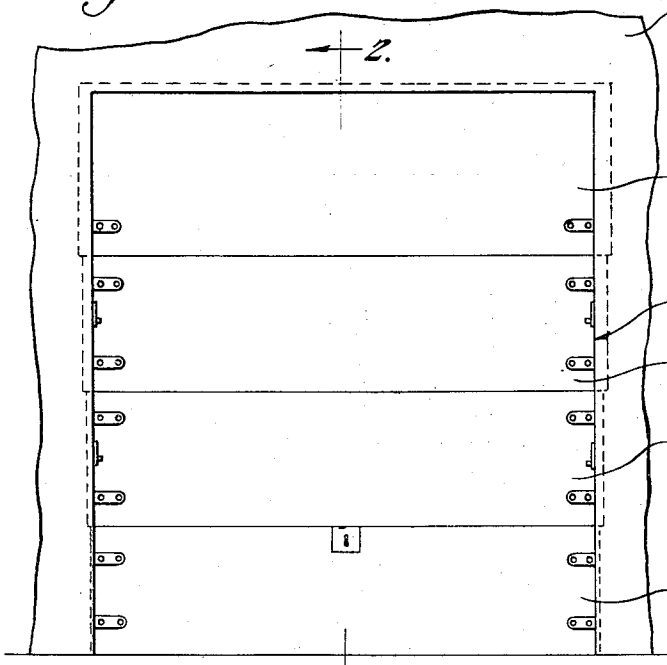
Nov. 7, 1933. R. W. JONES 1,934,544

DOOR CONSTRUCTION

Filed Sept. 21, 1931

Fig. 1.



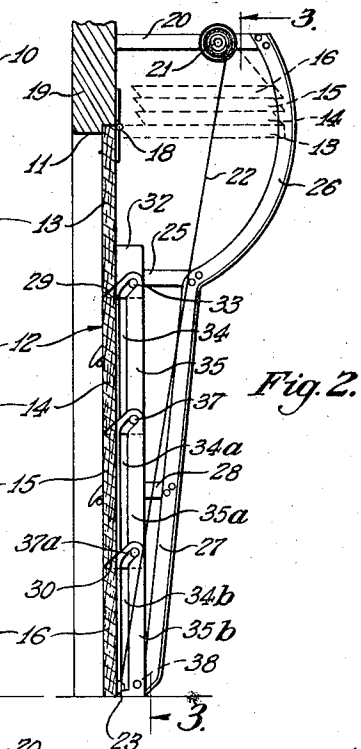


Fig. 2.

Fig. 3.

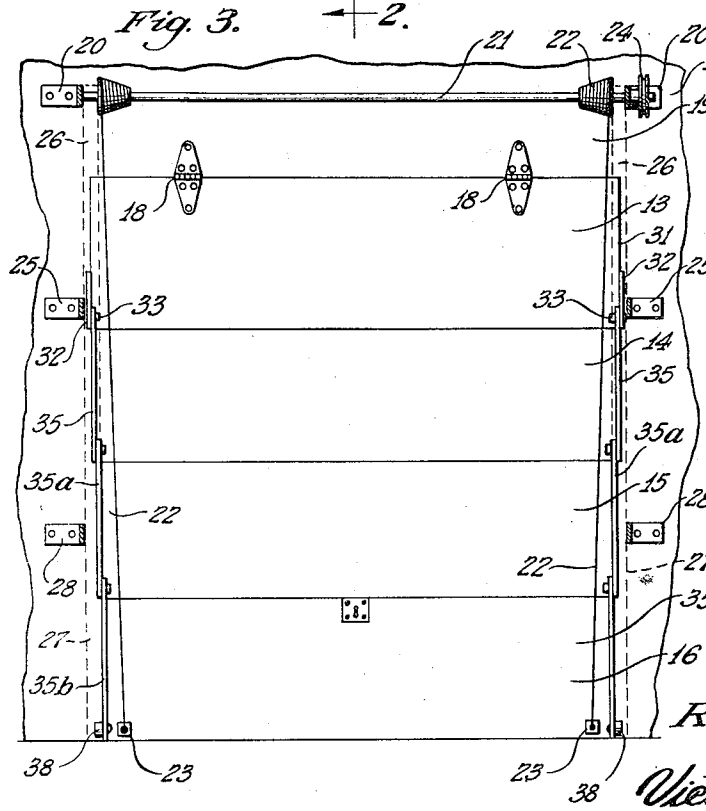
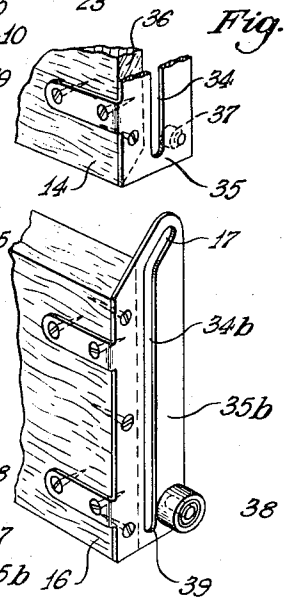


Fig. 4.



Robert W. Jones.
INVENTORS

Victor J. Evans & Co.
HIS ATTORNEYS

Patented Nov. 7, 1933 1,934,544

UNITED STATES PATENT OFFICE

1,934,544

DOOR CONSTRUCTION

Robert W. Jones, Hartford City, Ind.

Application September 21, 1931
Serial No. 564,240

4 Claims. (Cl. 20—19)

This invention relates to certain novel improvements in door constructions, and has for its principal object the provision of an improved construction of this character which will be highly efficient in use and economical in manufacture.

It is an object of this invention to provide an improved weatherproof sectional door for buildings.

It is another object of the invention to provide novel and improved means for maintaining the sections of the door in one vertical plane when closed and for moving the sections successively into parallel vertical planes, during the door opening operation, and for moving the sections into parallel horizontal planes when in fully opened position.

Another object of the invention is to provide an improved door construction that is particularly adapted for use in buildings such as barns, shops, garages, factories, and the like.

Other objects will appear hereinafter.

The invention consists in the novel combination and arrangement of parts to be hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawing showing the preferred form of construction, and in which:

Fig. 1 is a front elevational view of a preferred form of construction of the invention;

Fig. 2 is a sectional view on line 2—2 of Fig. 1;

Fig. 3 is a rear elevational view, partly in section, on line 3—3 in Fig. 2; and

Fig. 4 is a perspective detail view of parts of the invention.

In the drawing which illustrates a preferred and practical construction, a building wall is indicated at 10 and has a door frame 19 therein defining an opening 11 with which our invention is associated.

Although it is apparent that this number may be varied to suit conditions, in the present instance our improved door, indicated generally at 12, includes a plurality of sections 13, 14, 15 and 16. The uppermost section 13 is hinged, as at 18, to the frame 19.

Between brackets 20 on the rear side of the wall 10 we mount a rotative shaft 21 about which are windable flexible elements 22, each of which has one end secured, as at 23, to the bottom section 16. Any suitable means, not a part of our invention, may be provided for revolving the shaft 21 but we have shown a sheave 24 on the shaft and we may, for example, employ a counterbalanced flexible element (not shown) windable on the sheave 24 for raising and lowering the door sections in a manner presently to be described; or a crank and gear arrangement may be provided to rotate the shaft 21, if desired.

Extending from the outer ends of the brackets 20 (Fig. 2) to brackets 25 mounted on the frame 19 at the lower end of the section 13, and being attached to these brackets 20 and 25, are arcuate guide rails 26 which are continuous with guide rails 27 that extend upwardly at an acute angle with the vertical, these rails 27 being supported by brackets 25 and similar brackets 28.

The bottom edges of the sections 13—14—15 are beveled, as at 29, Fig. 2, and the upper edges of the sections 14—15—16 are similarly beveled, as at 30, the rise of these bevels being toward the rear of the door, and when in closed position providing a watershed toward the front of the door.

Attached to each of the side edges 31 of the uppermost section 13 is a link 32 on the inner side of which is mounted, in any suitable manner, a roller 33. These rollers 33 ride in slots 34 formed in links 35, one of which is attached to each of the side edges 36 of the section 14. Each of the links 35 carries at its lower end, and on the inner side thereof, a roller 37, and these rollers 37 ride in the slots 34. Links 35*a* and 35*b*, similar to links 35, are carried by the sections 15 and 16, and these links 35*a* and 35*b* have formed therein slots 34*a* and 34*b* similar to the slots 34. The links 35*a* carry rollers 37*a* similar to the rollers 37. On the outer side and at the lower end of each of the links 35*b*, on the lowermost section 16, a roller 38 is provided, and these rollers 38 ride in the guide rails 27 and 26 when the doors sections are raised in a manner now to be described.

By rotating the shaft 21 the flexible elements 22 will be wound therearound, and since these elements 22 have their lower ends attached to the lowermost section 16, as at 23, a lifting force will be exerted on the section 16 and on the links 35*b* carried thereby, which will cause the rollers 38 to ride up the guide rails 27, the upper beveled edge 30 of the section 16 slipping past the lower beveled edge 29 of the sections 15, and the rollers 37*a* riding in the slots 34*b* as the links 35*b* and section 16 move upwardly. There is an offset or angled portion 17 in each of the slots 34—34*a*—34*b*, Fig. 4, and at the time the lowermost section 16 begins its upward movement the rollers 37*a*, being disposed in the angled slot portions 17, guide the links 34*b* to the right, as seen in Fig. 2, so that the section 16 moves into a vertical plane parallel to the section 15 but behind the latter.

When the lower ends 39 of the slots 34*b* engage the rollers 37*a*, the section 16 will be behind the section 15, and continued force exerted on the elements 22 will then lift the sections 16 and 15 together, the rollers 37 then riding in the slots 34*a* while the rollers 38 move up the guide rails 27. When the lower ends of the slots 34*a* engage the rollers 37 the section 15 will be in a vertical plane parallel to, but behind the section 14, and the section 16 will be behind the section 15. Continued lifting force exerted on elements 22 will then lift the sections 14—15—16 together, the rollers 33 riding in the slots 34 and the rollers 38 riding up the guide rails 27 until the lower ends of slots 34 engage the rollers 33, at which time the sections will be arranged in parallel vertical planes as follows, looking from left to right in Fig. 2: section 13—14—15—16; and at this time the rollers 38 will move into the guide rails 26. Continued lifting force applied to elements 22 will then pivot the sections at 18, and as the rollers 38 ride up the rails 26 the sections will be finally arranged in a horizontal plane, as shown in dotted lines in Fig. 2, the sections being arranged from top to bottom in the order shown.

The movement of the sections from dotted to full line position of Fig. 2 is a gravity action that may be effected by releasing the shaft 21 and elements 22 by any suitable means, the rollers 38 then riding down the rails 26 and 27 and the other sections of the series extending themselves by means of the rollers, links and slots in a manner readily apparent from the foregoing description considered in the light of the drawing.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to protect by Letters Patent is:

1. In combination with a wall providing a door opening, a series of door sections adapted to close said opening, the uppermost of said sections having a hinge connection with said wall, link mechanism attached to said sections securing them together, guides cooperating with said link mechanism to direct the sections successively into parallel vertical planes as the sections are opened, other guides continuous with the first-named guides to direct the sections from the said parallel vertical planes into parallel horizontal planes when in fully opened position, said sections pivoting from the vertical to the horizontal on said hinge connection, and rollers on the lowermost of the sections adapted to travel in said guides.

2. In combination with a wall providing a door opening, a series of door sections adapted to close said opening, the uppermost of said sections having a hinge connection with said wall, link mechanism attached to said sections securing them together, guides cooperating with said link mechanism to direct the sections successively into parallel vertical planes as the sections are opened, other guides continuous with the first-named guides to direct the sections from the said parallel vertical planes into parallel horizontal planes when in fully opened position, said sections pivoting from the vertical to the horizontal on said hinge connection, said guides cooperating with the link mechanism to direct the sections into one vertical plane when closed, and rollers on the lowermost of the sections adapted to travel in said guides.

3. A door or shutter comprising a group of sections including an uppermost section hingedly mounted on a support, a lowermost section, and sections intermediate said uppermost and lowermost sections, a link attached to each of the side edges of each of said intermediate and lowermost sections, each of said links having a slot provided therein, each of said slots having an angled upper end portion, a link attached to each side edge of said uppermost section, rollers on those of said links attached to said uppermost and intermediate sections guided in said slots, a guide track at each side of said door or shutter inclined at an acute angle to the vertical, and having an arc-shaped upper end portion curved convexly away from said door or shutter, rollers on those of said links that are attached to said lowermost section guided in said tracks, and flexible lifting elements having their lower ends attached to said lowermost section.

4. A door or shutter comprising a group of sections including an uppermost section hingedly mounted on a support, a lowermost section, and sections intermediate said uppermost and lowermost sections, a link attached to each of the side edges of each of said intermediate and lowermost sections, each of said links having a slot provided therein, each of said slots having an angled upper end portion, a link attached to each side edge of said uppermost section, rollers on those of said links attached to said uppermost and intermediate sections guided in said slots, a guide track at each side of said door or shutter inclined at an acute angle to the vertical, and having an arc-shaped upper end portion curved convexly away from said door or shutter, rollers on those of said links that are attached to said lowermost section guided in said tracks, and flexible lifting elements having their lower ends attached to said lowermost section, the meeting edges of said sections being beveled and extending substantially parallel to said angled end portions.

ROBERT W. JONES.