A. RITTER.

DOOR.

APPLICATION FILED AUG. 31, 1914.

1,179,376.

Patented Apr. 11, 1916.

2 SHEETS—SHEET 1.

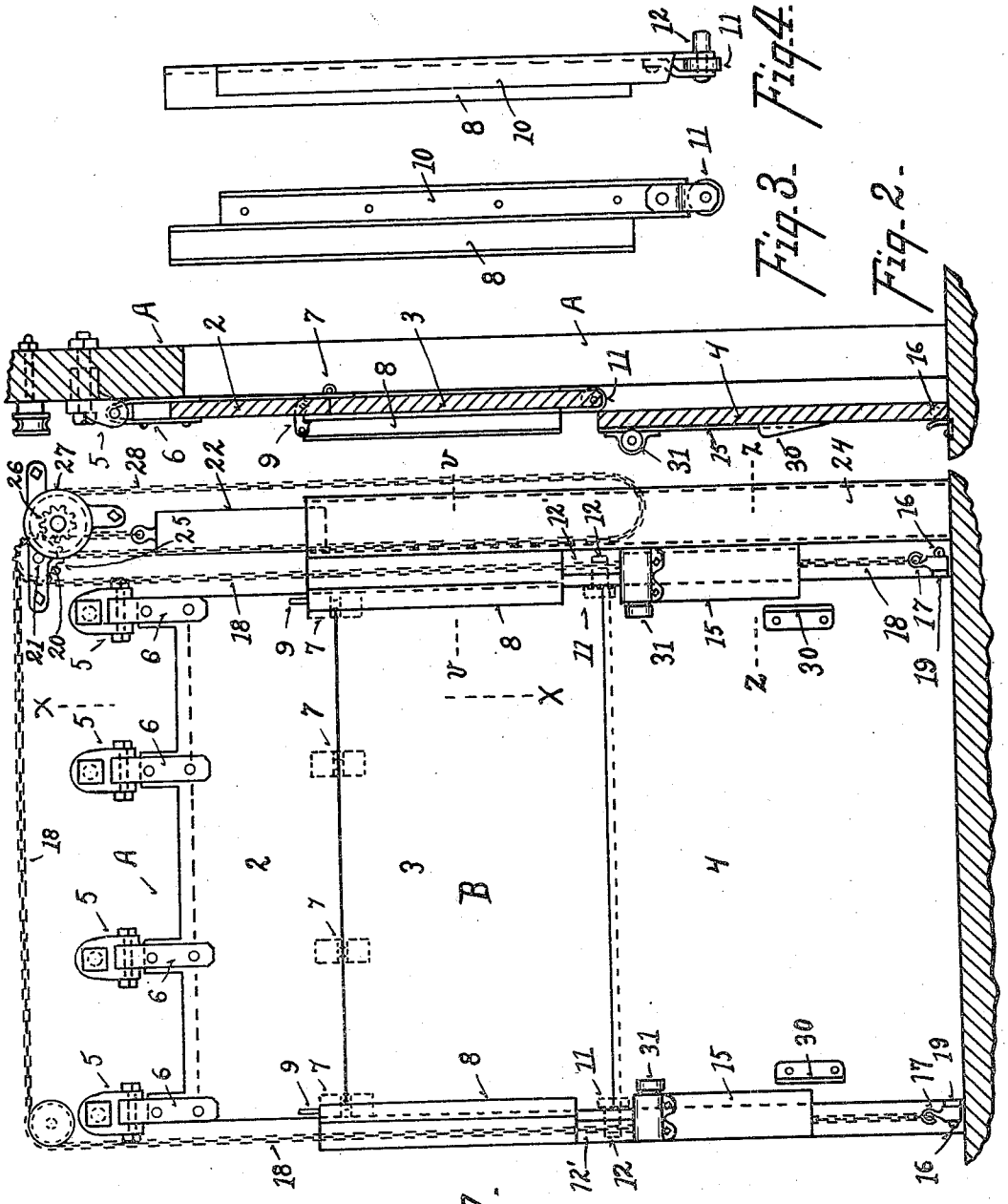


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Witnesses:
B. F. Groff
Ralph H. Grott

Inventor
Adam Ritter

By C. W. Miles.

Attorney

A. RITTER.

DOOR.

APPLICATION FILED AUG. 31, 1914.

1,179,376.

Patented Apr. 11, 1916.

2 SHEETS—SHEET 2.

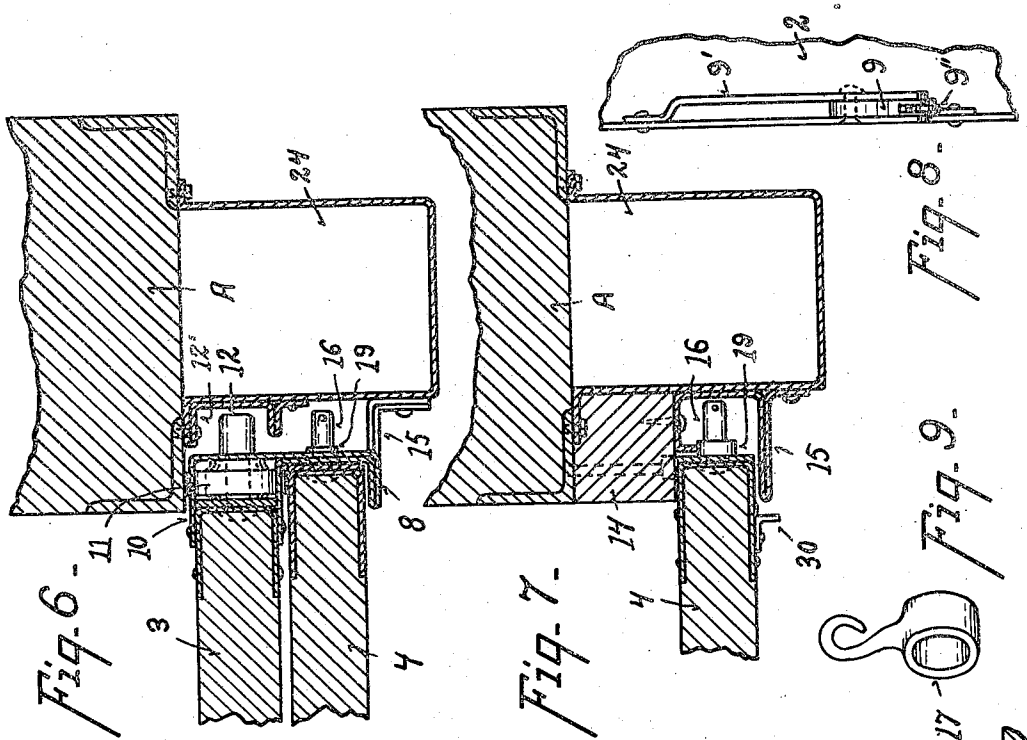


Fig. 6.

Fig. 7.

Fig. 8.

Fig. 9.

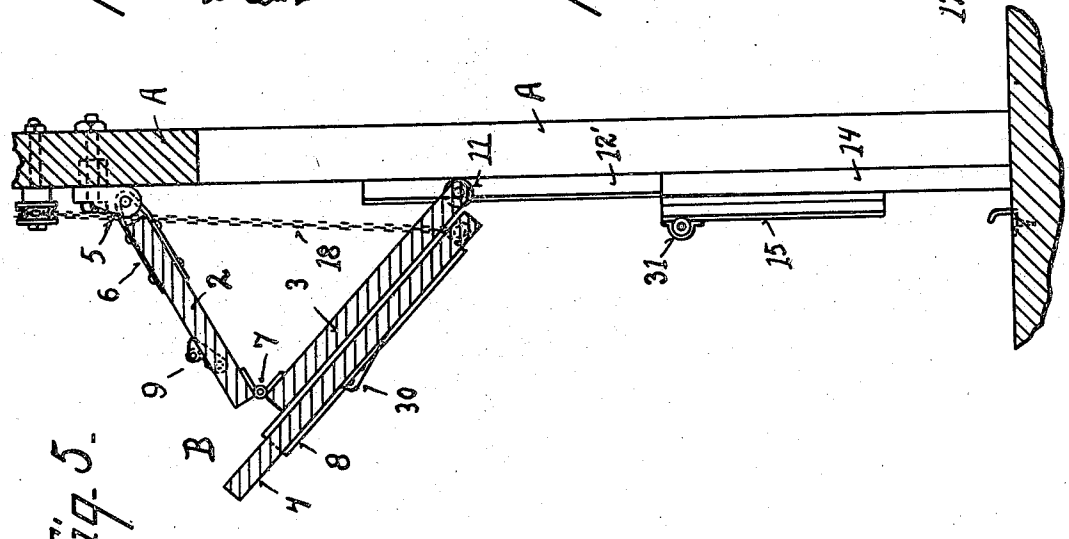


Fig. 5.

Witnesses:
B. P. Krooff
Ralph A. Trott

Inventor
Adam Ritter
By C. W. Miles.
Attorney

UNITED STATES PATENT OFFICE.

ADAM RITTER, OF CINCINNATI, OHIO.

DOOR.

1,179,376. Specification of Letters Patent. Patented Apr. 11, 1916.

Application filed August 31, 1914. Serial No. 859,301.

To all whom it may concern:

Be it known that I, ADAM RITTER, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Doors, of which the following is a specification.

My invention relates to improvements in doors for freight houses, round houses, and similar purposes.

One of its objects is to provide an improved vertically moving door to occupy a position above the opening when in open position.

Another object is to provide an improved door in which the lower section lifts vertically while in a substantially vertical plane for a portion of its movement to avoid interference with objects on or near the floor and close to the door.

Another object is to provide an improved arrangement whereby the door sections are substantially counterbalanced at all points of their movement.

Another object is to provide improved automatic means to tightly close and automatically latch and unlatch the door.

My invention also comprises certain details of form, combination and arrangement, all of which, will be fully set forth in the description of the accompanying drawings in which:

Figure 1 is an elevated view of my improved door in closed position. Fig. 2 is a vertical section through the same on line X X of Fig. 1. Figs. 3 and 4 are details of metal guide and facing members attached to the edges of the second door section. Fig. 5 is a vertical section on line X X of Fig. 1 illustrating the door in partly open position. Fig. 6 is a sectional detail on line V V of Fig. 1. Fig. 7 is a sectional detail on line Z Z of Fig. 1. Fig. 8 is a detail of the latch. Fig. 9 is a perspective view of the hook which attaches the counterweight chain to the lower door section.

The accompanying drawings represent the preferred embodiment of my invention in which A represents the door frame. B represents the door which is composed of three or more sections 2, 3, 4 arranged when closed in positions substantially one below another. The upper door section 2 is hinged at a plurality of points to the door frame above the opening by means of hangers 5 attached to the door frame and straps 6 pivotally supported thereby and attached to door section 2. Door section 3 is hinged by hinges 7 to and hangs from the door section 2. The door section 4 moves telescopically with reference to section 3 in guides carried by said section 3 and also beneath the section 3 in guides carried by the door frame. Thus, when the door commences to open the lower section 4 first moves telescopically upward in channel shaped guides 8 carried by the section 3 and this telescopic movement is substantially completed before the latch 9 is tripped by section 4 to permit the sections 2 and 3 to commence their folding movement upon the hinges 7.

The guides 8 are preferably built up with or united to metal facing members 10 which are attached to the side edges of section 3 and are provided with bearings for rollers 11 located at the lower edges of section 3 and which rollers travel along the faces of the vertical sections of the door frame. Pins 12 projecting from the axles of said rollers travel in channel shaped guides 12′ to prevent said rollers being forced away from the face of the door frame.

Below the section 3 filling strips 14 are attached to the door frame on opposite sides against which strips the lower door section makes a tight joint when in the closed position while channel bars 15 form guides for the opposite face of the lower section 4 when in closed or nearly closed position.

Studs 16 are attached to the lower ends of the section 4 to receive hook members 17 to which counterweight chains 18 are attached, said hook members being detachably held in place by cotter pins.

The gravity latches 9 are mounted in metal boxes 9′ mortised into the edges of section 2. The noses of the latches are preferably provided with antifriction rollers 9″, and said latches engage the upper edges of the guides 8.

When the section 4 has reached the upper limit of its travel in the guides 8 the upper

end of section 4 strikes and releases the latches 9 which due to the hinge axes 7 and 5 being slightly out of line vertically causes the axes 7 to move over vertically beneath centers 5. Then the shoulders 19 of the studs 16 engage the lower edges of guides 8 limiting the upward telescopic movement of section 4 in said guides 8, and bringing lifting force to bear upon the lower end of section 3 to cause sections 2 and 3 to fold together or turn upon their axes at 5 and 7. This folding movement may be continued until the sections 2, 3, and 4 occupy substantially horizontal positions one beneath the other above the door opening.

The separate counterweight chains 18 are attached to opposite sides of section 4 by the studs 16 and hooks 17 and said chains run over separate sprocket wheels 20 on a single axle 21 and are both connected to a counterweight 22 which travels vertically in a housing or guide 24. On the axle 21 is a gear 25, driven by a pinion 26 by means of a sprocket wheel 27 and hand chain 28, to open and close the door.

As the door closes, sections 2 and 3 first unfold and then section 4 after reaching a substantially vertical position is lowered through and out of the guides 8 and enters the stationary guides formed by the filling strips 14 and channel bar 15 until its lower edge reaches the floor. After the section 4 enters the guides 15 wedge shaped cams 30 carried thereby engage rollers 31 carried by the door frame which presses sections 3 and 4 against the door frame into position for the upper end of guides 8 to be engaged by the latches 9 which hold the door sections in position against the door frame until section 4 is again lifted.

By properly proportioning the door sections in vertical dimensions, approximately as illustrated they will remain in all positions approximately counterbalanced by a given or uniform weight, and hence will move readily and freely from one position to another. The construction of my improved door is such that any desired number of hangers 5 may be employed to support the sections without interfering with the operation of the door.

The several door sections may be framed up in metal, wood or concrete and paneled or glazed as desired.

The mechanism herein illustrated is capable of considerable modification without departing from the principle of my invention.

Having described my invention, what I claim is:

1. A door comprising a plurality of door sections hinged together upon horizontal axes and pivotally supported at a point above the opening, and a door section telescopically movable in guides carried by one of said hinged door sections, and movable telescopically to commence the opening and to complete the closing operations.

2. A door comprising a door section pivotally supported at a point above the opening, a door section hinged upon a horizontal axis to said first door section and provided with vertical guides, and a door section supported in said guides and movable in a plane parallel to the plane of said second door section.

3. A door comprising a door frame a door section pivotally supported at a point above the opening, a door section hinged upon a horizontal axis to said first door section and provided with vertical guides, a door section movable telescopically relative to said second door section on said guides, and guides carried by said door frame to be engaged by said second and third door sections.

4. A door comprising a door frame, a door section pivotally supported at a point above the opening, a door section hinged upon a horizontal axis to said first door section and provided with vertical guides, a door section movable vertically with reference to said second door section upon said guides, and filler strips carried by said door frame to engage the inner face of said third door section in its closed position.

5. A door comprising a door frame, a door section pivotally supported at a point above the opening, a door section hinged upon a horizontal axis to said first door section and provided with vertical guides a door section movable vertically with reference to said second door section upon said guides, and means attached to the lower portion of said third door section to open and close said door.

6. A door comprising a door frame, a door section pivotally supported at a point above the opening, a door section hinged upon a horizontal axis to said first door section and provided with vertical guides, a door section movable vertically with reference to said second door section upon said guides, guides carried by said door frame to engage the second and third door sections, and means carried by said door sections to automatically latch said door to and unlatch it from said door frame.

7. In combination with a door frame, a door having a plurality of hinge-connected upper sections pivotally suspended from above, a bottom section adapted to slide over the lower of said upper sections, and means for limiting the upward sliding movement of the bottom section.

8. In combination with a door frame, a door having a plurality of hinge-connected upper sections pivotally suspended from a transverse axis above the door frame, a bottom section adapted to slide over and be supported by the lower of said upper sections, means for limiting the upward sliding

movement of the bottom door section, means for guiding the lower end of the bottom section to move in the plane of the door frame, and hoisting means applied to the lower portion of the bottom door section for opening the door.

In testimony whereof I have affixed my signature in presence of two witnesses.

ADAM RITTER.

Witnesses:
B. R. KROPF,
C. W. MILES.