

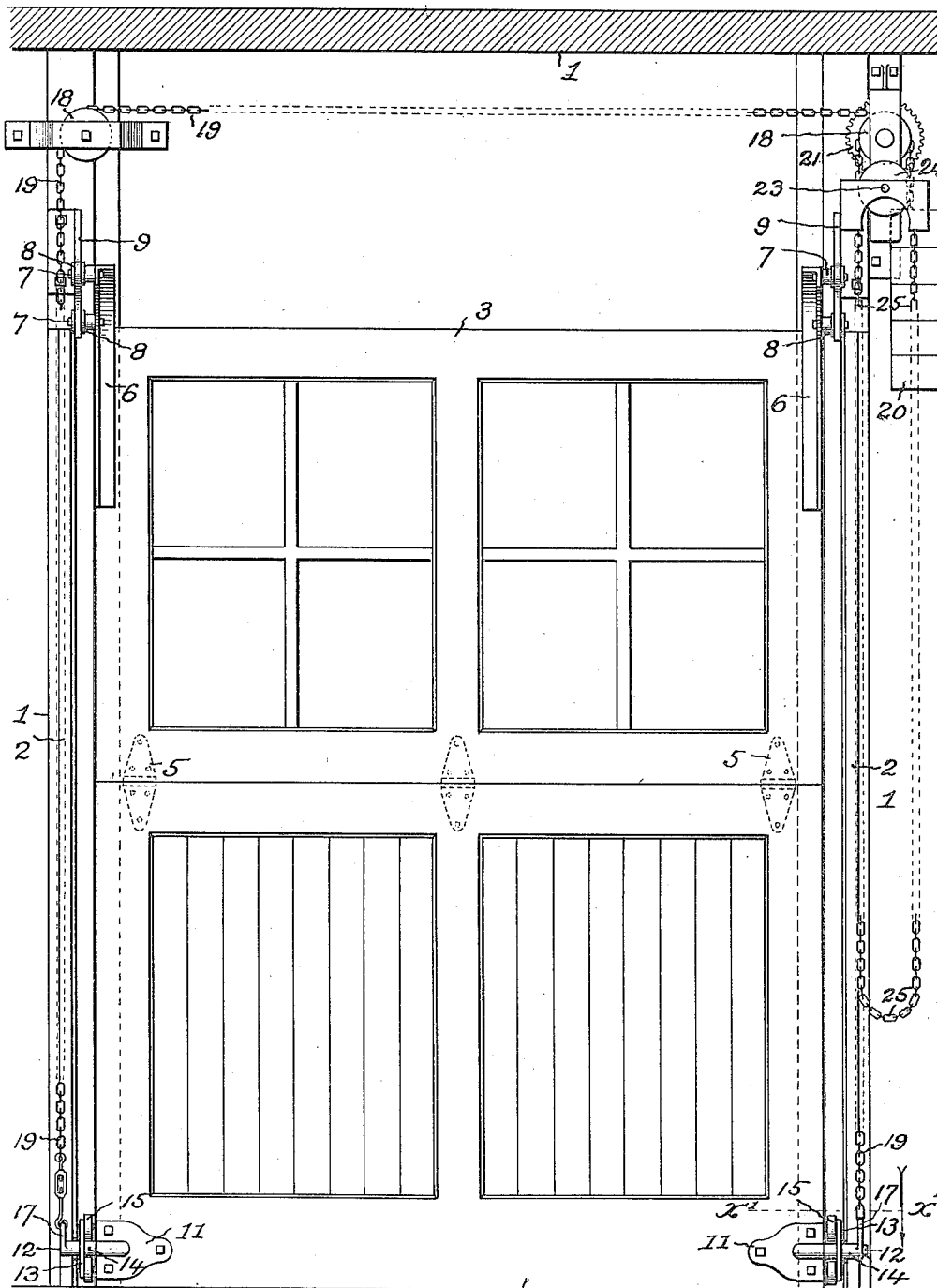
W. A. CROSS.
WAREHOUSE DOOR.

APPLICATION FILED JAN. 22, 1912.

Patented Apr. 29, 1913.

2 SHEETS—SHEET 1.

1,059,981.



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Fig. 1. 4

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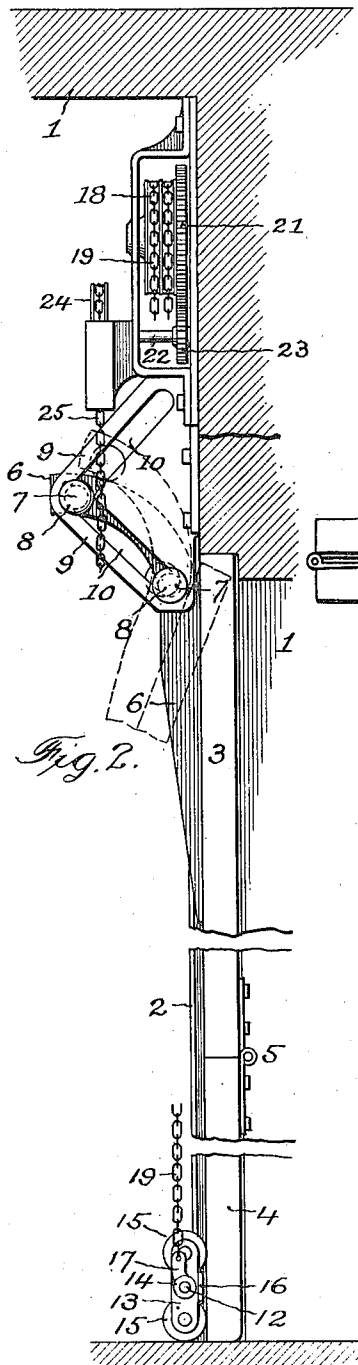


Fig. 2.

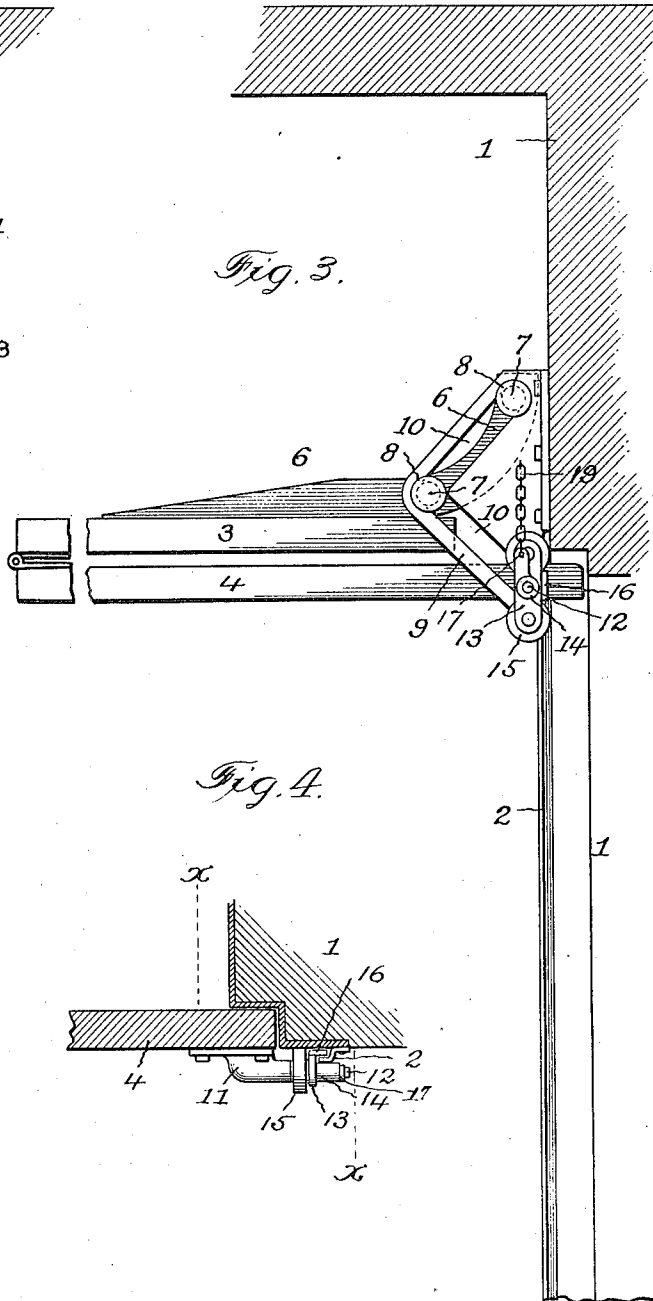


Fig. 3.

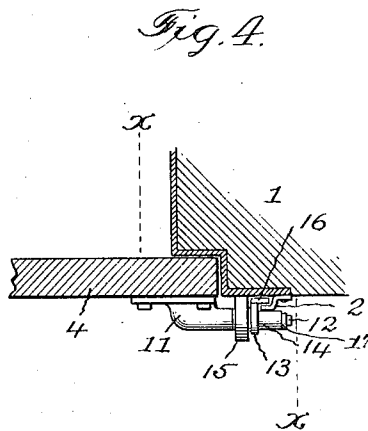


Fig. 4.

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UNITED STATES PATENT OFFICE.

WILLIAM A. CROSS, OF CHICAGO, ILLINOIS.

WAREHOUSE-DOOR.

1,059,981.

Specification of Letters Patent.

Patented Apr. 29, 1913.

Application filed January 22, 1912. Serial No. 672,624.

To all whom it may concern:

Be it known that I, WILLIAM A. CROSS, a citizen of the United States of America, and a resident of Chicago, in the county of Cook, State of Illinois, have invented certain new and useful Improvements in Warehouse-Doors, of which the following is a specification.

This invention relates to that class of warehouse doors which are formed in sections, hinged together horizontally and adapted to fold together in a vertical direction in the opening movement of the door. And the present improvement has for its object to provide a simple and efficient structural arrangement and combination of parts wherein the door sections are effectively guided in their opening and closing movements, and with which when the door sections are in an "open door" position, the same are substantially held against accidental descent, all as will hereinafter more fully appear.

In the accompanying drawings:—Figure 1, is an elevation of a warehouse door and its operating mechanism, embodying the present invention. Fig. 2, is an end elevation, with parts in section on line $x-x$, Fig. 4, showing the door in an unfolded position closing the doorway, and illustrating in dotted lines a partially open condition of the upper door section. Fig. 3, is a similar view with the door in an elevated and open position. Fig. 4, is a detail horizontal section on line $x'-x'$, Fig. 1.

Similar reference numerals indicate like parts in the several views.

Referring to the drawings, 1 represents the door frame or casing provided with the usual vertical guideways 2, at its respective sides, and preferably of the construction hereinafter described in detail.

3 and 4 are the respective upper and lower sections of the door connected together at their meeting edges by hinge connections 5, so as to fold and unfold in the opening and closing movements of the door.

In the present construction the upper corners of the upper door section 3 are provided with counterpart angular hanger bars 6, preferably of the curved shape shown, and each of which is provided with a pair of lateral bearing studs 7 and 8, which in turn are preferably provided with the usual loose friction reducing sleeves or rollers, for

movement in the track grooves hereinafter described. In the present construction the aforesaid lateral studs 7 and 8, are arranged in angular and separated relation as shown and for the functions hereinafter stated.

9 are counterpart suspension brackets secured to the door frame or casing 1, above the door opening of the same, and adjacent to the hanger bars 6 aforesaid for operative engagement therewith. Said suspension brackets are formed with vertically disposed track grooves or slots 10, of a reflex and approximately right-angle form, and with each groove or slot comprising upper and lower reversely arranged branches the junction of which is disposed at a point removed from the door frame, while the terminals of said upper and lower branches are disposed at points adjacent to the door frame as shown. The length of each branch aforesaid is approximately the same as the distance which separates a pair of the lateral bearing studs 7 and 8 above described, and which studs have individual engagement and movement in the aforesaid branches of the groove or slot 10. The described construction provided the means of support for the door as well as for guiding the upper door section in the folding and unfolding movements of the door sections, and the pairs of lateral studs 7 and 8 will occupy the lower portions of the above described branches of the grooves or slots 10, when the door sections are in an unfolded condition, as illustrated in Figs. 1 and 2, to constitute the closure for the doorway. With an upward and folding movement of the door sections, by mechanism hereinafter described, the upper lateral studs 7 will move toward the door frame in the upper branches of the guide slots 10, while the lower lateral studs 8 will move away from the door frame in the lower branches of the guide slots 10, and accordingly, with such movements imposed on the pairs of lateral studs, the upper door section will gradually swing from the vertical position shown in Fig. 2, into the horizontal position shown in Fig. 3, as a fully opened condition of the doorway is attained.

In the vertical swinging movement of the upper door section from a vertical to a horizontal position above referred to, the upper end of said door section will have a downward swing, with the lower lateral bearing studs

8 for a pivot, to clear the upper portion of the door frame as shown in dotted lines in Fig. 2.

As usual in the present type of sectional doors, the lower end of the lower door section 4, is confined to vertical travel in the opening and closing movements of the door, by sliding engagement with the vertical guideways 2, of the door frame 1 aforesaid. In the present construction such sliding connection is attained by the following detail construction and arrangement of parts.

11 are brackets secured to the respective lower corners of the lower door section and provided with laterally projecting horizontal arbors 12, for pivotal connection with the wheeled carriage now to be described.

13 are carriages formed with pivot sleeves 14 for pivotal connection with the arbors 12 of the aforesaid bracket 11, and provided with track wheels 15, adapted to travel upon the inner vertical faces of the door frame 1.

16 are lateral lugs on the carriages 13 for engagement in the vertical recesses of the guideways 2, and adapted to prevent lateral or inward movement of the lower end of the lower door section 4 in the operation of the door.

17 are short upwardly extending eye bars, the lower ends of which have pivotal engagement with the arbors 12 aforesaid, while their upper ends have connection with the raising and lowering chains of the windlass mechanism now to be described.

18 are pulleys mounted upon the wall of the building at a point above the upper corners of the upper door section 3, aforesaid.

19 are chains or like flexible connections, passing around said pulleys 18, and connected to the eye bars 17 of the carriages 13 aforesaid, and to a counterbalance weight 20, at one side of the doorway, as shown more particularly in Fig. 1.

21 is a gear wheel secured to the shaft of one of the pulleys 18, aforesaid, and 22 is a countershaft carrying a pinion 23, having driving connection with the gear wheel 21, aforesaid.

24 is a chain sheave carried by the countershaft 22 and provided with an endless operating chain 25, by which the mechanism is manually operated to raise and lower the door.

With the above described arrangement of parts, the upward and opening movement of the door is attained by the pulling action of the lifting chains 19 upon the lower corners of the lower door section 4, and the respective door sections 3 and 4, folded together

in the manner heretofore described in connection with the lateral bearing studs 7 and 8, and the reflex grooves or slots 10 of the suspension brackets 9. In the lowering and closing movement of the door, the lower end of the lower door section 4 initially moves downward to effect an operation of the door sections in a reverse manner to that heretofore set forth in connection with the opening movement of the door.

Having thus fully described my said invention what I claim as new and desire to secure by Letters Patent, is:—

1. The combination of a door, a door frame, and a connecting means comprising a hanger member attached to the upper end of the door, and a bracket member attached to the door frame, one of said members having a vertically disposed track groove of a reflex form, and the other of said members having a pair of separated lateral bearing studs which engage and move in the reflex track groove aforesaid, substantially as set forth.

2. The combination of a door, a door frame, and a connecting means comprising a hanger member attached to the upper end of the door, and a bracket member attached to the door frame, one of said members having a vertically disposed track groove of a right-angle form, and the other of said members having a pair of separated lateral bearing studs which engage and move in the track groove aforesaid, substantially as set forth.

3. The combination of a door formed in upper and lower sections hinged together horizontally, a door frame, a vertical guideway at the side of the door frame adapted for guiding engagement with the lower end of the lower section of the door, means for connecting the upper door section to the frame, the same comprising a hanger member attached to the upper door section and a bracket member attached to the door frame, one of said members having a vertically disposed track groove of a reflex form, and the other of said members having a pair of separated lateral bearing studs which engage and move in the reflex track groove aforesaid, and a raising and lowering mechanism having engagement with the lower end of the lower door section.

Signed at Chicago, Illinois, this 12th day of January 1912.

WILLIAM A. CROSS.

Witnesses:

ROBERT BURNS,
HENRY MOE.