Nov. 24, 1931. B. J. HAYMAN 1,833,252

FOLDABLE SECTIONAL DOOR

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Fig. 3.

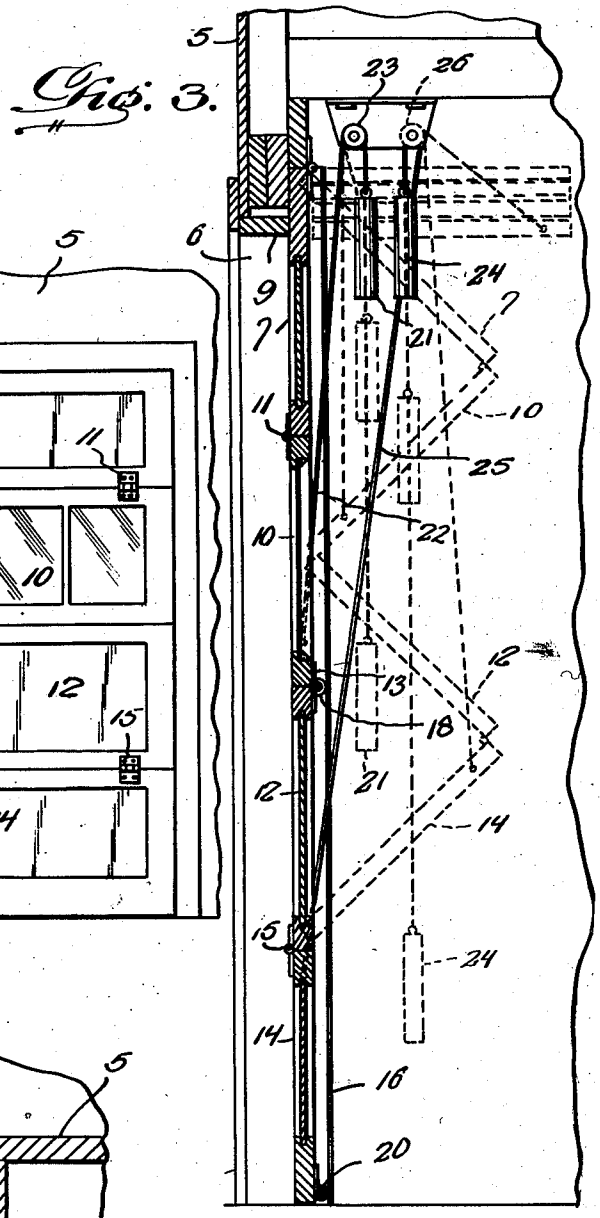



Fig. 1.

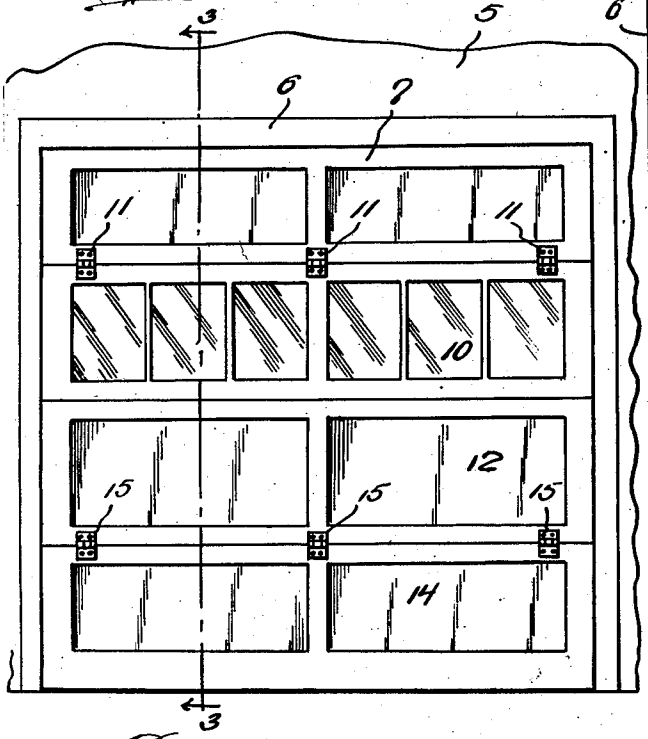
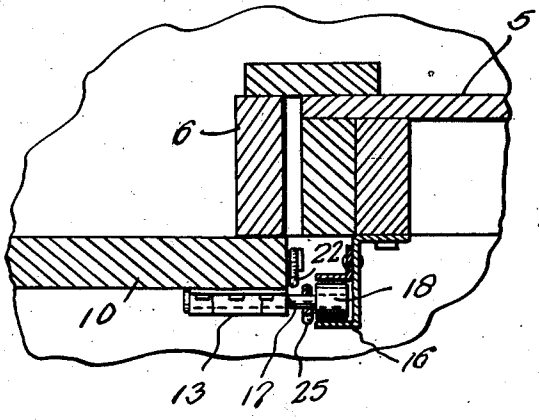



Fig. 4.




Bryan J. Hayman,
INVENTOR.

BY J. Stanley Burch
ATTORNEY.

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Fig. 2.

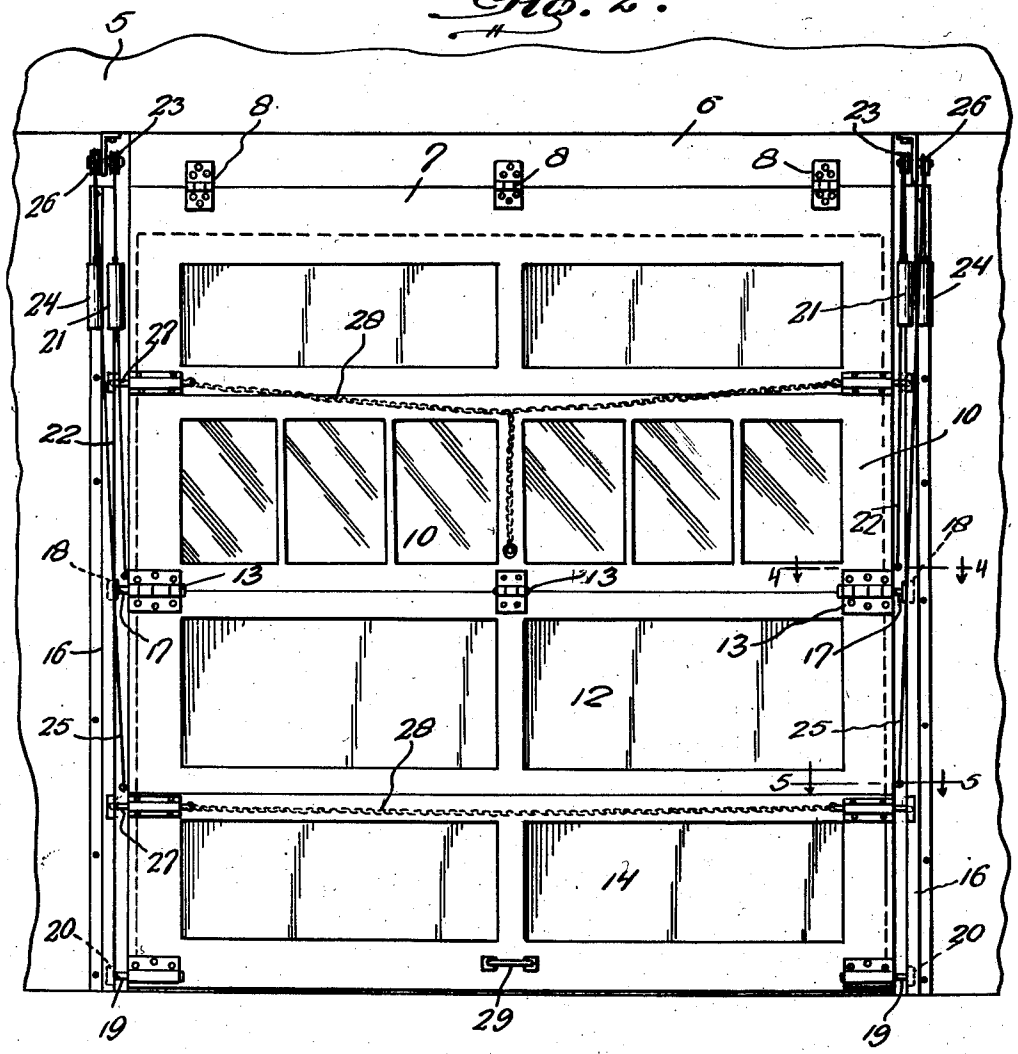
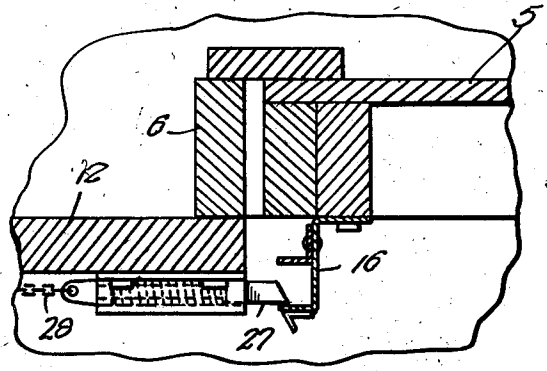



Fig. 5.




Bryan J. Hayman

INVENTOR.

BY J. Stanley Bunch

ATTORNEY.

Patented Nov. 24, 1931 1,833,252

# UNITED STATES PATENT OFFICE

BRYAN J. HAYMAN, OF ENID, OKLAHOMA

## FOLDABLE SECTIONAL DOOR

Application filed February 28, 1930. Serial No. 432,159.

This invention relates to an improved foldable sectional door for garages and the like, where large door openings are required.

An object of the invention is to provide a door of the above character which, when in open position, is folded into compact condition so as to utilize a minimum amount of space, and which, when so opened, is disposed inwardly of and above the lintel of the doorway in a substantially horizontal position so as to leave the entire door opening clear for its entire width and height, whereby no obstruction is presented by the door to movement of an automobile or the like through the doorway.

Another object of the invention is to provide a foldable sectional door of the above kind and means for opening and closing the same which are of relatively simple construction, not liable to get out of order or to jamb under conditions of use, and which may be manufactured and installed at a relatively low cost.

Other objects will appear as the nature of the invention is better understood, and the same consists in the novel form, combination and arrangement of parts hereinafter more fully described, shown in the accompanying drawings and claimed.

In the drawings:

Figure 1 is a front elevational view of a door embodying the present invention.

Figure 2 is an enlarged rear elevational view thereof.

Figure 3 is an enlarged vertical section taken on line 3—3 of Figure 1.

Figure 4 is an enlarged fragmentary horizontal section taken on line 4—4 of Figure 2; and

Figure 5 is a fragmentary horizontal section taken on line 5—5 of Figure 2.

Referring in detail to the drawings, 5 indicates a wall of a garage or the like having a relatively large doorway defined by a door frame 6. The door of the present invention includes an upper section 7 hinged at the top, as at 8, inwardly of and above the lintel 9 of the doorway to swing inwardly and upwardly on a horizontal axis to a horizontal position above the plane of the lintel 9. A further door section 10 is connected at the top thereof to the bottom of the section 7 by hinges 11 so as to permit the two sections 7 and 10 to fold together along a horizontal axis with their front or outer faces adjacent and in substantially parallel relation. In a like manner, a still further door section 12 is connected at the top thereof with the bottom of the section 10 by hinges 13 so as to permit the two sections 10 and 12 to fold together along a horizontal axis with their rear or inner faces adjacent and in substantially parallel relation. Finally, a fourth or lower door section 14 is connected at the top thereof to the bottom of the section 12 by hinges 15 so as to permit the two sections 12 and 14 to fold together along a horizontal axis with their front or outer faces adjacent and in substantially parallel relation. The sections 7 and 10 and 12 and 14 are thus adapted to fold rearwardly or inwardly and outwardly, in pairs, the door being compactly folded with the sections thereof in contiguous relation and in a horizontal position at the inner side of and entirely above the lintel 9, when the door is fully opened, as indicated by dotted lines in Figure 3.

Rigidly mounted inwardly of and adjacent each side of the doorway or frame 6 is a vertical metallic guide 16 having a channel whose open side extends toward the doorway and the door. The door is of a width to almost fill the space between the guides 16 and, when closed, is disposed in alinement with said guides and in a plane adjacent but rearwardly of the plane of the frame 6 of the doorway. One of the hinges 13 is located adjacent each side edge of the door and has a hinge 10 provided with an outwardly and laterally projecting end portion 17 carrying

a roller 18 movable in the channel of the adjacent guide 16. Attached to the lower portion of the lower door section 14 at each side thereof is a similar laterally projecting pin 19 on which is journaled a roller 20 which is also slidably movable in the channel of the adjacent guide 16. In this way, the adjacent ends of the intermediate door sections 10 and 12 and the lower end of the lower door section 14 are restrained against inward or outward movement and caused to move in a vertical rectilinear path when the door sections are folded or unfolded in opening or closing the door. At the same time the sections 10, 12 and 14 are permitted to freely swing about axes coincident with the axes of the pins 17 and 19 to freely permit the desired relative swinging or folding movement of the door sections. As shown in Figures 2 and 3, the guides 16 extend above the lintel 9 so as to permit compact folding of the door sections into contiguous relation above the plane of the lintel 9 as hereinbefore mentioned, and as shown by dotted lines in Figure 3.

Suitable means is provided to substantially counterbalance the weight of the door and to simultaneously exert a vertical lift on all sections thereof so that the door may be opened with the expenditure of a minimum amount of manual effort and automatically retained in open folded condition, as well as to prevent sudden lowering or closing of the door. For accomplishing this result, the said means may comprise a counterweight 21 disposed at each side of and adjacent the upper part of the door when the latter is closed, and connected by a chain or cable 22 with the adjacent side of the door section 10 near the bottom thereof, the chain or cable 22 passing upwardly from the door section 10 over a sheave 23 suitably mounted above and adjacent the adjacent side of the door, and then to a point of connection with the counterweight 21. In a similar manner, a further counterweight 24 is disposed at each side of and adjacent the upper part of the door when the latter is closed, and connected through the medium of a further chain or cable 25 with the adjacent side of the next to the lower door section 12 near the bottom of the latter, the chain or cable 25 passing upwardly from the door section 12 over a further sheave 26 suitably mounted beside and inwardly of the sheave 24 above the door, and thence to a point of connection with the counterweight 24.

Spring projected latch bolts 27 are carried by opposite sides of the upper and lower door sections 7 and 14 adjacent the joints between the sections 7 and 10 and 12 and 14, which latch bolts are adapted to enter the channels of the guides 16 when the door is closed and the sections thereof are disposed in a vertical plane, the latch bolts of each door section being connected at their inner ends by a chain 28 for simultaneous retraction or release upon exerting a pull upon such chain. The free ends of the latch bolts are preferably beveled so as to permit them to automatically snap into the channels of the guides 16 when the door sections are fully unfolded and the door completely closed. Further, it is apparent that these latch bolts 27, being mounted on the inner sides of the respective door sections, will serve to effectively prevent breaking of the joints between the sections 7 and 10 and 12 and 14, thereby securely fastening the door in closed condition and preventing opening thereof except from the interior of the garage or building equipped with the door.

To open the door, it is first necessary to release the latch bolts 27 and then break the joints formed by the hinges 11 and 15. This is preferably done by first pulling on the chain 28 connecting the latch bolts of the upper pair and then pulling upon the chain 28 connecting the latch bolts of the lower pair, whereby these joints are broken in the order mentioned simultaneously with release of the latch bolts adjacent said respective joints. More specifically, the very act of releasing the latch bolts is utilized to simultaneously break the joint adjacent which such latch bolts are arranged. After releasing the latch bolts and breaking the joints at the hinges 11 and 15, the door is completely folded or opened by lifting upwardly on the lower door section 14, the latter having a central handle 29 near the bottom thereof for this purpose. Obviously, a reversal of this operation will result in completely closing and latching the door in closed position. The inner surface of the lower door section 14 being lowermost when the door is completely folded overhead, the handle 29 will be readily accessible for pulling downwardly on and unfolding the door sections in the door closing operation.

From the above description, it will be seen that I have provided a very simple and durable, as well as efficient construction for carrying out the contemplated objects of the invention. Minor changes may be made without departing from the spirit and scope of the invention as claimed.

What I claim as new is:

A door comprising four hingedly connected door sections pivotally supported above the door opening so as to be folded above said opening in substantially horizontal position when the door is in the fully open position, guides at the sides of the door opening, guiding members carried by certain of said door sections adjacent the hinge connections therebetween and engaging said guides, pulleys journaled above and at each side of the door opening, flexible directly counterweighted members connected to opposite

sides of the lowermost door section adjacent the top thereof and passing upwardly over certain of said pulleys, and further separately and directly counterweighted flexible members connected to opposite sides of the next to the uppermost door section adjacent the bottom thereof and passing upwardly over other of said pulleys, whereby the weight of the door sections is sustained by the counterweighted flexible members at points both inwardly of and adjacent the door opening to prevent binding of said guiding members in said guides when the door is in any of its partially or fully open positions.

In testimony whereof I affix my signature.

BRYAN J. HAYMAN.