July 18, 1939. C. R. WOLF 2,166,898

GARAGE DOOR CONSTRUCTION

Filed April 13, 1938 2 Sheets-Sheet 1

FIG. 1.

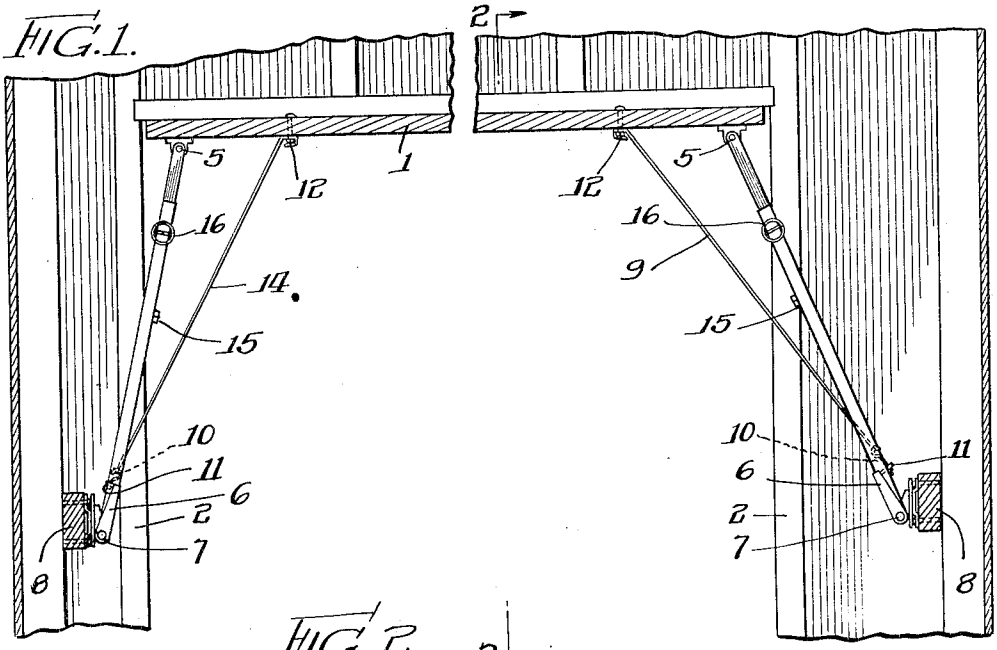
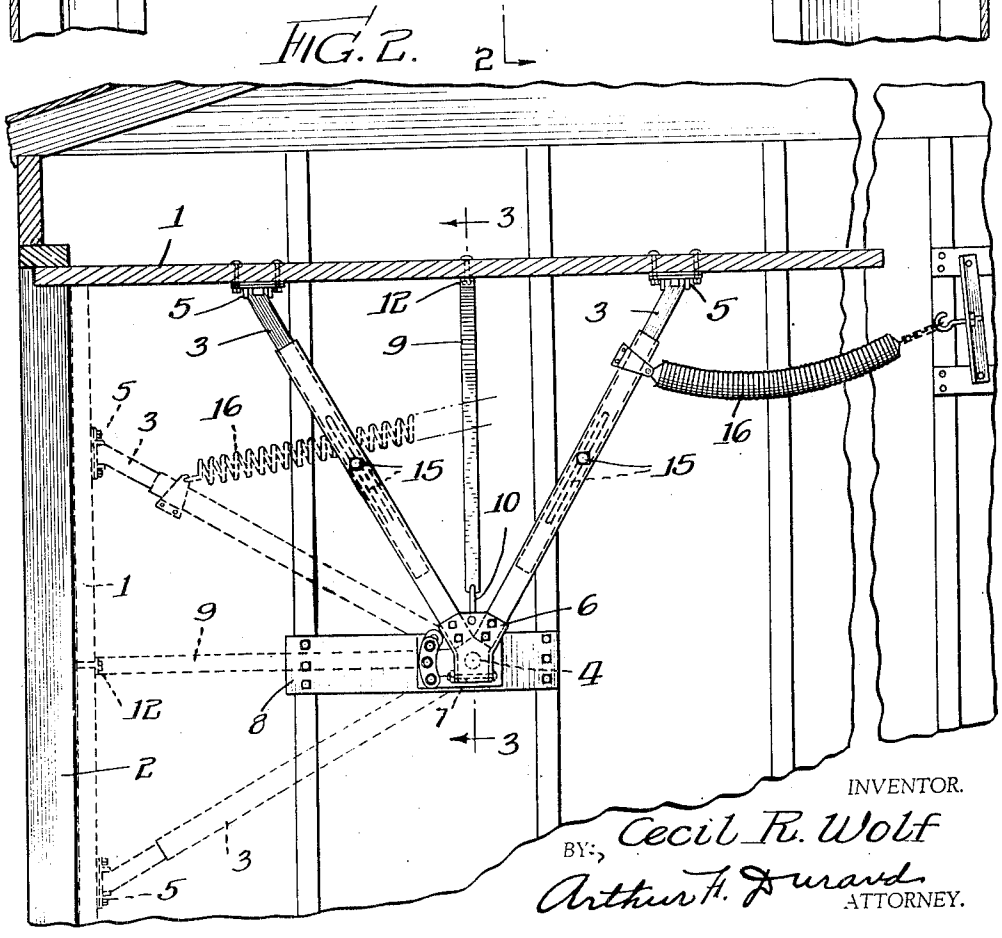


FIG. 2.



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FIG. 3.

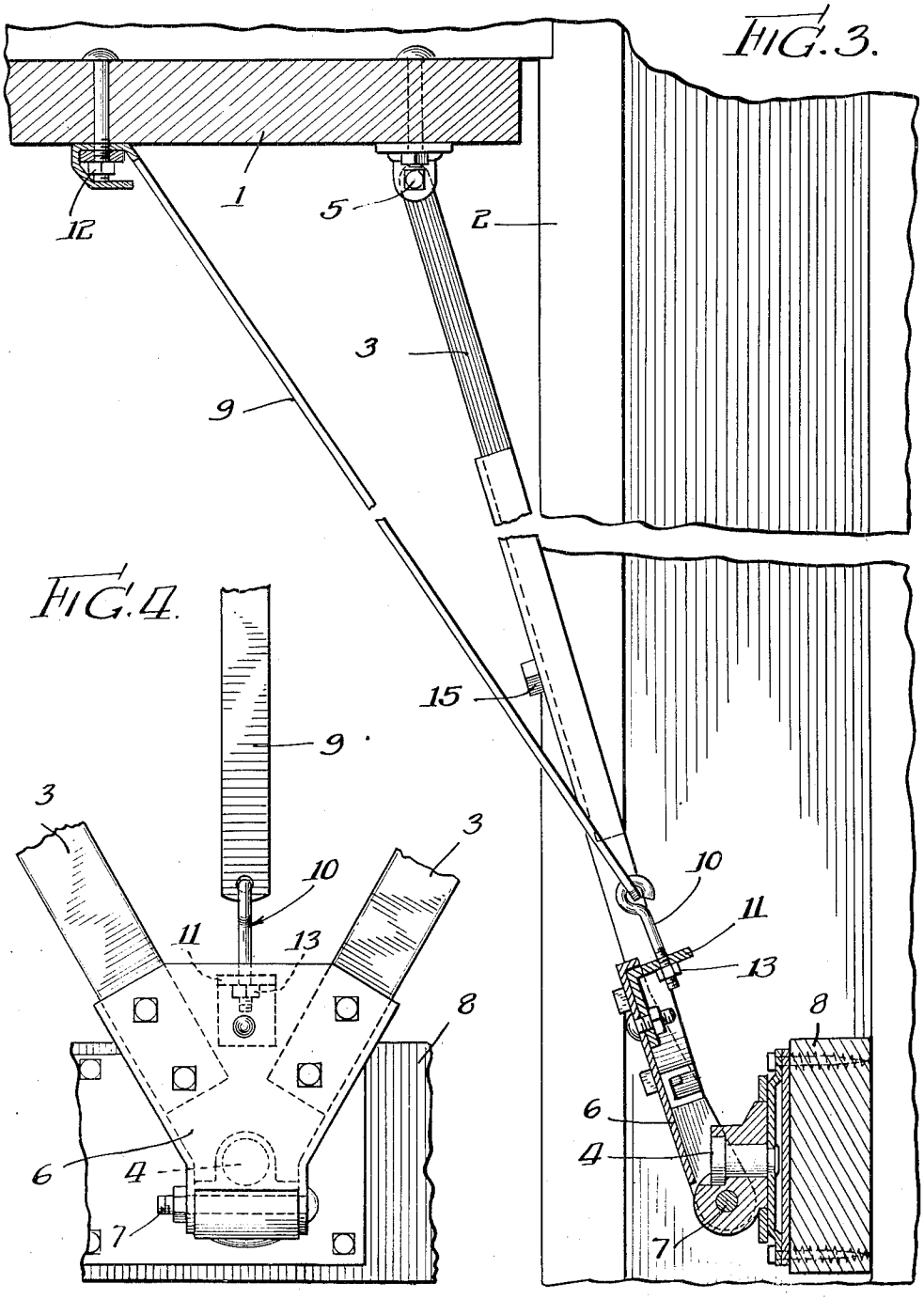


FIG. 4.

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GARAGE DOOR CONSTRUCTION

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Application April 13, 1938, Serial No. 201,679

10 Claims. (Cl. 20—16)

This invention relates to garage doors, and more particularly to those that are made in one rigid section, and which are mounted to swing upward into an overhead horizontal open position, and which are usually provided with counterbalancing means of some kind, such as springs, to assist in opening the door and in cushioning the downward or closing movement thereof.

Generally stated, the object of the invention is to provide an improved and novel construction and arrangement whereby bracing means are provided to prevent lateral displacement of the door, particularly when the latter is in its horizontal open position, so that the door will open and close accurately, even in cases where the structure of the building is such as would tend to unbalance the door laterally, thereby to insure the operation of the door in the desired manner.

It is also an object to provide certain details and features of construction and combinations tending to increase the general efficiency and desirability of a garage door having bracing means of this particular character.

To the foregoing and other useful ends, the invention consists in matters hereinafter set forth and claimed and shown in the accompanying drawings, in which—

Fig. 1 is an inside view of a garage doorway having a door constructed in accordance with the invention, showing the door in its open or overhead position, and in vertical section.

Fig. 2 is a vertical sectional view on line 2—2 in Fig. 1 of the drawings.

Fig. 3 is an enlarged fragmental sectional view on line 3—3 in Fig. 2 of the drawings.

Fig. 4 is a side elevation of the lower portion of Fig. 3 of the drawings.

As thus illustrated, the invention comprises a rectangular door 1 made in one rigid section, adapted to have a vertical closed position in the doorway 2, and adapted to have a horizontal overhead open position as shown in Figs. 1 and 2 of the drawings. When it is in open position, the door is preferably and entirely within the building.

For the purpose of mounting the door, downwardly converging arms 3 are provided at each side of the doorway, to extend downwardly to a fixed horizontal axis provided by the pivots 4 at each side of the doorway. These downwardly converging arms are pivoted at their upper ends at 5 on the inner side of the door, assuming that the latter is in open position, and have their lower ends rigidly connected by a casting 6 that is pivoted at 7 to turn about an axis at right angles to the axis provided by the pivots 4 previously mentioned. In this way, the side arm mountings for the door are, in effect, adjustable toward and away from each other on their pivots on the door, and are similarly adjustable toward and away from each other on their pivots in the building, the said pivots 4 and 7 being supported by blocks 8 on the sides of the building.

Thus, the blocks 8 can be set any desired distance apart because of the adjustability of the two side arm mountings of the door. As shown in Fig. 1, there may be more space at one side of the doorway than at the other, so that the converging arms 3 at one side will not have the same angle as those at the other side, for the reason that one block 8 is nearer the doorway than the other. In such case, the door 1, in its overhead position, is not exactly balanced, and would tend to shift toward the left in this figure of the drawings, for the reason that the arms 3 at one side are not at the same angle as the arms 3 at the other side. Therefore, to prevent such lateral shifting of the door, and to maintain a balanced condition thereof, a bracing member 9 is connected at its lower end by a hook 10 to the bracket 11 on the casting 6 previously mentioned, and is connected at its upper end to the door by the bolt 12, as shown in Fig. 3 of the drawings. By tightening the nut 13 on the screw hook 10, the brace 9 can be tightened to draw the door 1 to the right in Fig. 1 of the drawings, enough to correct the balance of the door, so that the latter will maintain an accurate position relatively to the doorway, in both the open and closed position of the door.

In some cases, a second brace 14, of the same character, may be applied to the other side of the door, as shown in Fig. 1 of the drawings, and the brace 9 may be omitted, assuming the condition shown in Fig. 1, relative to the positioning of the blocks 8, to be the reverse of what is shown in this figure. Or, on the other hand, these braces may be applied at both sides of the door, if desired, so that any tendency of the door to shift laterally, in either direction, can be corrected. Buildings of this kind sometimes settle, more or less, in one direction or another, in a way tending to throw the door out of balance. By equipping the door with bracing means of the kind shown and described, the desired balancing effect to insure the accurate opening and closing of the door can be maintained.

Preferably, the arms 3 are endwise extensible by means of bolts and slots 15, as indicated in Fig. 2 of the drawings, so that the door can be accurately leveled up in its overhead or horizontal position, regardless of the angles at which the arms 3, relative to the door, are adjusted in order to accommodate the supporting means to the conditions of the building.

It will also be seen that springs 16 are preferably interposed between the arms 3 and some stationary portion of the building, in order to assist in raising the door into overhead open

position, and for the purpose of cushioning the downward or closing movement of the door, thereby to prevent jolting and jarring when the door is opened and closed, but the door being preferably balanced in open position without the aid of said springs, as indicated in Fig. 2 of the drawings.

It will be seen that the bracing means, such as 9 or 14, are combined with arms that are not only pivoted on the sides of the building, but that are also pivoted on the door itself, as specifically shown in the drawings. However, it will be understood that the said bracing means, whereby the door can be held against lateral horizontal displacement, in its overhead open position, can be combined with any suitable or desired means for mounting the door for operation in the desired manner, without departing from the spirit of the invention.

The braces 9 and 14, therefore, are in a common plane which is radial to the axis 4 about which the door is moved up and down, in the opening and closing thereof. When viewed in the direction of said axis 4, these braces appear to be radial to said axis, as indicated in Fig. 2 of the drawings. But by looking at Fig. 1 of the drawings, it will be seen that these braces 9 and 14 do not extend at right angles to said axis, but are oblique thereto, notwithstanding the fact that they do appear to extend radially when the structure is viewed in the direction of said axis. But, in any event, these braces are preferably in a common plane that is radial to said axis, and this is true regardless of whether two braces are required, or only one.

It is obvious, of course, that the pivot bolts 5 and 7 can be tightened to resist pivotal action at these points, after installation of the door, but except for this the braces 9 or 14 are relied upon to prevent such pivotal action, after the door has been adjusted to accurate position in the plane thereof.

Looking at Fig. 2 of the drawings, it will be seen that each supporting arm is V-shaped or fork-shaped in form, and that each arm thus formed has its upper and lower fork prongs, as they may be called, pivoted on the door in the manner shown and described. Thus, when the door is in closed position, and the two supporting arms are in the position shown in dotted lines in Fig. 2, each arm is adapted to have swivel adjustment about a vertical pivot 7, on the two hub plates that are shown fastened to the supports 8 at opposite sides of the doorway, and thus the arm can be adjusted in the manner shown and described, for doors of different widths, or for different distances between the sides of garage buildings of this kind.

What I claim as my invention is:

1. In a garage door construction, a doorway, a rigid door having a vertical closed position in said doorway and an overhead open position inside the building, means forming in effect a pair of arms spaced apart and extending inwardly from the back of the door, means to pivot said arms on the door, so that in effect the arms are adjustable toward or away from each other about their pivots on the door, in the installation of the door, devices to pivotally support the ends of the arms on the building, so that the door may accurately swing upward into said overhead open position, and bracing means to keep the door from getting out of balance laterally, together with counter-balancing means to assist in opening the door, and to cushion the closing thereof.

2. A structure as specified in claim 1, said arms being adjustable in length in accordance with their distance apart, when adjusted at an angle to each other, and said bracing means being adjustable to insure said balancing effect.

3. A structure as specified in claim 1, each arm being double and comprising two duplicate telescoping connections converging from fixed pivotal points on the door to the pivotal mounting on the building, at each side of said bracing means, with means to fix the telescoping adjustment of each said arm connection, radially, so that in effect the arms are variable in length in accordance with their distance apart at an angle to each otner.

4. A structure as specified in claim 1, each pivotal support for the arms comprising a fixed horizontal axis about which the door swings up and down and another fixed axis at right angles to said horizontal axis for the angular adjustment of the arm and the bracing means relatively to the door.

5. In a garage door construction, a rigid door section having a vertical closed position and an overhead open position, means for mounting the door to open and close in the manner stated, having pivots on the door, and lateral bracing means carried by the door and said means for mounting the door, for preventing lateral displacement of the door in the plane thereof, said means for mounting the door having joints that are in themselves adapted to permit free lateral displacement or lateral adjustment of the door in the plane thereof.

6. A longitudinally or endwise adjustable tightening brace for an overhead opening garage door, the brace being disposed in a plane radial to the fixed axis of the door.

7. In a balanced door construction, the combination of a base plate to be attached to a support at each side of the doorway, a hub mounted to rotate on each base plate on a substantially horizontal axis, a door-supporting arm secured to each hub and capable of adjustment on the same about a substantially vertical axis when the door is in its closed position, adjustable bracing means to hold each arm against displacement about its said vertical axis, said door-supporting arms each having an upper fork prong and a lower fork prong extending toward the door, a door plate corresponding to each of the prongs to be attached to the door, means for pivotally connecting and securing the door plates to the ends of the prongs, and pulling means connected with said parts for counterbalancing the weight of the door, said parts co-operating to enable the door to be swung from a vertical position in the doorway into a substantially horizontal overhead position.

8. A structure as specified in claim 7, said bracing means extending from the door to the arms, and being adjustable on the latter.

9. A structure as specified in claim 7, said bracing means being horizontal when the door is closed, and being in a vertical plane when the door is open.

10. A structure as specified in claim 7, each said door plate having a pivot thereon for its arm prong which is vertical when the door is closed.

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