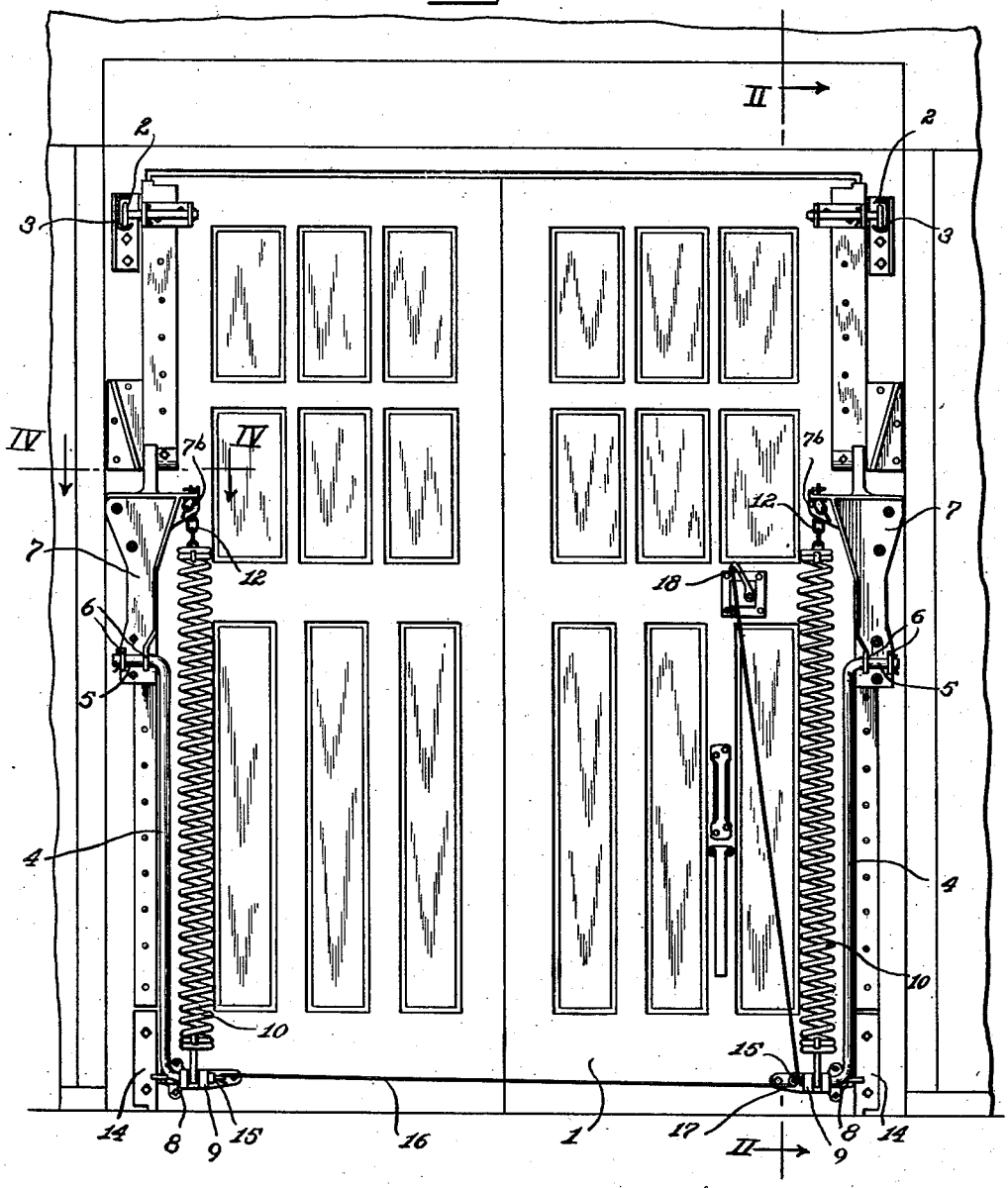
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DOOR CONSTRUCTION

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Fig. 1



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Fig. 2

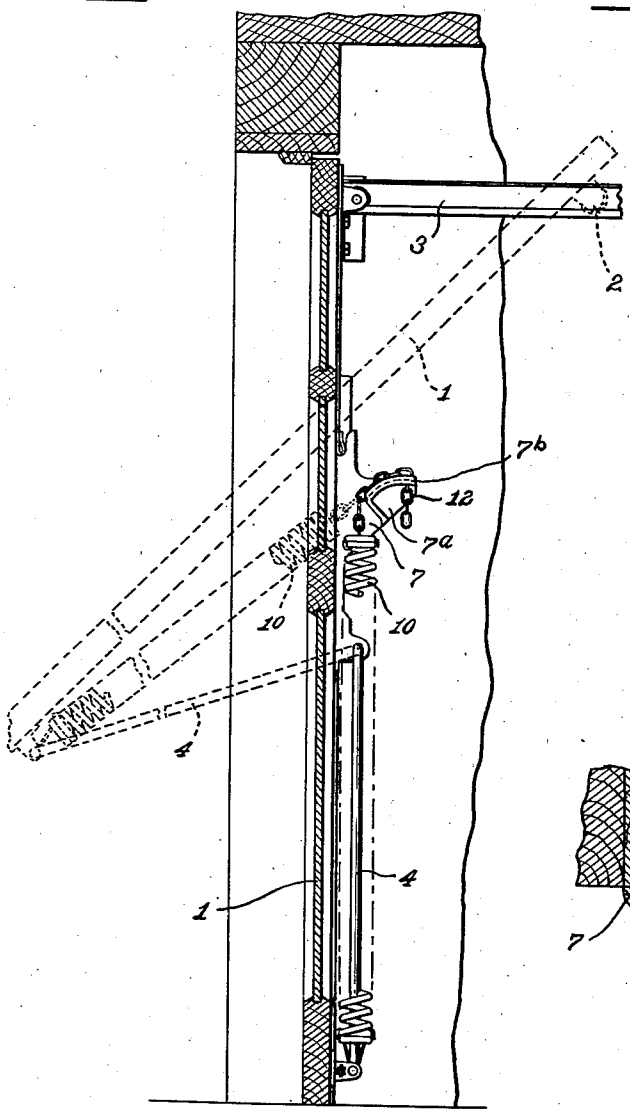


Fig. 3

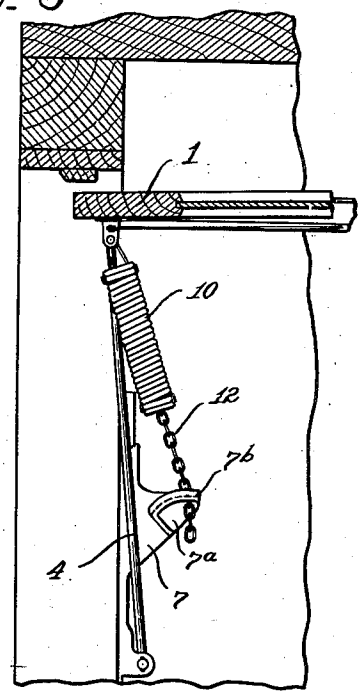
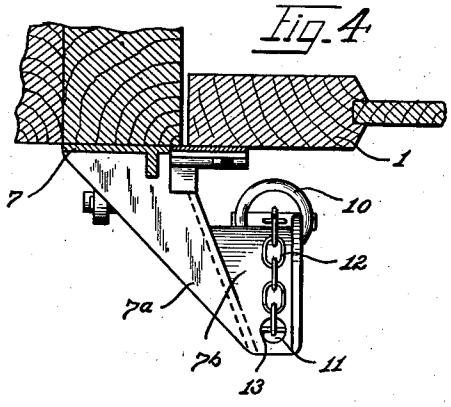


Fig. 4



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UNITED STATES PATENT OFFICE

2,173,684

DOOR CONSTRUCTION

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Application December 19, 1934, Serial No. 758,190

12 Claims. (Cl. 20—19)

This invention relates to a door construction, primarily designed for garages and concerns itself with means for elevating a one-piece garage door to overhead position and maintaining the same in such position. More specifically, the invention concerns itself with yielding means anchored to the door and to a curved fulcrum member upon the door frame that provides a changeable pivot or fulcrum point for the yielding means making it possible to decrease the resistance of the same so that the door may be more easily lowered and may be closed without slamming thereof.

The invention comprises the novel structure and combination of parts hereinafter described and more particularly pointed out and defined in the appended claims.

In the accompanying drawings which illustrate a preferred form of this invention and in which similar reference numerals refer to similar features in the different views:

Figure 1 is an interior elevational view of a garage door with adjacent parts of the garage.

Figure 2 is a sectional view taken upon the line II—II of Figure 1 looking in the direction of the arrows and illustrating in dotted lines the upward movement of the door.

Figure 3 is a fragmentary sectional view similar to the upper portion of Figure 2 showing the door in overhead position.

Figure 4 is an enlarged sectional view taken upon the line IV—IV of Figure 1 looking in the direction of the arrows.

In the drawings which illustrate the chosen embodiment of this invention, a one-piece garage door 1 has been shown that is provided with rollers 2 upon its upper lateral edges. The rollers 2 travel on overhead tracks 3 supported within the garage. Upon the frame of the doorway are pivotally mounted tie rods 4 which have upper right angled journal portions 5 journalled in bearing lugs 6 upon brackets 7 attached to the frame of the doorway or adjacent part of the garage. The rods 4 have lower right angled bearing portions 8 which are journalled in castings 9 secured upon the lower portion of the door. Coil springs 10 are anchored at their lower ends to the journal portions 8 of the rods 4 and the upper ends of said springs are adjustably anchored to the brackets 7 to provide changing fulcrums therefor as will presently appear.

In referring to Figures 2 and 4, it will be observed that the brackets 7 have inwardly extending arms 7a which have laterally projecting curved supports 7b. These curved supports 7b are provided with apertures 11 at their upper ends. It will be noted that the curved surfaces of said supports slope downwardly in a direction toward the door. The upper ends of the springs 10 are anchored to short chains 12 which are trained over the curved supports 7b and extend through the apertures 11. A pin 13 is adapted to extend through a link in each chain beneath its support 7b for adjustably anchoring the same. By this construction, it is possible to adjust the tension of the springs since the anchoring pins 13 may be inserted through any desired links in the chain.

Upon the lower side frame members are stops or strike plates 14 located upon the interior of said members for arresting the lower portion of the door when the same is swung downwardly to its closed position. Latch bolts 15 in the castings 9 are adapted to be projected beyond the strike plates for locking the door in closed position. A cable 16 which is anchored to the end of one latch bolt and is trained over a sheave 17 upon the other latch bolt extends upwardly and is attached to a crank arm 18 carried by the door whereby the bolts may be retracted.

The door is adapted to be opened by pulling the lower end outwardly and then upwardly, the springs 10 assisting and serving to move same to overhead position as shown in Figure 3. The tie rods 4 guide and control the door in its upward and downward movements.

As the door is swung upwardly to overhead position by the springs 10 which are of course under tension, the curved cam supports 7b will provide gradually rising fulcrum points for such springs and gradually increase the angle between such springs and the rods 4. Increasing such angle will increase the effective components of force acting to elevate the door and sustain the same in overhead position. Thus weaker springs may be used than would be the case if the springs had a stationary fulcrum. When the door is in fully elevated position as shown in Figure 3 the springs 10 still have an effective component of force for maintaining the door in overhead position and against outward movement as is readily apparent from the angle between the spring and door as shown in Figure 3.

When the door is swung downwardly, the chains 12 will gradually engage over the curved supports 7b and gradually decrease the angle that the springs 10 make with the rods 4 until the door is closed when said springs are substantially in parallel relation with the rods 4 and the door. Thus the effective components of force of the springs 10 in lowering the door never act at an angle that includes the upper pivot points of the rods 4 so as to slam the door shut. In the use of a weaker spring, less effort is required to lower the door. Heretofore before the varying fulcrums were used it was necessary to use such strong springs for elevating the door and maintaining the same in elevation position that a great deal of effort was required to lower the

door. Such strong springs would also cause a slamming of the door.

From the foregoing, it will be appreciated that the closing of such garage doors has been greatly facilitated through the use of weaker springs that are so mounted that their effectiveness for elevating the door and maintaining the same in overhead position is increased.

We are aware that many changes may be made and numerous details of construction may be varied through a wide range without departing from the principles of this invention, and we, therefore, do not purpose limiting the patent granted hereon otherwise than necessitated by the prior art.

We claim as our invention:

1. The combination with a one-piece garage door, yielding means connected to the bottom portion of the door, stationary supports having arcuate surfaces and means connected to said yielding means and trained over said arcuate surfaces and attached to said supports.

2. In a building having a doorway, a rigid door for closing said doorway, anchor rods connecting said door to said building, springs connected to the lower portion of said door, brackets upon said building having upwardly curved surfaces, and means attached to the upper ends of said springs and trained over said curved surfaces and anchored to said brackets.

3. In a building having a doorway, a rigid door for closing said doorway, anchor rods pivotally connecting said door to said building, springs connected to the lower portion of said door, curved supports upon said building and means for supporting the upper ends of said springs over said curved supports.

4. In a structure of the class described, a pair of spaced supports having upper arcuate surfaces, a vertical member between said supports, springs attached to said vertical member, flexible elements attached to the free ends of said springs and trained over said arcuate supports and anchored thereto, said springs being effective for moving said member to overhead horizontal position when the lower portion is tilted outwardly.

5. In a structure of the class described, a pair of spaced supports having upper arcuate surfaces, a vertically movable member between said supports, radius rods connecting said member with said supports, coil springs attached to the bottom of said member, and flexible elements attached to the upper ends of said springs and trained over the arcuate surfaces of said supports and adjustably anchored thereto for the purpose set forth.

6. In a building having a doorway, a rigid door for closing said doorway, anchor rods pivotally connecting said door to said building, springs connected to the lower portion of said door, brackets attached to said building and having upwardly curved surfaces, flexible members attached to the upper ends of said springs and trained over said curved surfaces and means for adjustably anchoring said flexible members to said brackets.

7. In a building having a doorway, a rigid door for closing said doorway, anchor rods pivotally connecting said door to said building, springs attached to the bottom of the door, brackets attached to said building and having surfaces and flexible members attached to said springs and trained over said surfaces and anchored to said brackets, said surfaces having varying contours for causing said members to engage at different points thereof during the opening or closing movement of the door.

8. In a building having a doorway, a rigid door for closing said doorway, radius rods pivotally connecting said door and building, springs attached to the lower portion of said door, brackets attached to said building, means for attaching said springs to said brackets, said brackets having curved surfaces over which said means pass and causing said springs to assume parallel relation with the door when the same is closed.

9. The combination with a swinging type upward-acting closure, a stationary support having an upwardly and inwardly directed surface, and counterbalancing means operating between the bottom portion of the closure and said support and trained over said surface to exert an upward pull when the closure is in closed position and an inward pull when the closure is in open position.

10. The combination with a closure mounted for swinging from a closed vertical position to an overhead horizontal position, a stationary bracket at the side of the closure having a guiding surface adjacent the closure and spaced inwardly from the closure when the same is in closed position, and counterbalancing means operating between the bottom of the closure and the bracket and trained over said guiding surface to exert an upward pull when the door is in closed position and an inward pull when the door is in open position.

11. The combination with a swinging type upward-acting closure, a stationary support having an upwardly and inwardly directed surface, and counterbalancing means operating between the bottom portion of the closure and said support and trained over said surface to exert an upward pull when the closure is in closed position and an inward pull when the closure is in open position, said support having a bearing lug below said surface to which the closure is swingably connected.

12. In a construction having a doorway, tracks extending inwardly from the top portion of the doorway, brackets secured to the side door jambs of the doorway and having upwardly and inwardly guiding surfaces projecting into the doorway, said brackets also having upwardly extending fingers spaced inwardly from the side jambs; a closure for said doorway having rollers at the top portion thereof engaging in said tracks, weatherstrips secured on the inner faces of said door projecting over the door jambs and having rolled lower end portions for abutting against said fingers of the brackets to urge the weatherstrips against the door jambs when the door is in closed position, anchor rods pivotally connecting said brackets with the lower portion of the door, tension springs secured to the lower portions of the door adjacent said anchor rods, flexible means anchored on said brackets and trained over said guiding surfaces thereof, and means connecting said flexible means with the tension springs whereby said springs exert a vertical upward pull on the door when the same is in closed position and an inward pull when the door is in open position.

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