

Aug. 20, 1929.

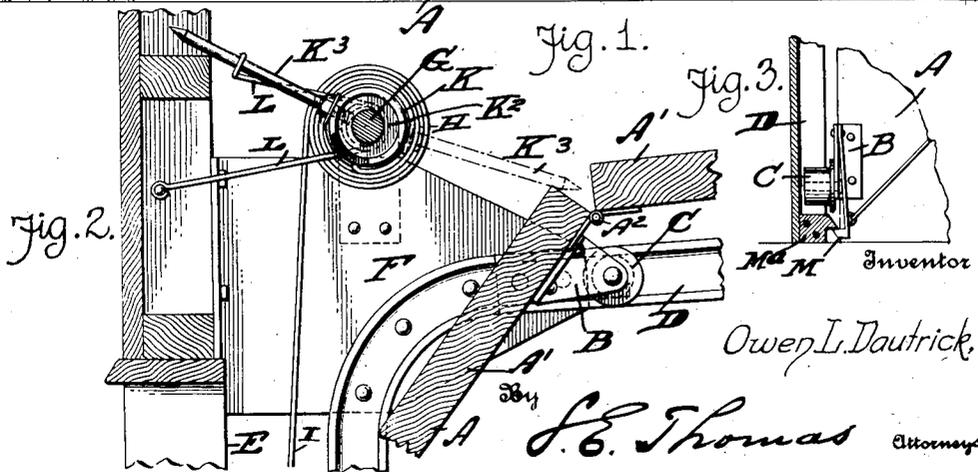
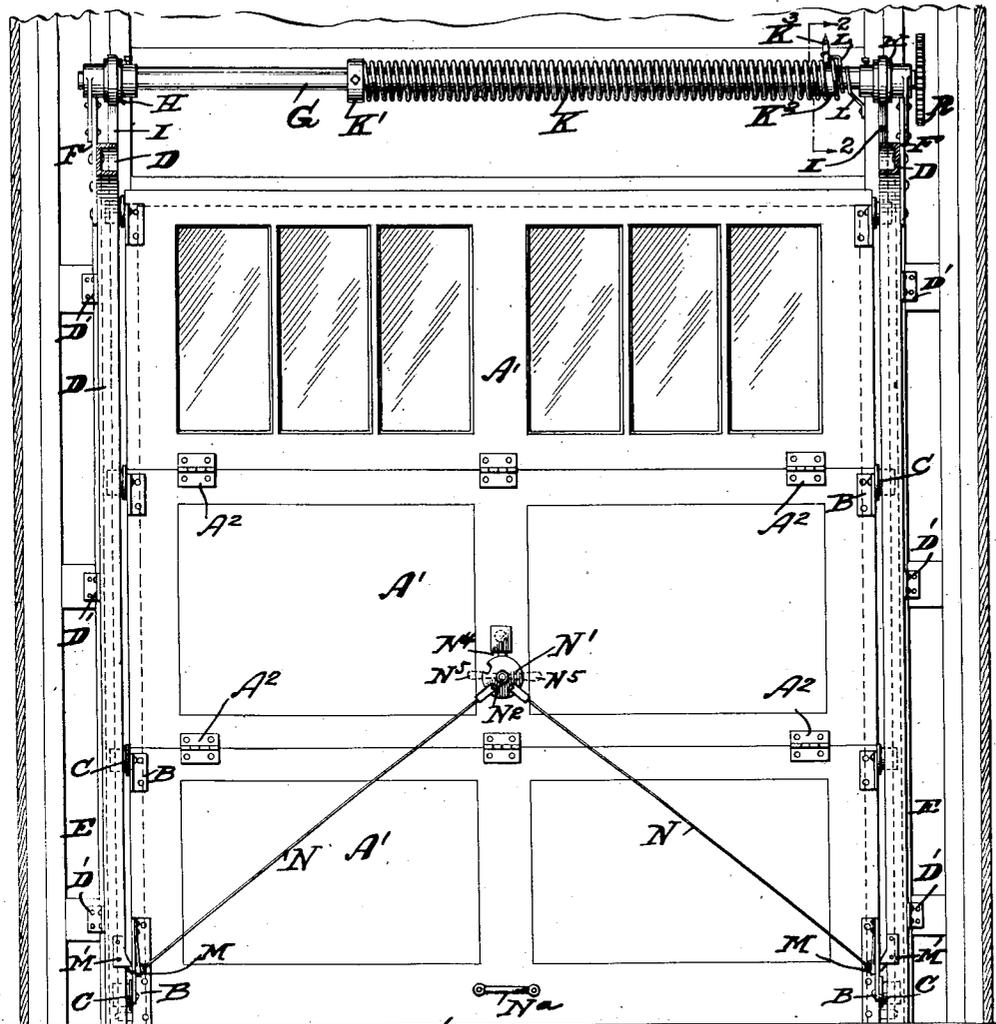
O. L. DAUTRICK

1,724,995

GARAGE DOOR

Filed Nov. 20, 1922

2 Sheets-Sheet 1



Aug. 20, 1929.

O. L. DAUTRICK

1,724,995

GARAGE DOOR

Filed Nov. 20, 1922

2 Sheets-Sheet 2

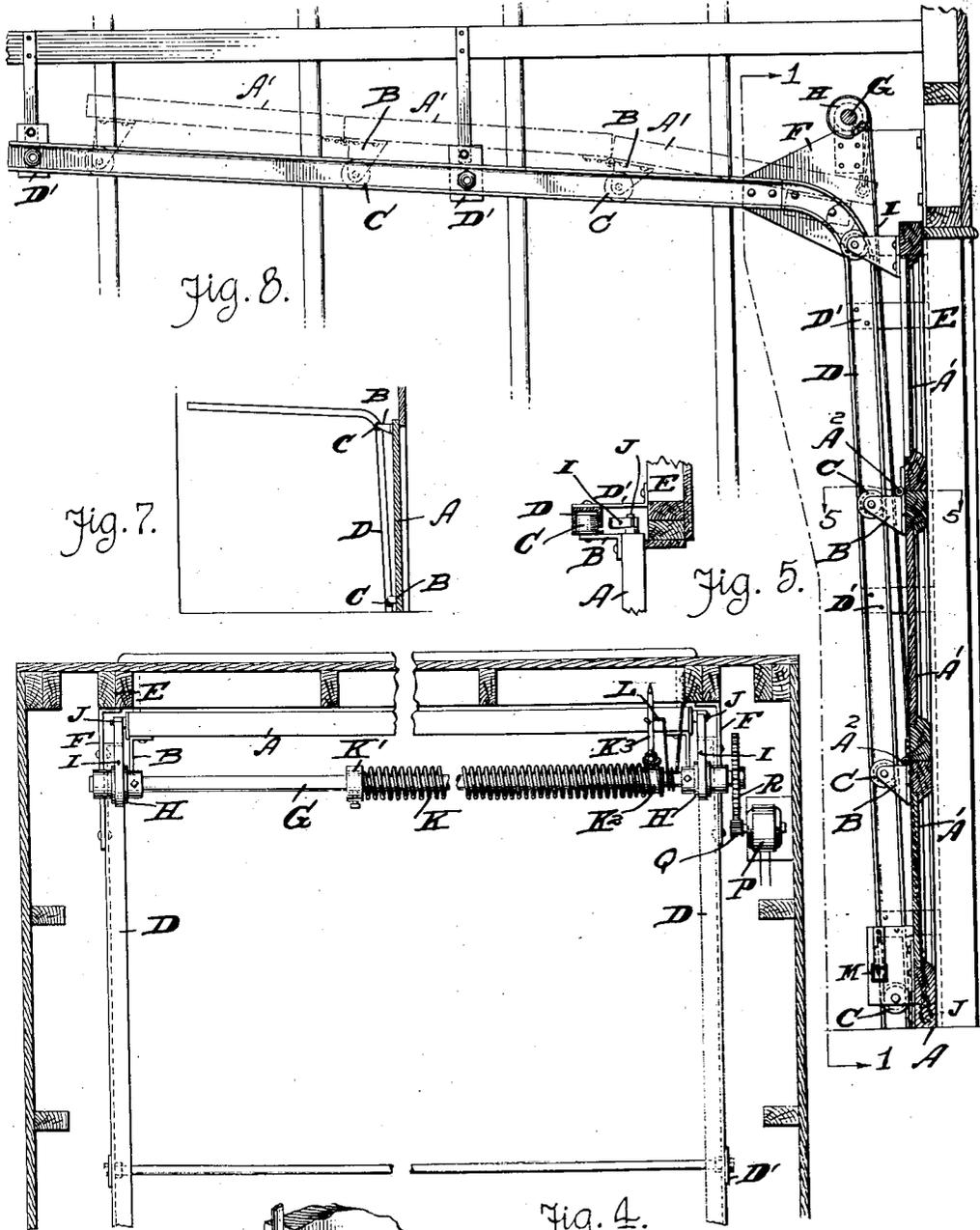


Fig. 7.

Fig. 5.

Fig. 4.

Fig. 6.

Inventor

Owen L. Dautrick,

By *S. B. Thomas*

Attorney

# UNITED STATES PATENT OFFICE.

OWEN L. DAUTRICK, OF DETROIT, MICHIGAN, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF ONE-HALF TO ERNEST R. WILSON AND ONE-HALF TO RAYMOND C. KRAUSE, BOTH OF DETROIT, MICHIGAN.

## GARAGE DOOR.

Application filed November 20, 1922. Serial No. 602,014.

My invention relates to garage and other doors of like character, shown in the accompanying drawings and more particularly described in the following specification and 5 claims.

The primary object of this invention is to provide means whereby a vertically movable door may be easily raised and lowered with the least expenditure of manual effort.

10 In carrying my invention into effect the door is preferably constructed of a plurality of horizontal panels hinged together adapted to be raised vertically to uncover the door opening, above which it is guided in a 15 substantially horizontal direction by suitable channel members extending upwardly and inwardly from the floor at each side of the door casing; one of the objects of my invention being to remove the door from 20 frictional contact with the casing immediately upon being raised,—the construction however is such that when the door is lowered it will be forced into abutting contact with the door casing to insure a tight and 25 satisfactory closure.

A further object of the invention is to reduce the manual effort required to raise and lower the door,—a relatively long spiral spring being provided mounted upon a 30 horizontal shaft journaled in brackets above the door,—and adjacent to the ends of the shaft are secured rim pulleys on which are wound metal tapes or other flexible elements attached to the lower panel of the door. 35 The spiral spring is connected at one end with a collar secured to the shaft and at the other end to a collar loosely mounted upon the shaft from which extends radially an arm, adapted to bear upon the framework 40 of the building or other suitable abutment, whereby upon lowering the door the spring will be wound upon the shaft to increase its tension so that when it is desired to raise the door the effort necessary to lift the latter 45 will be proportionately reduced through the resilient action of the spring.

A further object of the invention is to provide a suitable break mechanism adapted in the event of the spring breaking under the 50 load of the door to automatically arrest the

downward movement of the latter and thus avoid injury to anyone beneath the door at the time of the accident.

A further object of the invention is to provide means whereby the door may be auto- 55 matically locked when closed.

A further object of the invention is to provide means whereby the door may be either manually or mechanically actuated by an electric or other motor which may be 60 distantly controlled from the garage, office or dwelling.

A further object of the invention is to provide means whereby the tension of the spiral spring wound upon the horizontal 65 shaft may be regulated to adapt it to the weight of the door which it is adapted to control.

With the foregoing and other objects in view which will appear as the description 70 proceeds the invention further resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed it being understood that changes may be made in the precise embodi- 75 ment of the invention hereby disclosed without departing from the spirit of the same.

In the drawings accompanying this specification and forming a part thereof:— 80

Figure 1 is a sectional elevation of the door and its casing taken on or about line 1—1 of Figure 8.

Figure 2 is a vertical cross-sectional view of a detail of construction taken on or about 85 line 2—2 of Figure 1.

Figure 3 is a cross-sectional view of a detail of the lower portion of the door showing a modification in the arrangement of the roller and latch for automatically lock- 90 ing the door when closed.

Figure 4 is a horizontal sectional and plan view taken through the wall of the building above the door, showing a shaft journaled above the door carrying flanged 95 pulleys with steel tapes wound thereon connected with the door, also a spiral spring mounted upon the shaft adapted to assist in raising and lowering the door.

Figure 5 is a horizontal sectional view of 100

a fragmentary detail of the door and its casing taken on or about line 5—5 of Figure 8, showing one of the brackets secured to the door carrying a guide roller extending into the channel member in which it travels,—the channel member being supported by a bracket bolted to the door casing.

Figure 6 is a fragmentary perspective view of the lower corner of the door showing the arrangement of the roller and latch for automatically locking the door when closed.

Figure 7 is a diagrammatic cross-sectional view of a modification showing a door constructed of a single unit, in place of the hinged panels indicated in the other figures.

Figure 8 is a cross-sectional view of the door showing the inwardly inclined guide channels in which a plurality of rollers travel carried by brackets attached to the door whereby the door is directed to and from the door-casing and horizontally above the latter.

Referring now to the letters of reference placed upon the drawings:—

A denotes a garage door comprising a plurality of horizontal panels  $A^1$  hinged together as at  $A^2$ . Secured to the respective panels at each side of the door are brackets B on which are journaled rollers C extending into channel members D in turn secured by suitable brackets  $D^1$  to the door casing E or other framework. The channel members D are inclined slightly from the floor to the top of the door casing;—they then extend in a substantially horizontal direction beneath the ceiling of the building. The brackets B carrying the roller C are respectively longer on each superimposed panel than the brackets secured to the panel directly below in order that the rollers may follow the inclined guide channel members D to provide for a perfect closure of the door when lowered to the floor.

It will be evident upon raising the door that it will follow the inwardly inclined channel members which serve to relieve the door from frictional contact with the casing, that it may be raised by a minimum expenditure of effort.

F, F, are brackets bolted to the channel members or to the frame of the building and journaled therein above the door is a horizontal shaft G. Adjacent to each end of the shaft G is secured a flanged pulley H, on which is wound a steel tape or other suitable flexible element I, in turn connected with a suitable engaging device J attached to a bracket secured to each side of the door adjacent its lower edge.

Coiled upon the shaft G is a spiral spring K having one end secured to a collar  $K^1$  bolted or otherwise fastened to the shaft.  $K^2$  is a collar loosely mounted upon the shaft G—that the shaft may turn therein—to which

the spring K is also secured. Projecting from the loose collar  $K^2$  is an arm  $K^3$  pointed at its end as shown in Figure 2. Coiled upon the shaft G is a relatively light spring L; one end of which is bent to engage the arm  $K^3$ —the other end being secured to the frame of the building or other stationary support—the tension of the spring L being exerted in the opposite direction to that of the spring K, it only becomes effective upon the breakage of the latter whereupon the pointed arm  $K^3$  is turned, as indicated in dotted lines in Figure 2, that it may engage the door and thus arrest its downward movement.

M, M, are inclined spring latches, secured to brackets attached to the lower panel of the door, adapted to engage a suitable latch plate  $M'$   $M'$ , bolted to the outside of the channel members—see Figures 1 and 8.

N, N, are flexible connections between the spring brackets and a rotatable plate  $N^1$  pivoted at  $N^2$  to the door panel. The plate  $N^1$  has a notch  $N^3$  to receive the spring actuated bolt of the lock  $N^4$ , actuated by a key or other like device. Projecting from the rotatable disc are handles  $N^5$  for rotating the disc whereby the spring latches N, N, are disengaged from their latch plates following the withdrawal of the spring actuated bolt of the lock  $N^4$  from the notch  $N^3$  in the disc.

$N^a$  denotes a handle for manually raising and lowering the door. P, indicates an electric motor—see Figure 4—with a pinion Q on its armature shaft in mesh with a gear R, secured upon the end of the shaft G, by the operation of which the door may be raised or lowered as required from a distant point and without manual effort.

In Figure 3 has been shown a modification of the latch engaging member  $M^a$  bolted between the flanges of the channel, in this case the guide roller C which also travels in the channel members are above the latch plate.

In Figure 7 is diagrammatically shown a single panel door, provided with pulleys C respectively located at the top and bottom of the door only, to guide the door upon traversing the inclined channel members.

Having now indicated the several parts of my invention by reference letters the construction and operation of the same will be readily understood.

Assuming the door to be closed the locking latch may be operated to release the door in the manner previously explained. The door may then be readily raised through the action of the spring K,—the tension of which can be regulated by adjusting the loose collar  $K^2$  along the shaft G, whereby the effective length of the spring is increased or reduced as required;—the tension of the spring being thus regulated to meet the requirements of the door. As the door is raised it will be

forced out of contact with the door-casing by the inclined guide rails or channels D, D, thereby releasing it from the frictional drag that might otherwise occur when raising or  
5 lowering the door.

Upon lowering the door it will be forced to a tight closure upon reaching the floor by the brackets of relatively different length carrying the rollers that traverse the inclined  
10 channels at each side of the door.

As previously indicated the door may be mechanically raised and lowered by an electric or other motor which may be operated from the garage, office, dwelling or other  
15 location as will be readily understood.

Having thus described my invention what I claim is:—

1. In a building structure of the character described, a vertically disposed door,  
20 guide rails inclined upwardly and inwardly from the door opening from the floor to a point above the door opening and having grooves therein extending in the planes of the rails throughout their lengths, rollers  
25 journalled on the door adapted to traverse said grooves in the inclined guide rails whereby the door may be forced by the grooved guide rails out of frictional contact with the door casing when the door is raised,  
30 means whereby to raise the door and a device arranged above the door opening and constructed for automatic operation to impinge against and hold the door from accidental lowering movement in the event of  
35 breakage of the door raising means.

2. In a building structure of the character described, a vertically disposed door, guide rails extending upwardly from the floor adjacent the door opening and inclined inwardly from the door opening to a point  
40 above the opening and having grooves therein extending in the planes of the rails throughout their lengths, brackets of respectively different lengths secured to the door,  
45 rollers mounted in the brackets and adapted to traverse said grooves in the rails, whereby the door may be guided by the inclined guide rails out of frictional contact with the door casing when the door is raised and when the  
50 door is lowered, the same being forced to a tight closure with relation to the door opening, and means whereby to raise the door.

3. In a building structure of the character described, a vertically movable door, inclined  
55 guide rails extending upwardly and rearwardly from the sides of the door opening and being inclined inwardly away from the door opening and having grooves therein extending in the planes of the rails throughout their lengths, rollers journalled on the door and adapted to traverse said guide rails, a horizontally disposed rotatable shaft journalled above the door opening, pulleys on said shaft, flexible elements connected with  
65 the door and wound upon the pulleys on said

shaft for raising and supporting the door, a spring coiled upon the shaft with one end secured to the latter, and means connected with the spring whereby upon lowering the door, the tension of the spring may be increased to assist in raising the door.

4. In a building structure of the character described, a vertically movable door, inclined  
75 guide rails extending upwardly from the floor to a point above the door opening and being inclined inwardly away from the door opening and provided with grooves therein extending in the planes of the rails throughout their lengths, rollers journalled on the door and adapted to traverse said inclined guide rails, operating in the grooves  
80 of the latter, a horizontally disposed rotatable shaft journalled above the door opening, flexible elements connected to the door and to said shaft to be wound above the latter for raising and supporting the door, a spring  
85 coiled upon the shaft with one end secured to the shaft, a collar loosely mounted upon the shaft adapted for adjustable engagement with the spring, and means for holding said collar against rotation when the door is lowered whereby the tension of the spring may be increased to assist in raising the door.

5. In a building structure of the character described, a vertically movable door, inclined  
95 guide rails extending upwardly from the floor to a point above the door opening and being inclined inwardly away from the door opening and having grooves therein in the planes of the rails throughout their lengths, rollers journalled on the door and arranged for operation in the grooves of the rails, a horizontally disposed shaft journalled above the door opening, flexible metallic tapes connected with the door and adapted to be  
100 wound around the shaft for raising and supporting the door, a spring coiled upon the shaft with one end secured to the shaft, means for engaging the spring whereby upon lowering the door, the tension of the spring may be increased to assist in raising the door, means whereby to raise the door and a device arranged above the door opening and constructed for automatic operation to impinge against and hold the door from  
115 accidental lowering movement in the event of breakage of the door raising means.

6. In a device of the character described, a vertically movable door, guide rails extending upwardly and rearwardly from the sides of the door, rollers adapted to traverse said guide rails mounted in brackets of relatively different lengths secured to the door, a horizontally disposed rotatable shaft journalled above the door opening, flexible metallic tapes connected with the door adapted to be wound upon the shaft for raising and supporting the door, a spring coiled upon the shaft with one end secured to the latter, means connected with the spring whereby  
130

upon lowering the door the tension of the spring may be increased to assist in raising the door and means for automatically locking the door when closed.

7. In a device of the character described, a vertically movable door, guide rails extending upwardly and rearwardly from the sides of the door, rollers adapted to traverse said guide rails mounted in brackets of relatively different lengths secured to the door, a horizontally disposed rotatable shaft journaled above the door opening, flexible metallic tapes connected with the door adapted to be wound upon the shaft for raising and supporting the door, a spring coiled upon the shaft with one end secured to the latter, means connected with the spring whereby upon lowering the door the tension of the spring may be increased to assist in raising the door, means for automatically locking the door when closed, and means for releasing said locking means.

8. In a device of the character described, a vertically movable door comprising a plurality of panels hinged together inclined channel members extending upwardly from the floor and thence rearwardly substantially on a plane with the top of the door opening, rollers adapted to traverse said channel members journaled in supporting brackets of relatively different lengths respectively secured to the several panels, a horizontally disposed rotatable shaft journaled above the door opening, flexible metallic tapes connected with the door adapted to be wound upon the shaft for raising and supporting the door, a spring coiled upon the shaft to assist in raising and supporting the door, a collar secured to the shaft to which one end of the spring is attached, a second collar loosely secured to the spring adapted for longitudinal adjustment upon the shaft, whereby the tension of the spring may be raised or lowered and means for arresting the descent of the door resulting from a fracture of said spring.

9. In a device of the character described, a vertically movable door, inclined guide rails extending upwardly from the floor and thence rearwardly from the door opening, rollers adapted to traverse said inclined guide rails respectively journaled in supporting brackets of relatively different length secured to the door, a horizontally disposed rotatable shaft journaled above the door opening, flexible elements connected with the door adapted to be wound upon the shaft for raising and supporting the door, a spring coiled upon the shaft with one end secured to the shaft, a collar loosely mounted upon the shaft adapted for longitudinal adjustable engagement with the spring, a pointed rod projecting from said collar, adapted to bear upon the framework whereby the tension of the spring may be increased when the door is lowered to assist in raising the door, and a

relatively light auxiliary spring adapted to engage the projecting rod, the tension of said spring being in the opposite direction to the tension of the first named spring, whereby upon the breakage of the first named spring said last named spring will operate to throw said pointed rod into the path of the door to arrest its downward movement.

10. In a building structure of the character described, a vertically movable door comprising a plurality of panels hinged together, inclined guide rails adjacent the sides of the door openings and extending upwardly and inwardly in inclined planes from the floor to a point above the door opening, having grooves therein extending in the planes of the rails throughout their lengths, brackets of relatively different lengths respectively secured to the several panels, rollers journaled in the brackets to traverse the grooves in the rails, a spring controlled horizontally disposed rotatable shaft journaled above the door opening, flexible elements connected with the door and adapted to be wound upon the shaft for raising and supporting the door, and means operatively connected with said shaft for automatic coaction with the door for arresting the descent of the door in the event of a fracture of the spring which controls said shaft.

11. In a device of the character described, a vertically disposed door, comprising a plurality of panels hinged together, inclined channel members on each side of the door opening extending from the floor upwardly and inwardly to the top of the door opening and thence rearwardly in a substantially horizontal direction, rollers adapted to traverse said channel members journaled in brackets of relatively different length secured to the several panels of the door, a horizontally disposed shaft journaled above the door opening, metallic tapes connected with the door adapted to be wound upon the shaft for raising and supporting the door, a spring coiled upon the shaft having one end secured to the latter, means for engaging the spring whereby upon lowering the door the tension of the spring will be increased to assist in raising the door, and means for arresting the descent of the door in the event of the spring breaking under its load.

12. In a building structure of the character described, a vertically movable door comprising a plurality of panels hinged together, inclined guide rails adjacent the sides of the door openings and extending upwardly and inwardly in inclined planes from the floor to a point above the door opening, having grooves therein extending in the planes of the rails throughout their lengths, brackets of relatively different lengths respectively secured to the several panels, rollers journaled in the brackets to traverse the grooves in the rails, a spring controlled horizontally

disposed rotatable shaft journalled above the door opening, flexible elements connected with the door and adapted to be wound upon the shaft for raising and supporting the door, and means operatively connected with said shaft for automatic coaction with the door for arresting the descent of the door in the event of a fracture of the spring which controls said shaft, said arresting means including a spring controlled pointed element adapted to be thrown quickly into a holding engagement with one of the panels of the door.

13. In a building structure of the character described, a vertically disposed door composed of a plurality of panels hingedly connected together, inclined guide rails extending from the floor adjacent the lower end of the door opening upwardly and thence rearwardly in a substantially horizontal direction from the door opening, the guide rails having grooves therein extending throughout the length thereof and in the same planes therewith, brackets of relatively different lengths secured to the respective panels of the door, rollers journalled in the brackets adapted to traverse the grooves in the rails whereby upon lowering the door, the several panels will be forced to a tight closure with the door opening, and whereby upon raising the door, the panels will be moved away from and released from frictional drag upon the case of the door opening.

14. In a building structure of the character described, a vertically disposed door composed of a plurality of panels hingedly connected together, guide rails for the door, means for raising the door and a spring controlled device arranged above the door opening and constructed for automatic operation to impinge against and hold the door from accidental lowering movement in the event of breakage of the door raising means.

15. In a building structure of the character described, a vertically disposed door composed of a plurality of panels hingedly

connected together, guide rails for the door, means for raising the door and a spring controlled device arranged above the door opening and constructed for automatic operation to impinge against and hold the door from accidental lowering movement in the event of breakage of the door raising means, said arresting device including a spring controlled element having a pointed end adapted to bite into the panels to check downward movement of the door.

16. In a garage doorway, jamb structure, a door structure having substantially wide hingedly-connected panels of a length to overlie the jamb structure when the door is in its lowered or entrance-closing position, guide-rail structure for the door structure with the rails extending into an overhead position within the garage to support the door structure when the latter extends in a generally horizontal direction in its raised or entrance-open position, said rail structure including a length extending in a general vertical direction inclined to the plane of the inner face of the jamb structure within the distance representing the height of the door opening, said door-structure carrying means, including rollers co-operating with the rail structure, for maintaining the door structure in a substantially straight flight within the space between the respective planes of the jamb structure face and the rail structures when the door is in entrance-closing position, the jamb structure and door-carried means co-operating with the door in maintaining the entrance closed while the door is in such closing position.

17. A garage doorway as in claim 16 characterized in that the door-carried means includes brackets varying in projecting length to support the rollers, the length of the brackets of a panel being determined by the position of the panel relative to the adjacent portion of the inclined rail when the panels are in door-closing position.

In testimony whereof, I sign this specification.

OWEN L. DAUTRICK.