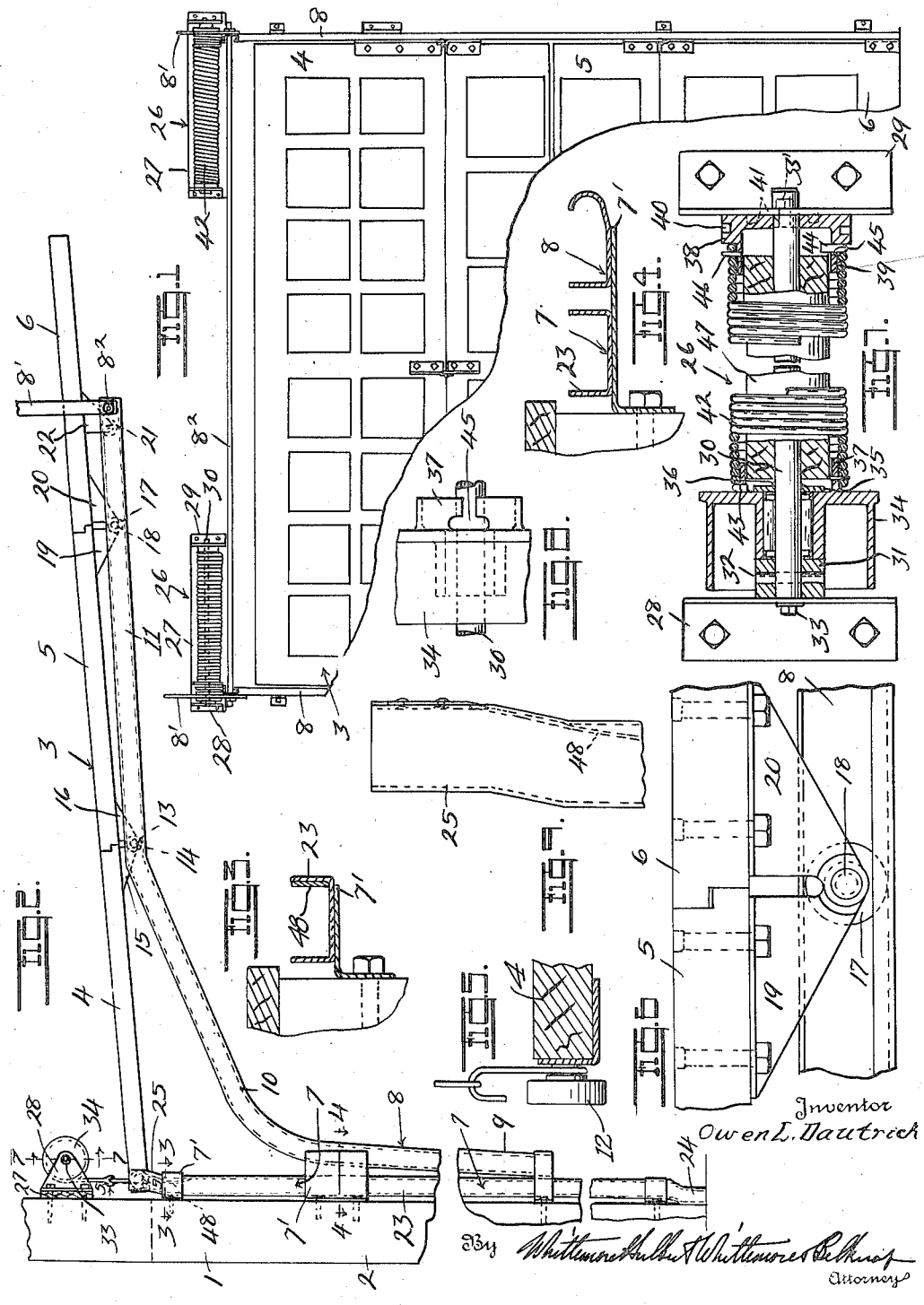
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DOOR CONSTRUCTION

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DOOR CONSTRUCTION

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1 Claim. (Cl. 20—20)

The invention relates to door constructions and is particularly applicable to door constructions for use in garages and the like. One of the objects of the invention is to provide an improved door construction, whereby the door may be easily raised and lowered. Another object is to so form the door construction that friction between the door and frame during the initial portion of the raising movement of the door may be quickly relieved. Further objects of the invention are to so form the door construction that the door is supported in its raised position in a manner such that the initial lowering movement thereof may be accomplished with very little effort and continued lowering movement thereof is assisted by gravity, which exerts an increasing effort upon the door; to provide improved mechanical means for assisting in raising the door; and to provide means for retarding the opening movement of the door near the end of its travel.

These and other objects of the invention will become apparent from the following description, taken in connection with the accompanying drawing, in which

Figure 1 is an inside elevation of a door construction, showing an embodiment of my invention;

Figure 2 is an end view showing the door in raised or open position;

Figures 3, 4, 5, and 7 are enlarged cross sections on the lines 3—3, 4—4, 5—5 and 7—7, respectively, of Figure 2;

Figure 6 is an enlarged view of a portion of Figure 2;

Figure 8 is a plan view of a portion of Figure 7;

Figure 9 is an enlarged sectional view of a portion of Figure 2.

The door construction shown in the present instance is designed particularly for use in a garage having the door opening 1 at the sides of which are the door jambs 2 of the door frame. 3 is the door which is formed of horizontal panels pivotally connected to each other, there being in the present instance the lower panel 4, the intermediate panel 5 and the upper panel 6. The adjacent edges of the panels are rabbeted to overlap.

7 is a pair of upwardly extending tracks each of which is located laterally beyond a side of the door opening 1 and in rear of the door jamb 2. 8 is a pair of other tracks each of which is located in the rear of a track 7 and has the lower portion 9, the intermediate portion 10 and the upper portion 11. 12 is a pair of shoes in the nature of rolls located at the lower end of the door, there being one shoe at each side edge of the lower panel 4 and near its lower end. These shoes are engageable with and guided by the tracks 7 which are channel shaped. 13 is a pair of shoes in the nature of rolls, there being a shoe at each side edge of the door. Each shoe is journaled upon the pivot pin 14 which pivotally connects the hinge sections 15 and 16. The hinge section 15 is secured to the rear face of the lower door panel 4, while the hinge section 16 is secured to the rear face of the intermediate door panel 5, the pivot pin 14 being in line with the adjacent portion of the joint between these door panels. 17 is another pair of shoes in the nature of rolls, there being a shoe at each side edge of the door. Each shoe is journaled upon the pivot pin 18 which pivotally connects the hinge sections 19 and 20. The hinge section 19 is secured to the rear face of the intermediate door panel 5 and the hinge section 20 is secured to the rear face of the upper door panel 6 and the pivot pin is in line with the adjacent portion of the joint between these door panels. 21 is still another pair of shoes in the nature of rolls with a shoe at each side edge of the door. Each shoe is journalled in the bracket 22 which is secured to the rear face of the upper door panel intermediate its ends. The bracket 22 is preferably integral with the adjacent hinge section 20 so that the shoe carried by the bracket is accurately located with respect to the lower edge of the upper door panel. The shoes 13, 17 and 21 engage and are guided by the tracks 8. The rolls forming these shoes preferably have rounded peripheries and, while the tracks 8 are generally channel shaped, one of their flanges is rounded to engage the peripheries of the rolls.

For the purpose of securing close engagement of the door with the door frame and also for the purpose of providing quick relief of the friction between the door and the door frame when the door is being initially raised, the tracks 7 and 8 are constructed as follows: The tracks 7 has the main portion 23 which extends vertically and is spaced in rear of its door jamb 2 and also has the lower end portion 24 which is forwardly offset with relation to the main portion 23, the arrangement being such that when the shoes 12 engage the main portions 23 the door is spaced rearwardly from the door frame and when the shoes 12 engage the lower end portions 24 the lower end of the door is forced into firm engagement with the door frame. The lower portion 9 of each track 8 is upwardly and rearwardly in-

clined from its lower end, which latter is preferably located in the vicinity of the joint between the lower and intermediate door sections 4 and 5 respectively, the arrangement being such that when the shoes 13 engage the lower end portions, the upper end of the lower door panel 4 and the lower end of the intermediate door panel 5 are held firmly against the door frame. The intermediate portion 10 of each track 8 is curved upwardly and rearwardly, while the upper portion 11 of each track 8 extends rearwardly. The length of each lower portion 9 of each track is such that when the door is in closed position the shoes 17 and 21 engage this lower portion and the shoe 21 is preferably located substantially at the junction between the lower portion 9 and the intermediate portion 10. The pivots of these shoes are spaced in rear of the door a distance such that when the shoes engage the lower portions of the tracks 8 the upper end of the intermediate door panel 5 and also both the upper and lower ends of the upper door panel 6 are in contact with the door frame when the door is in closed position. However, it will be seen that upon initial opening or raising movement of the door from its closed position its panels will be moved rearwardly away from the door frame and the friction between these panels and the door frame will be quickly relieved.

The tracks 7 and 8 are suitably supported by the brackets 7', which are secured to suitable parts of the building, such as the door jambs, and the hangers 8', which are secured to the overhead framework of the building. 8^2 is a rod extending between the free ends of the upper portions 11 of the tracks 8 and serving to space these track portions.

To provide for moving the door to a substantially horizontal position when raised and more particularly to provide the necessary clearance between the lower end of the lower door panel 4 and the door frame at the upper end of the door opening during the final opening movement of the door, each track 7 has the rearwardly offset upper end portion 25 which is engageable by a shoe 12.

To assist in raising the door, I have provided the pair of devices 26 which are mounted above the door opening and preferably near its ends. Each device comprises the base 27 which is preferably formed of wood and which may be readily secured in place by screws or nails. The base 27 carries the end brackets 28 and 29 through which extends the shaft 30. 31 is a spacing collar upon the shaft 30 and fixedly secured thereto by suitable means, such as the pin 32. This collar is held from rotation by means of the cap screw 33 which extends through the bracket and into the collar. Journaled upon the shaft 30 adjacent to the collar 31 is the drum 34. This drum is held from movement inwardly of the shaft by suitable means, such as the washer 35, which abuts the fins 36 struck out from the shaft. The drum has the cylindrical flange 37 which extends inwardly or toward the bracket 29. Mounted upon the opposite end of the shaft 30 adjacent the bracket 29 is the anchor 38 which has the cylindrical flange 39 extending inwardly or toward the drum 34. This anchor is provided in its periphery with suitable wrench engaging means, such as the recesses 40, and is also provided in its radial wall with the angularly spaced annular series of tapped holes 41 any of which are engageable by the cap screw 33' extending through the bracket 29 to thereby hold the anchor from rotation. 42 is a coil spring encircling the cylindrical flanges 37 and 39 and having the inturned ends 43 and 44 for engaging the T-shaped slots 45 in the cylindrical flanges. To hold the end convolutions of this coil spring from becoming disengaged from either of the cylindrical flanges at any time and especially when the coil spring is being wound up, I have provided the transverse pins 46 which are engageable with the cylindrical flanges and pass between adjacent convolutions at the ends of the coil spring. To limit the buckling of the coil spring, I have provided the cylindrical member 47 which is preferably formed of wood and which is sleeved upon the shaft 30 and extends into the cylindrical flanges 37 and 39 and through the convolutions of the coil spring between these cylindrical flanges. The strengths of the coil springs of the devices are such that they substantially counterbalance the weight of the door when in closed position and the efforts exerted by these coil springs may be varied by first removing the cap screws 33 and then turning the anchors 38 until the proper tensions are arrived at, after which the set screws are replaced.

For the purpose of facilitating the initial lowering movement of the door, the upper portions 11 of the tracks are inclined upwardly and rearwardly to a slight extent from their points of junction with the intermediate portions 10 and furthermore the points of junction between these portions are located so that the shoes 13 in the raised or open position of the door engage the portions 11 near their junctions with the portions 10. As a result, it will be seen that when the door is in its open or raised position it will be inclined downwardly and forwardly toward the door frame. The inclination of the upper portions 11 is such that the upper face at the free end of the panel 6 is substantially level with the uppermost portions of the drums 34 when the door is in its raised or open position. With this arrangement, it will be seen that gravity assists in initially lowering the door and also that the force of gravity as the door is lowered progressively increases.

The intermediate portions 10 are upwardly and rearwardly curved so that they guide the shoes 17 and 21 in a manner such that the upper end of the upper door panel 6 does not extend at any time above the level of the uppermost portions of the drums 34 during either the raising or lowering of the door. As a result, the ceiling or joist line may be substantially flush with the uppermost portions of the drums.

For the purpose of retarding the raising of the door during its final portion of travel, I have provided the snubber springs 48 which are preferably formed of flat spring metal, there being one secured to each track 7 and more particularly one of its flanges at the upper end of the main portion 23. With this arrangement it will be seen that the rolls 12 coming into contact with these snubber springs causes the upward movement of the door to decelerate. With this arrangement, it will also be seen that these snubber springs may serve to hold the door in its raised or open position. The limit of travel of the door in an upward direction, it is noted, is determined by the shoes 13, 17 and 21 engaging the upper portion 11 of the tracks 8 and by reason of the adjacent edges of the door panels contacting with each other.

It will be seen that with the above arrangement the door may be made with only three panels and

at the same time requires but little head room to permit opening or closing the door.

What I claim as my invention is:

In a door construction, a pair of tracks at the sides and in rear of the door opening extending upwardly from near the lower end and terminating near the upper end of the door opening each track having a forwardly offset lower end and a rearwardly offset upper end, a second pair of tracks with one of each having an upwardly and rearwardly inclined portion in rear of one of said first mentioned tracks with its lower end between the upper and lower ends of the door opening, an upwardly and rearwardly inclined portion and an upwardly and rearwardly curved portion connecting said upwardly extending and upwardly and rearwardly inclined portions, said first mentioned tracks terminating in approximate registration with said upwardly and rearwardly inclined portions, a door movable upwardly and rearwardly, means tending to urge said door upwardly, shoes at the lower end of said door and guided only by said first mentioned tracks, and shoes between the upper and lower ends of said door, all of said last mentioned shoes being guided by said second mentioned tracks.

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