

Oct. 19, 1926.

1,603,379

O. L. DAUTRICK

DOOR

Filed August 24, 1925

3 Sheets-Sheet 1

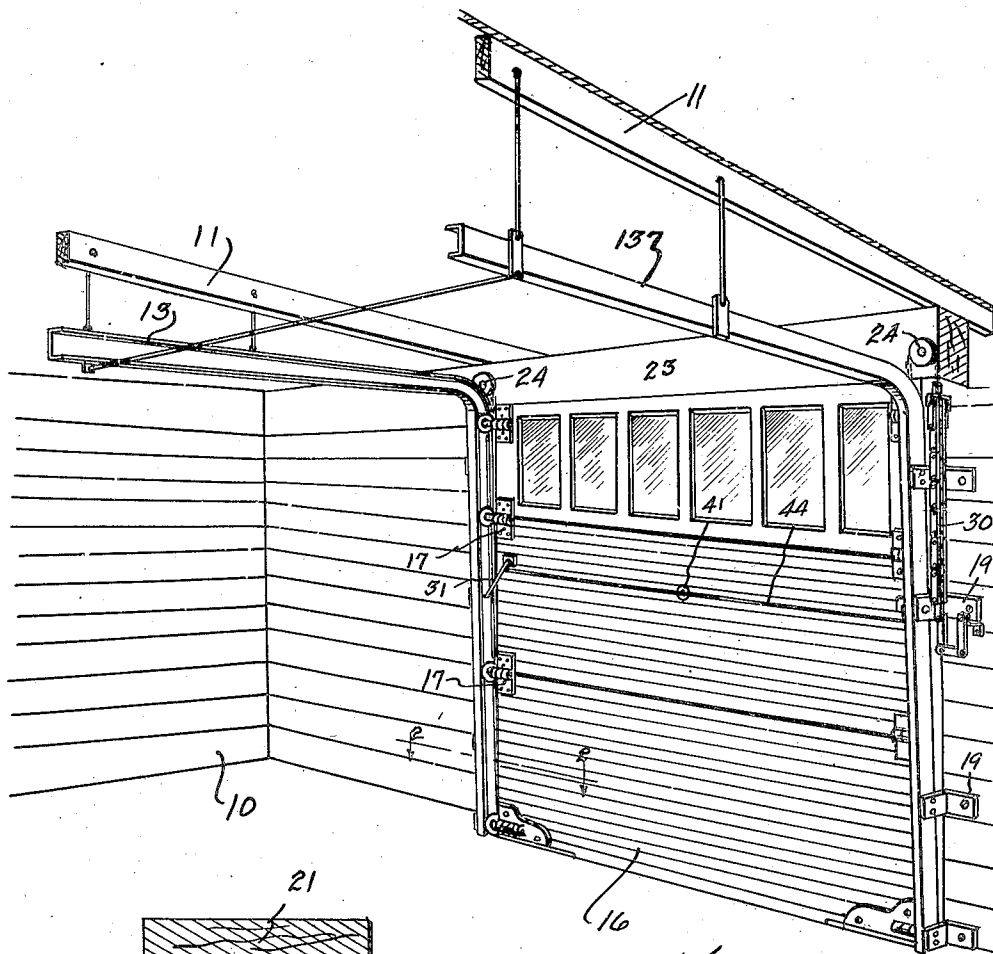


Fig. 1

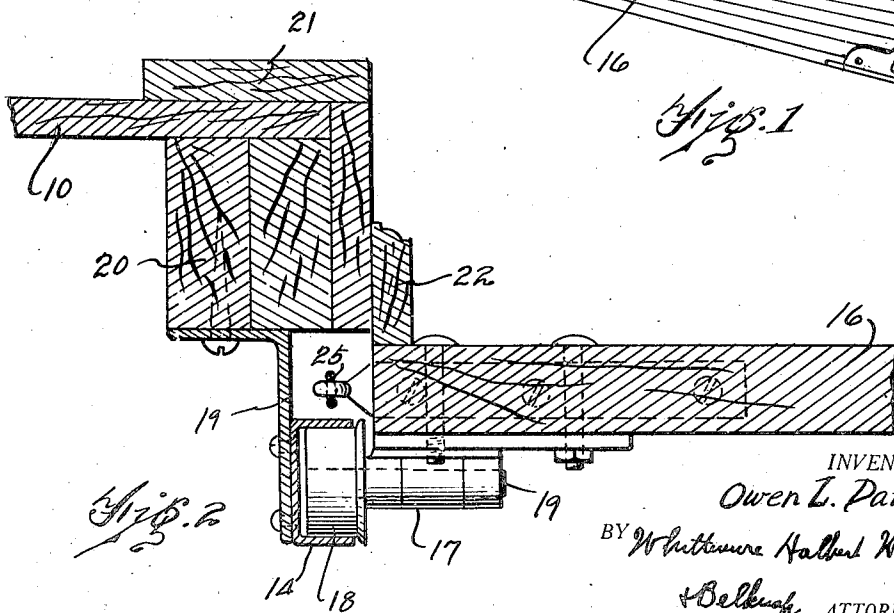


Fig. 2

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3 Sheets-Sheet 2

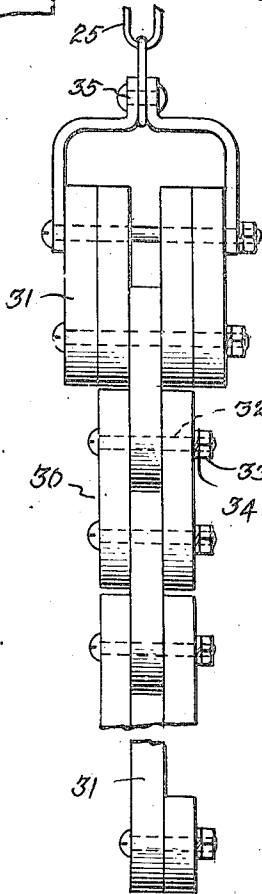
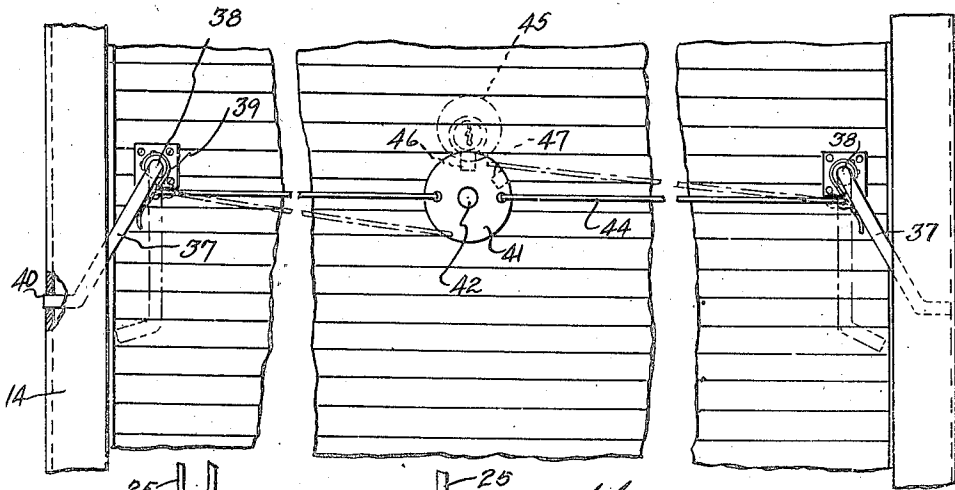


Fig. 4

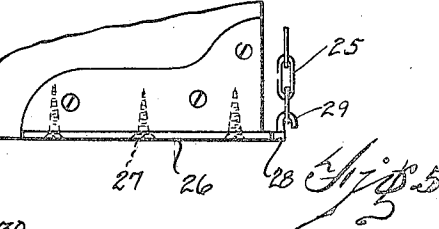
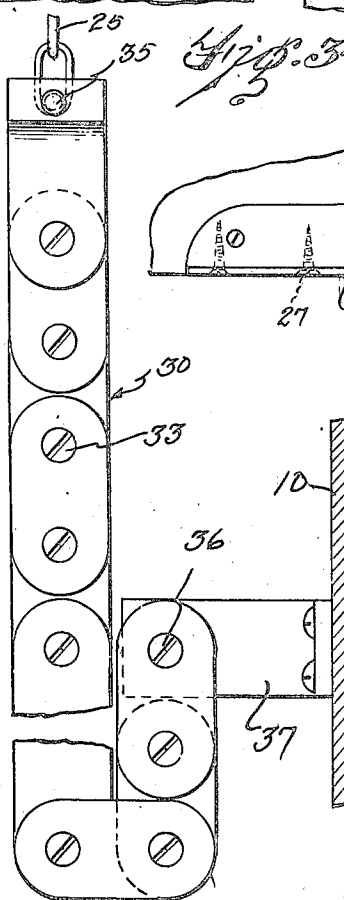
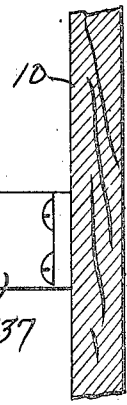


Fig. 5



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3 Sheets-Sheet 3

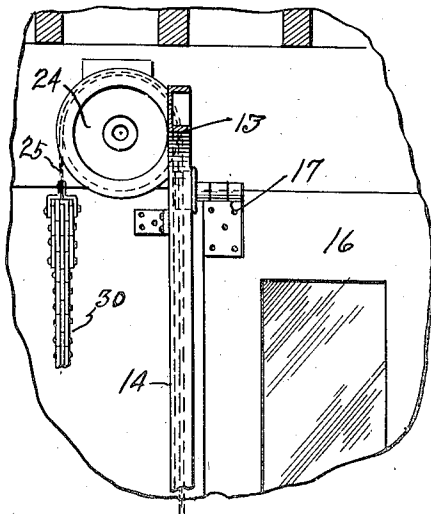
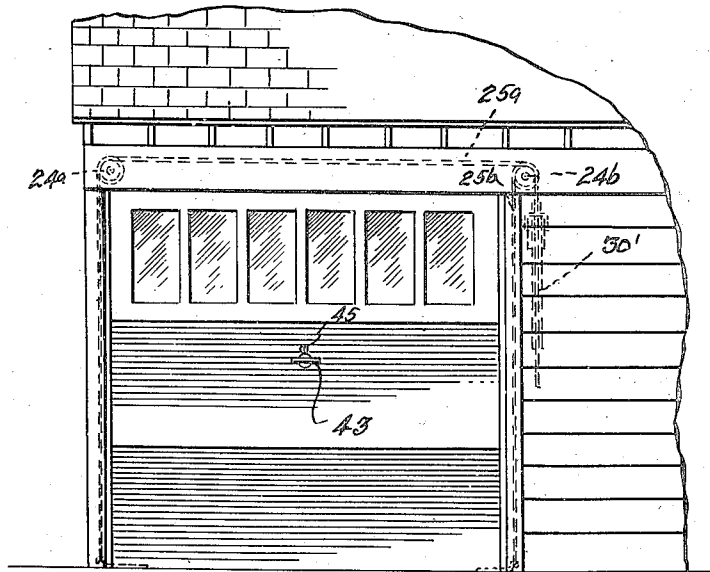
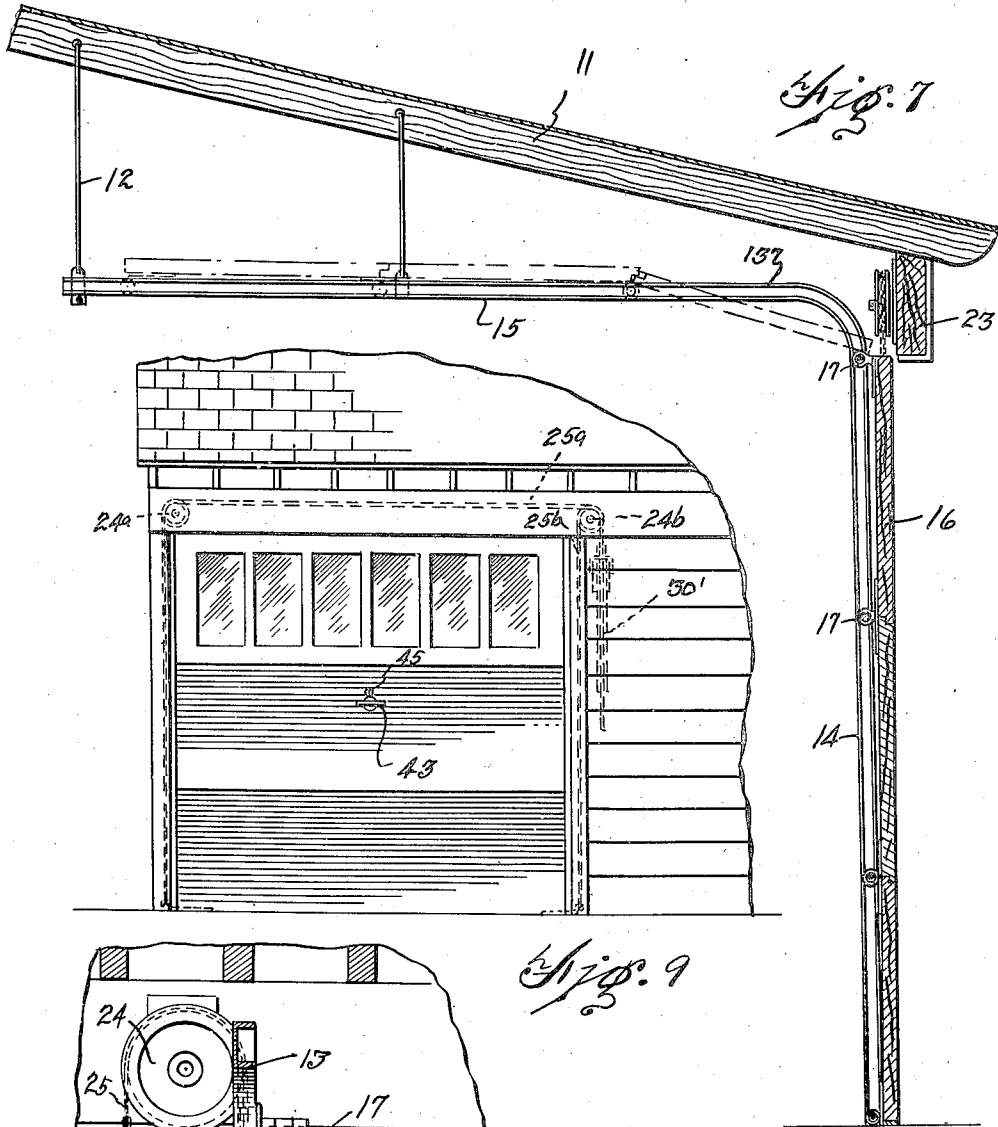


Fig. 9

Fig. 8

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UNITED STATES PATENT OFFICE.

OWEN L. DAUTRICK, OF DETROIT, MICHIGAN.

DOOR.

Application filed August 24, 1925. Serial No. 52,239.

The invention relates to movable doors or panels, and refers more particularly to operating means for the doors of garages, warehouses, factories, etc.

One of the objects of my invention is to provide a movable door or panel with a counterbalancing mechanism adapted to facilitate the operation of the door.

Heretofore it has been customary to provide doors of the above class with one or more operating springs serving to counterbalance the door. I have found that the use of springs is unsatisfactory for this purpose since the constant use of the door causes fatigue and failure of the springs. Furthermore, in the vertically movable type of door I have found that the resistance to moving the door varies non-uniformly due to friction and other factors. For these reasons especially the use of springs is unsatisfactory.

I have provided means tending to move the door by reason of a force readily capable of being proportioned throughout the movement of the door to compensate for resistance to movement of the door at any points along the travel of the door.

With these and other objects in view, the invention resides in the novel features of construction and combinations and arrangements of parts as more fully hereinafter described and claimed.

Referring to the accompanying drawings in which like reference characters indicate corresponding parts,

Figure 1 is a perspective view of my door in its closed position;

Figure 2 is a detail sectional view along 2-2 of Figure 1;

Figure 3 is a fragmentary elevation view showing the door locking mechanism;

Figure 4 is a detail view of the weight member;

Figure 5 is a fragmentary elevation view of the lower corner of the door;

Figure 6 is a detail side elevation view of the weight member illustrating the pivotal support for the same;

Figure 7 is a sectional elevation view of the door in the position shown in Figure 1;

Figure 8 is a detail view in elevation showing one of the weight sheaves; and

Figure 9 is an elevation view illustrating a modified construction.

In the drawings, reference character 10 indicates a building such as a garage, ware-

house, factory or the like, 11 being the roof thereof. Suspended from the roof by suitable rods 12 is an L-shaped track member 13 having the substantially vertically extending portion 14 and the inwardly extending portion 15. 16 indicates the door or panel which may be formed in one or more sections. In the embodiment shown in Figure 1 this door is shown formed of three sections hinged at 17.

For guiding the movement of the door along the track 13 I have provided a plurality of rollers 18 whose supporting axles 19 preferably constitute the pintles for the hinges 17. The portions 14 of the track 13 may be affixed by brackets 19 with the vertical door jamb 20. 21 represents the door casing, and 22 the stop. 23 is a beam extending above and across the door opening, this beam supporting, at points adjacent the upper corners of the door, the sheaves 24. 25 represents a chain which passes around each of the sheaves, one end of this chain extending downwardly to a lower corner of the door as shown in Figure 5. For connecting this chain to operate the door I preferably face the lower edge and corner of the latter with a member 26 secured to the door by suitable screws 27. The member 26 preferably extends beyond the door as at 28 and is formed with a hook portion 29 engageable by the chain 25.

For exerting a force on the door to facilitate the movement thereof I have provided a weight member 30, this member being preferably formed of a plurality of weight units 31 pivotally connected together by pivoted rods 32 for detachably holding the several units in overlapped relation as shown in Figure 4. The pivot rods 32 may be provided with a nut 33 and lock washer 34. The weight member 30 is connected at its upper end 35 with the chain 25 and preferably extends substantially one half the height of the door 16, having its lower end pivoted at 36 to a bracket 37 supported by the garage wall 10. As shown in Figure 1 I preferably provide a pair of the weight members 30, one of these members operating adjacent each side edge of the door.

I have found that in a door of the character described the resistance to movement of the door as the door moves along its track is variable, sometimes being greater than at other times. For example, as the door is moved from the portion 14 of the

track to the portion 15 I have found that there is a tendency for the lower or last section of the door to stick or to resist lifting of the last section to the height of the opening of the door as shown by the dotted lines in Figure 9. This is especially noticeable where the radius of curvature at the bend between the portions 14 and 15 is small, the latter being desirable to meet low head room requirements in a garage. In order to compensate for these points of frictional resistance I have provided the interchangeable weight units 31 so that any number of these units may be located at any point throughout the length of the weight member 30 whereby the door will be completely counterbalanced throughout its entire travel. Thus in the type of door illustrated in Figure 1, I have found it desirable to provide a larger number of the weight units at the top of the weight member. Since the lower end of the weight member is pivotally supported at 36, as increasing portions of the door move from the vertical track portion 14 to the horizontal portion 15, a corresponding length of the weight member is suspended from the bracket 37 and removed from the chain 25. If it is found that the door during its movement tends to stick at any point such resistance to movement can be readily overcome by the addition of one or more weight units to the weight member at the point corresponding with this resistance to movement. The weight member can in this manner be formed to entirely counterbalance the weight of the door corresponding to any given position of the door during its movement along the track.

In order to lock the door in its closed position I have provided the dogs 37 pivotally connected at 38 with the door, these dogs being acted upon by springs 39 to normally force them into engagement with suitable openings 40 formed in the portions 14 of the track. For controlling the movement of the dogs 37 I have provided a cam disk 41 rotatably supported at 42 and operable by means of a handle 43 extending transversely through the door for convenient operation from the outside of the garage. 44 are rods extending between the disk 41 and the dogs respectively, for operating the latter from the former. A suitable lock 45 is preferably provided having a bolt engageable in the recess 46 of the disk 41 whereby the latter disk may be held in locked position against rotation. 47 is a second recess adapted to be engaged by the locking bolt when it is desired to maintain the dogs in their retracted position as indicated by the dotted lines of Figure 3.

In operation with the parts as shown in the drawings the operator is free to rotate the disk 41 by reason of the handle 43.

Rotation of this disk actuates the dogs 37 so as to swing the latter free of engagement with the track portions 14. In this latter position the lock bolt may be engaged in the recess 47 to maintain the retracted position of the dogs 37 against the action of the springs 39. The door 16 is now free to be moved into the open position. For accomplishing this movement the operator exerts a slight upward movement on the door which being counterbalanced by reason of the weight members 30 will readily move from the closed position to the open position indicated by the dotted lines in Figure 7.

During the opening movement of the door the weight members acting on the door through the chain 25 will move downwardly as will be readily apparent. When it is desired to close the door the operator need only exert a slight lifting force on the weight thus causing the downward movement of the door.

I prefer to have the weight members so that they will just counterbalance the weight of the door although if desired a slight additional weight could be added at suitable points along the length of the weight member so that the operation of the door would automatically take place upon releasing of the dogs 37. Furthermore, while I have illustrated a door comprising three sections hinged together it is apparent that if desired the door could be made in one piece, or any number of pieces.

A further feature which facilitates the operation of the door resides in the upright track portions 14 which are inclined slightly upwardly and rearwardly so that when the door is moved from its closed to its open position the latter is held spaced from the track members thereby avoiding frictional engagement with the track members.

Instead of providing a weight operably connected to the respective side portions of the door I may provide a single weight for operating the door as shown in Figure 9. In this figure the single weight member 30' is connected with the chains 25^a and 25^b which respectively operate sheaves 24^a and 24^b, and are then connected as before with the lower corner of the door.

While it is believed that from the foregoing description, the nature and advantages of my invention will be readily understood, I desire to have it understood that I do not limit myself to what is herein shown and described and that such changes may be resorted to when desired as fall within the scope of the claims.

What I claim as my invention is:

1. In combination with a door adapted to move through a predetermined path, counterweighting means for said door comprising a plurality of counterweight units hingedly connecting together, additional counter-

weights being provided in said counterweighting means at points of increased resistance in the travel of the door, said additional counterweights being arranged to become ineffective after aiding in overcoming such increased resistance for the remainder of the travel of the door.

2. In combination with a movable panel, counterweighting means connected to operate the panel, said means including an increased weight at a point of increased resistance in the travel of the panel, said increased weight being arranged to become ineffective after aiding in overcoming such increased resistance during the remainder of travel of the panel.

3. In combination with a vertically and horizontally movable door, counterweighting means for said door, and additional counterweights being provided in said counterweighting means at points of increased resistance in the travel of the door, said additional counterweights being arranged to become ineffective after aiding in overcoming such increased resistance for the remainder of the travel of the door.

4. In combination with a door adapted to move through a predetermined path, a guide for the door, counterweighting means acting on said door, comprising a plurality of vertically extending counterweight units hingedly connected together, means supporting said counterweighting means at one end

with respect to said guide and additional counterweights in said counterweighting means for overcoming sticking of the door, said additional counterweights being arranged so as to be the lowermost links of said counterweight at such points of sticking of the door whereby as soon as the point of sticking is passed said additional counterweights become supported by said supporting means and ineffective for the remainder of the travel of the door.

5. In combination with a movable panel, counterweighting means for said panel comprising a flexible chain-like member composed of a plurality of counterweight links hingedly connected together, a bracket, one end of said member being connected to move the panel and the other end being connected to the said bracket, and one or more additional counterweights in said chain-like member for overcoming sticking of the panel, said additional counterweights being arranged so as to be the lowermost links of said chain at such points of sticking of the panel whereby as soon as the said points of sticking are passed said additional counterweights become supported by said bracket and hence ineffective as counterweighting means for the remainder of the travel of the panel.

In testimony whereof I affix my signature.

OWEN L. DAUTRICK.