March 13, 1951 W. G. DEURING 2,544,952

OVERHEAD GARAGE DOOR AND OPERATING MEANS

Filed March 29, 1949

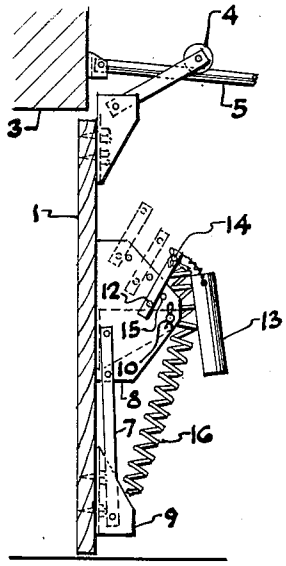



FIG. 1

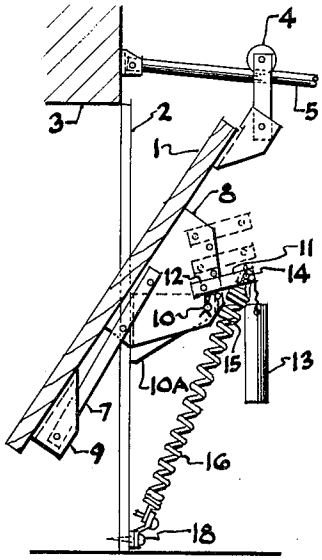



FIG. 2

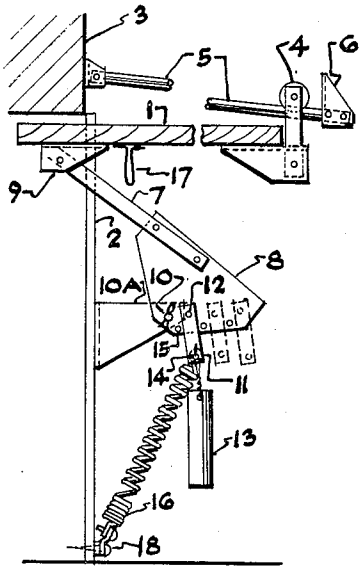



FIG. 3

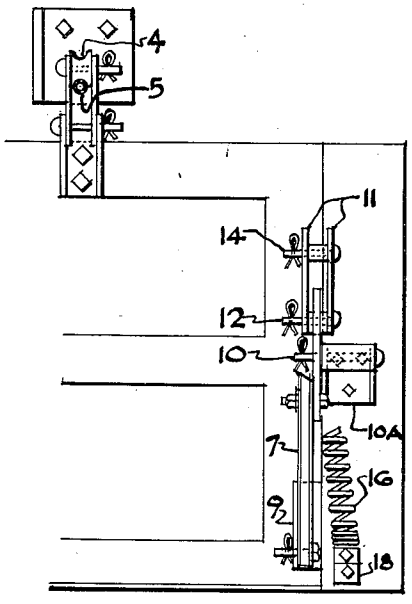



FIG. 4

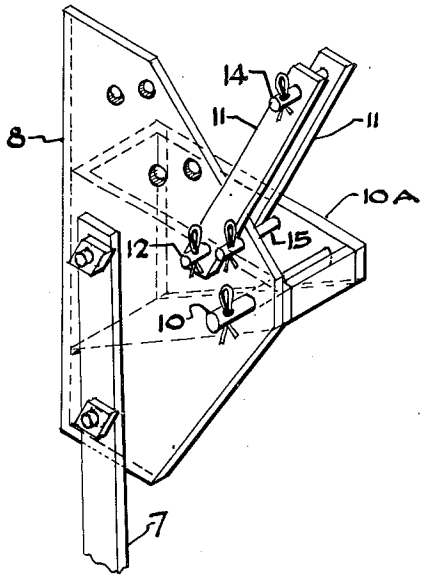



FIG. 5

INVENTOR.

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# UNITED STATES PATENT OFFICE

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## OVERHEAD GARAGE DOOR AND OPERATING MEANS

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Application March 29, 1949, Serial No. 84,059

1 Claim. (Cl. 20—19)

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This invention relates to one piece doors that have an elevated horizontal position when open and a vertical position when closed.

This application is a substitute for and continuation-in-part of abandoned application Serial No. 494,098, filed July 9, 1943, for the same invention.

The principal object of this invention is, to provide a counterbalance assembly, secured to lever arms, whereby the gravital moment of the door has a slight prevalence over the moment of the counterpoise during a minor portion of the door travel as when the door is moved by a cantilever action from a vertical position to an inclined position and the moment of the counterpoise having a slight prevalence over the gravital moment of the door during a major portion of the door travel as when the door is moved from an inclined position to a near horizontal position and the moments of the door and counterpoise being equal when the door is fully open.

Another object of this invention is in having the link member of the counterbalance assembly serve as a pivotal connection between the plate and the counterpoise during the initial downward movement of the door from an elevated horizontal position and thereafter the said link becoming a supplement to the plate, thereby increasing the mechanical advantage of the lever. These and other features of the invention will become apparent from a study of the following descriptions and claim, together with accompanying drawings, in which like parts are designated by like reference characters and wherein:

Fig. 1 is a sectional view showing the door in a closed position.

Fig. 2 is a sectional view showing the door about one fourth open and having an inclined position.

Fig. 3 is a broken sectional view showing the door fully open.

Fig. 4 is a fragmentary interior elevation of the right vertical side of the door.

Fig. 5 is a perspective view of the counterbalance assembly attached to the plate member of the lever which is mounted on the side bracket.

As shown in the drawings reference numeral 1 designates a door fitting a door frame or opening in a building, the numeral 2 designates the vertical side-jambs of the door frame and the numeral 3 the head or lintel. As illustrated, the door is rigid, the upper end of the door being slideably supported by the trolley 4, engaging the rail 5, the rail 5 extending from the lintel 3, to a part of the building frame 6, Fig. 3. The lower end of the door is raised and supported by

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a lever which is pivoted to each side of the door frame, the said lever comprising the door supporting arm 7, in conjunction with the plate 8, one end of the door supporting arm 7, being pivotally connected to the lower sides of the door by the bracket 9, and the other end being rigidly secured to the plate 8, the plate 8 being pivotally supported by the pin 10, which is journaled in the bracket 10A, the bracket 10A being fastened about midway on both interior sides of the side-jambs 2. The plate 8, having counterpoise adjusting holes to receive the pin 12, and additional spaced holes to receive the stop-pin 15. A link 11, including two similarly shaped members having spaced end portions, is pivoted at one end to the plate at 12, and the other end being connected to the upper end of the counterpoise spring 16, at 14, the lower end of the spring being fastened to the lower end of the side-jambs 2, at 18. The counterpoise spring may be supplemented by a counterweight 13. A pull strap 17, Fig. 3, is fastened to the lower interior surface of the door to facilitate a closing of the door from an elevated horizontal position.

The initial adjustment of the counterpoise for the initial downward movement of the door is accomplished when the door is in an elevated horizontal position by connecting the link 11, to the plate 8, by the pin 12, the counterpoise moment being governed by fixing the mechanical advantage of counterpoise arm of the lever by means of the adjusting holes in the plate, the length of the counterpoise arm of the lever being the distance between the pin 10, and the pin 12. In the downward travel and immediately after the initial downward movement of the door, the load on the door supporting arm is suddenly increased, to counteract this additional load the mechanical advantage of the counterpoise arm of the lever is also increased by preventing the pivotal movement of the link with respect to the plate, the link 11, being engaged by the stop-pin 15, the link then becoming a supplement to the plate, the length of the counterpoise arm of the lever then being the distance between the pin 10, and the pin 14, the counterpoise moment then having a slight prevalence over the gravital moment of the door until the door assumes an inclined position as shown in Fig. 2, the plate member of the lever then being in contact with the inside surface of the door and the lever then being the sole support of the door, and the gravital moment of the door and the moment of the counterpoise being equal. To close the door from the inclined position, the lower end of the door

is forced in, the door then having a cantilever action by the pivoting of the lever on the pin 10, the gravital moment of the door then having a slight prevalence over the counterpoise moment during the minor portion of the door travel and when the door assumes a closed position.

One feature of this invention is in providing an increase in the counterbalancing moment of the counterpoise by increasing the mechanical advantage of the lever during the downward travel of the door.

Another feature of this invention is in having the gravital moment of the door prevail over the counterpoise moment during the minor portion of the door travel and then having the counterpoise moment prevail over the gravital moment of the door during the major portion of the door travel.

Another feature of this invention is in having the plate member of the lever support the upper half of the door and enable the door to have a cantilever action during the minor portion of the door travel.

Having described the invention and in what manner the same may be used, what I claim as new and desire to protect by Letters Patent is:

In an overhead door adapted to assume a vertical position when closed and an elevated horizontal position when open, guide means for carrying the upper end of the door in a horizontal path during a major portion of the door travel, a lever pivoted to each vertical side of the door frame,



said lever comprising a door supporting arm pivotally connected at one end to the lower sides of the door, and a plate rigidly secured to the other end of said arm, a link pivotally connected at one end to said plate and at the other end to a counterpoise, counterpoise adjustment holes in the plate to receive the counterpoise adjustment pin connecting the link to the plate, for each counterpoise adjustment hole a correlated stop-pin hole in the plate to receive a stop-pin, the correlated holes being spaced apart so that in the travel of the door from an open position to a closed position, the link being free of the stop-pin during the initial downward movement of the door and the link being engaged by the stop-pin during the major portion of the door travel, the engagement of the link by the stop-pin causing the link to become a supplement to the plate and thereby increase the length of the counterpoise arm of the lever.

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