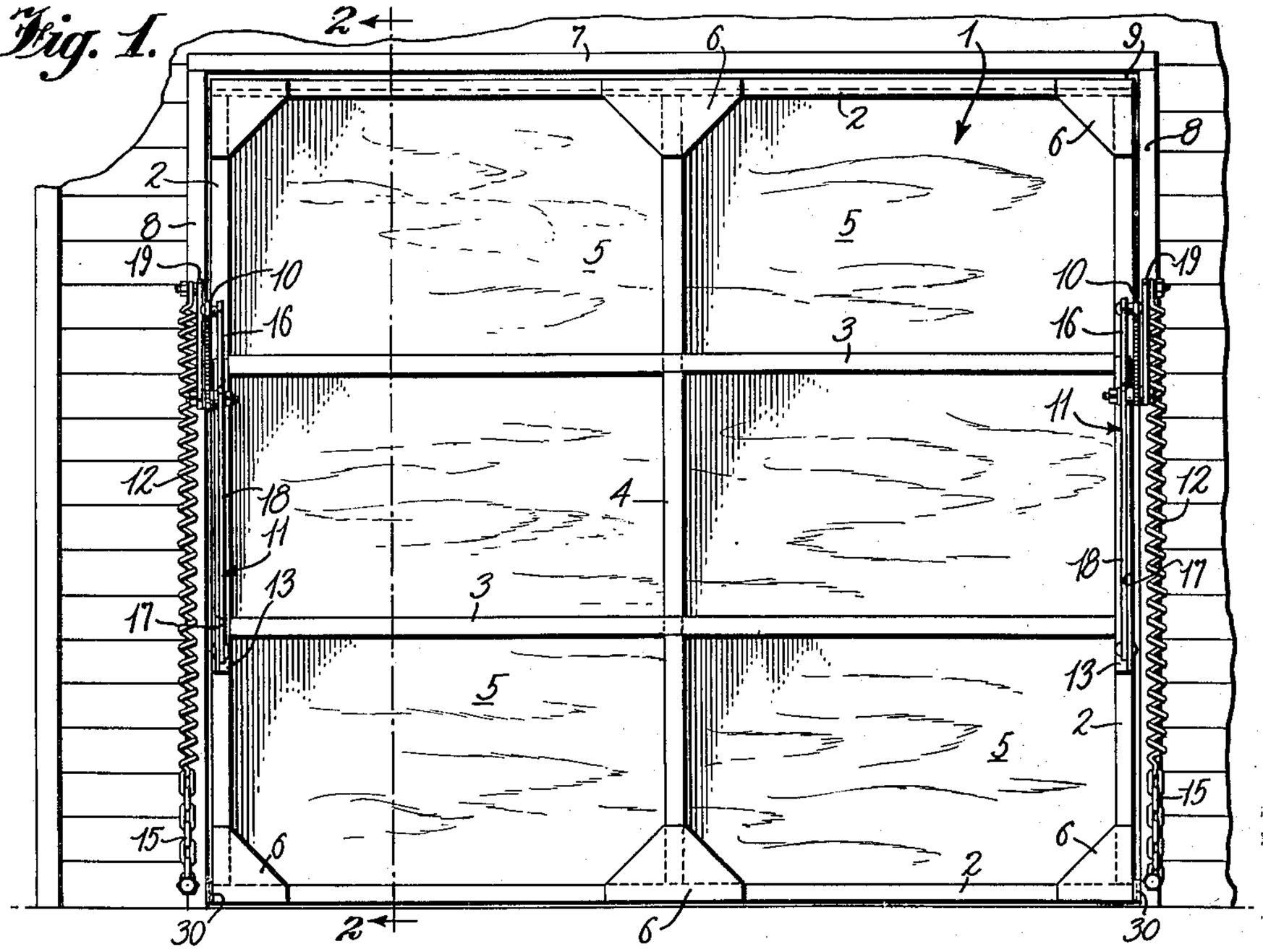
Feb. 17, 1953 R. B. ROGERS 2,628,385

MOUNTING FOR TILT-UP TYPE GARAGE DOORS

Filed Oct. 18, 1949 2 SHEETS—SHEET 1

Fig. 1.



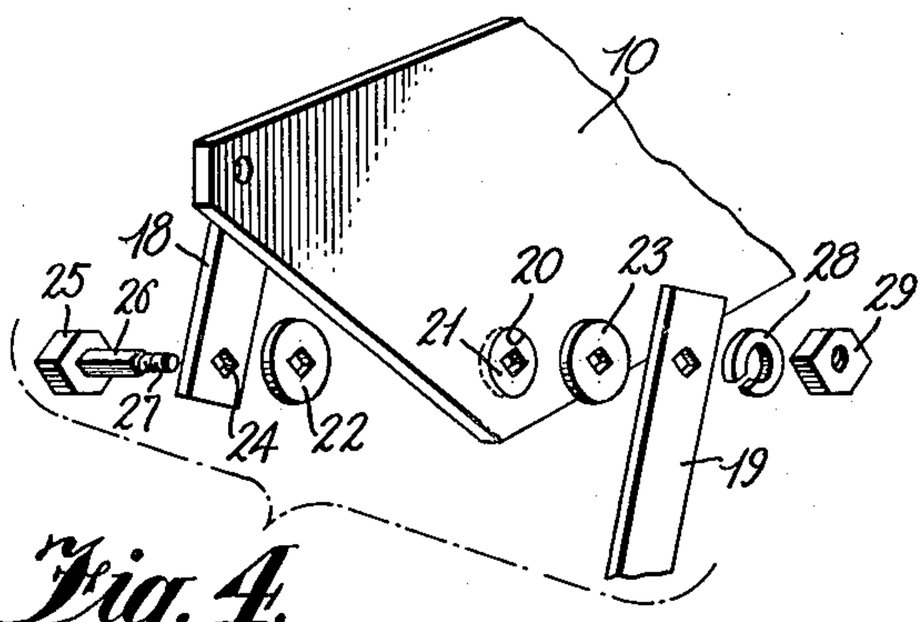


Fig. 4.

Fig. 5.

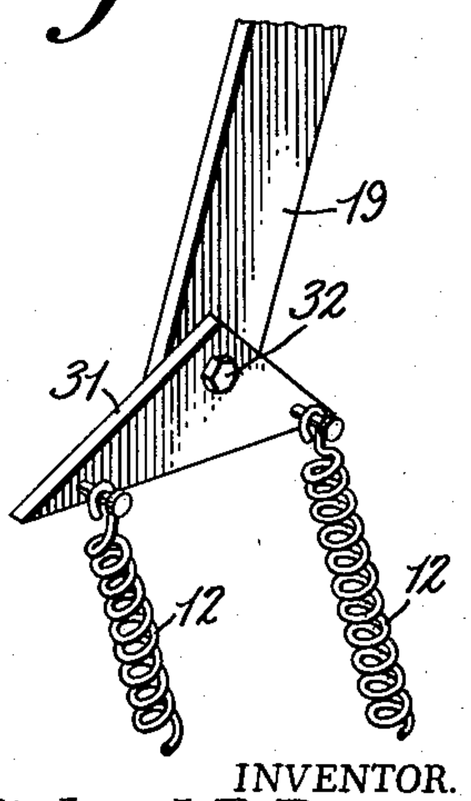


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Fig. 2.

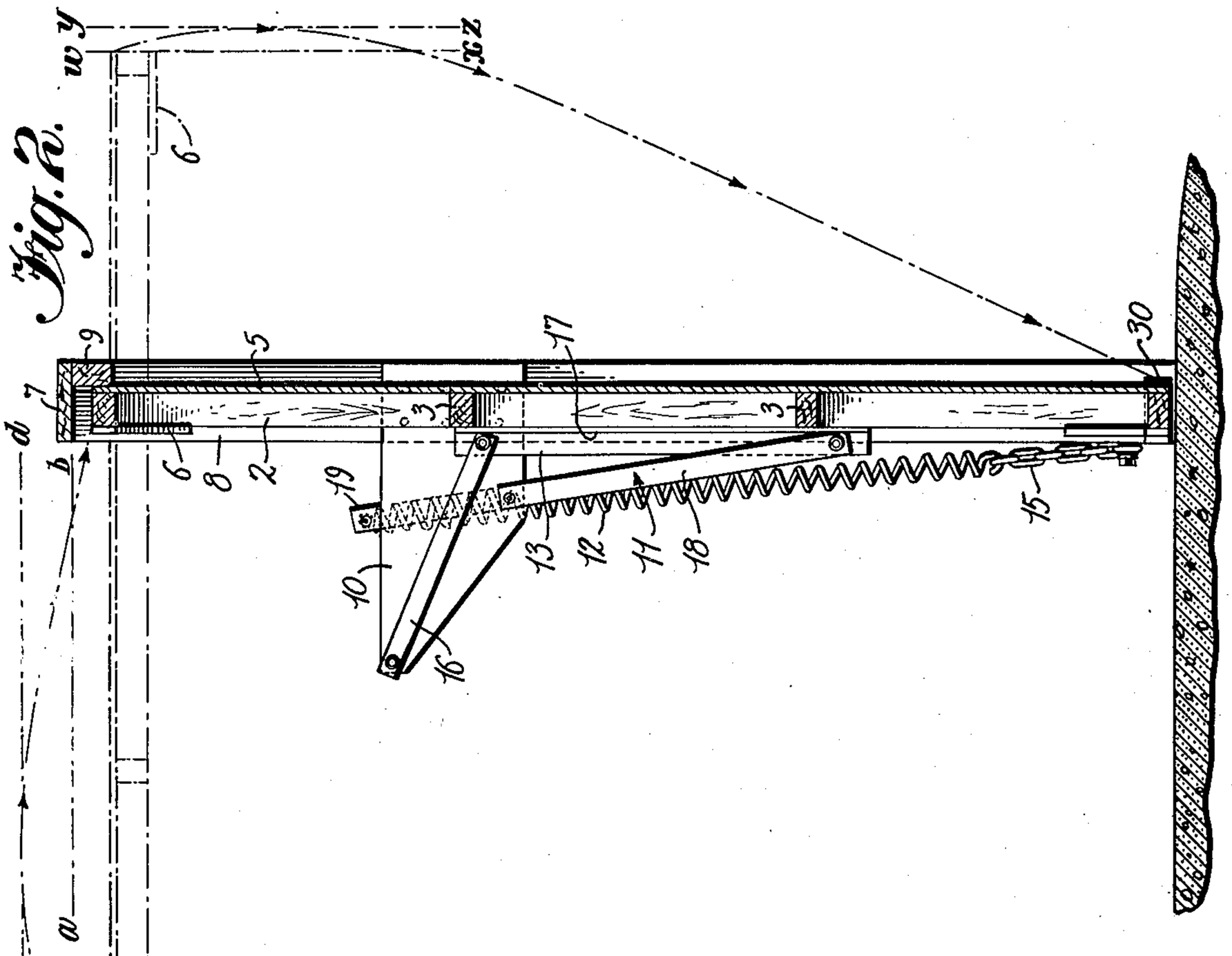
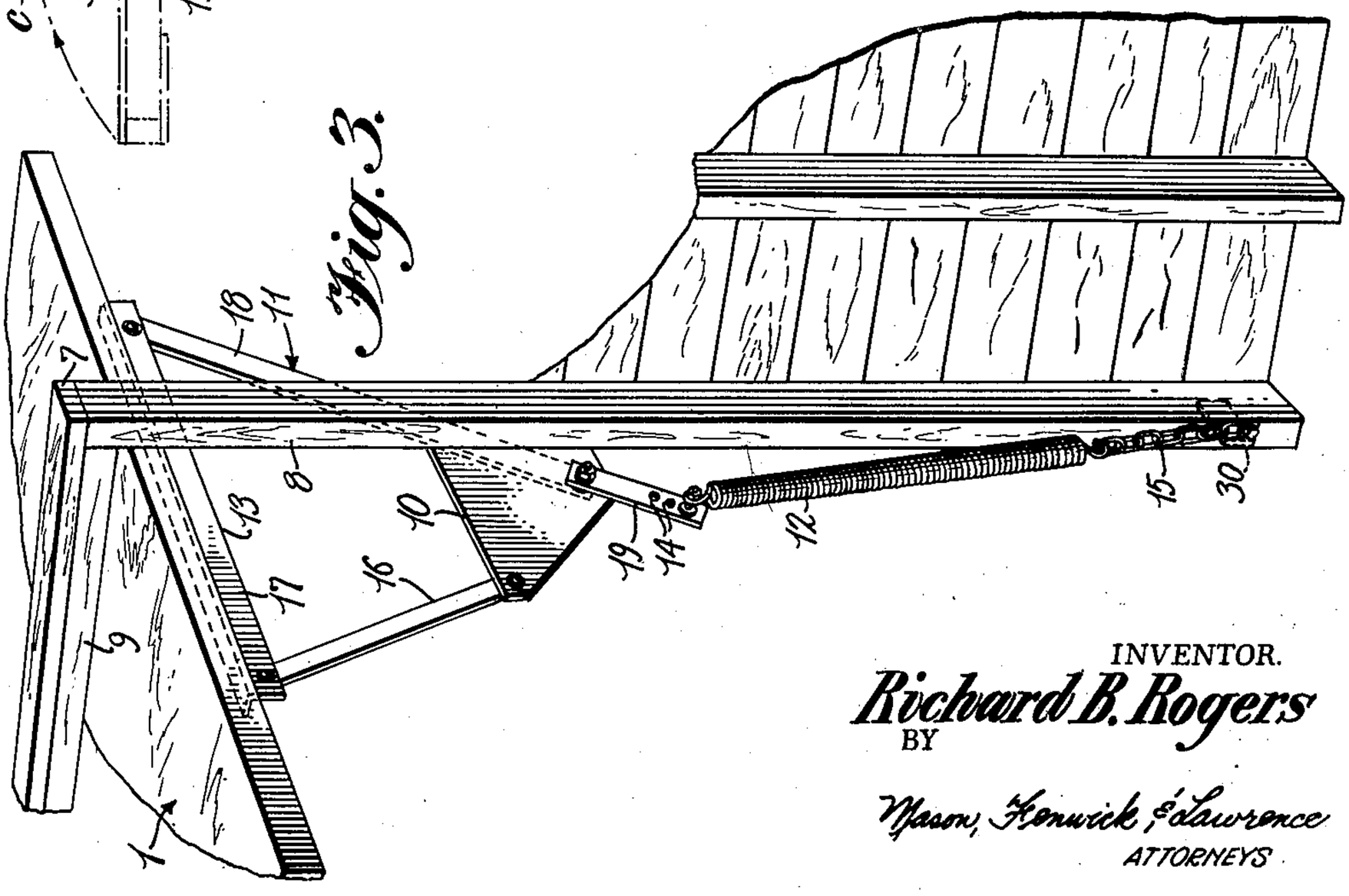


Fig. 3.



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MOUNTING FOR TILT-UP TYPE GARAGE DOORS

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2 Claims. (Cl. 16—163)

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This invention relates to mountings for garage doors and similar closures of the "tilt-up" type.

The general object of the invention is to provide mountings that are simple and inexpensive to manufacture, easy to install and efficient in operation.

One of the objects of the invention is to provide garage door mountings of the "tilt-up" type that shall support the door at points approximately equidistant from its top and bottom when in open position, so that there will not be the tendency of the door to droop either at the top or bottom ends, as would be the case if it were overbalanced at either end.

Another object of the invention is to provide mountings of such construction as to permit the maximum unobstructed width of opening between the jambs.

Still another object of the invention is the provision of mountings which will require the minimum clearance above the level of the door opening for the movement of the top edge of the door when being opened, and minimum protrusion of the door beyond the door frame on the outside of the garage when in open position.

Another object of the invention is to provide garage door mountings so constructed as in effect to snap the door shut in the last few inches of the closing movement of the door.

Other objects of the invention will appear as the following description of a preferred and practical embodiment thereof proceeds.

In the drawings which accompany the following specification and throughout the several figures of which the same reference characters have been used to denote identical parts:

Figure 1 is a view in elevation of the inside of the entrance of a garage, showing the position of the mountings with the door closed;

Figure 2 is a section taken along the line 2—2 of Figure 1;

Figure 3 is a perspective view showing the position of the mounting at one side, with the door in fully open position;

Figure 4 is an exploded view showing in perspective the supporting bracket plate with adjacent portions of the lifting arm offset on opposite sides of the plate, the bearing for said arm, and the connections that unify its divided portions;

Figure 5 is a perspective fragmentary view showing an alternative construction including a balance plate with duplicate springs for doors of unusual width and heaviness.

Referring now in detail to the several figures, the numeral 1 represents the door, which may

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be of any practical construction but is here shown, constructed, in the interest of lightness, with a peripheral wood frame 2 and studs 3 and 4, plywood sheathing 5 on one side, and stiffening gussets 6 at the angles, on the other side.

The door is mounted in an opening defined by a frame having the lintel 7 and jambs 8. A header 9 bridges the jambs against the lintel and acts as a stop which the top edge of the door engages when the door reaches closed position. Mountings are between the sides of the door and the jambs, the mountings being duplicated, one for each side.

Referring to Figures 2 and 3, a flat supporting bracket plate 10 is secured to the inside of the jamb 8, that is, the side which faces the door opening. This plate projects inside the garage, as shown. A lifting arm 11 is pivotally mounted in the bracket plate 10 at an intermediate point in the length of said arm, the lower end of the arm being connected to the heavy coil spring 12, while the upper end is pivoted to the flange of an angle bar 13, extending along approximately the middle third of the side of the door. The lower end of the spring is anchored to the jamb near the bottom. When the door is fully open, as shown in Figure 3, the spring is in its most relaxed condition, but still under sufficient tension to lift the door to its open position. The lifting arm 11 has a series of holes 14 in its lower end, in any one of which the upper end of the spring may be secured for adjusting the leverage of the lifting arm. The lower end of the spring may be hooked into any one of the links of the chain 15 for adjusting its tension.

A guiding arm 16 is pivoted at its respective ends to the bracket plate 10 and the angle bar 13, the pivotal connections of said lifting arm and guiding arm with the bracket plate being so relatively positioned that said arms oscillate with radii of different length, that of the lifting arm being longer, and the arms being so positioned that when the lifting arm has raised the door almost to its fully open position, the guiding arm passes slightly beyond its vertical radial position, which is the highest point in the path of movement of its pivotal connections with the angle bar, the parts becoming automatically stabilized in the positions shown in Figure 3, in which the predominant weight of the door which is inside the garage, as indicated in broken lines in Figure 2, is supported by the guiding arm so that to initiate the closing of the door one must pull it forward by its lower edge until the guid-

ing arm has passed to vertical radial position before the spring 12 begins to function as a counterbalance.

The only elements of mounting that extend beyond the jamb into the door opening are the bracket plate 10 and the flange 17 of the angle bar 13, which are substantially in the same plane, and the lifting and guiding arms 11 and 16, respectively, which lap the parts 10 and 17. Since each of these members is relatively thin, of the order of one-quarter inch in thickness, the total intrusion of each mounted into the door opening is not over one-half of an inch.

The lifting arm is divided in two sections 18 and 19, the longer section 18 being on the door side of the plate 10, and the shorter section 19 being on the jamb side. There are two reasons for offsetting the sections of the lifting arm in this manner; first, if the section 19 were on the same side as the section 18, and integral therewith, it would collide with the guiding arm 16 in the course of the folding movements of said arms; second, the spring 12 which is of relatively large diameter, would set out objectionably beyond the jamb into the door opening.

The two sections of the lifting arm are fixedly united and journaled in the bracket plate 10 by means of the following instrumentalities.

A large circular hole 20 is punched through the plate 10. See Figure 4. This is the bearing. The disk 21 that came out of the hole, or another disk of equal diameter, serves as a journal within said bearing. A pair of washers 22 and 23 of larger diameter than the hole 20, are placed on opposite sides against the plate 10, axially aligned with the hole 20, forming covers for said hole and retaining the journal 21 within said bearing. The respective ends 18 and 19 of the lifting arm are placed against the washers 22 and 23 in parallel relation to one another. Each of the aforementioned members, disk, washers, and lifting arm sections, are formed with a similar polygonal bolt hole 24, and a bolt 25 is provided, having a polygonal shank 26 equal to the aggregate thickness of the plate 10, washers and arm sections, said shank having a cylindrical threaded end portion 27.

Said bolt extends through the polygonal bolt holes and is secured by means of the lock washer 28 and nut 29, the latter engaging the threaded end portion 27. By this construction the sections 18 and 19 of the lifting arm are rigidly united, and a journal box is formed by the plate 10 and the washers 22 and 23, which will retain a film of grease or oil and exclude dust. The circumferential interface between the bearing and journal is relatively large, so as to minimize wear and ensure long life to the mounting.

Figure 2 shows the position of the mounting parts when the door is closed. The lifting arm has rotated clockwise through an angle of approximately 160°, so that the arm section 19 which was down, is now up, having stretched the spring 12 by an amount almost twice the length of said section. The spring 12 is thrusting downwardly almost in alignment with the lifting arm.

Simultaneously with the clockwise swing of the lifting arm, the guiding arm 16 has also swung clockwise until just before the door becomes quite closed, it is horizontal, and from that point its pivotal connection with the door moves downward in an arc that inclines toward the inside of the garage. This movement is produced by the spring acting with its maximum force component, and creates in effect a snap action which forces the door shut. The door is thus forcefully held against swinging due to fluctuations in wind pressure.

It is also to be noted that the jambs 8 are provided near the bottom with attached wedges 30, the forward ends of which face outwardly, so that the two wedges flare in relation to one another. They act as centering devices for the door, and under the snap action referred to, the door is firmly held between these wedges.

The train of arrows in Figure 2 indicates the trajectories respectively of the top and bottom edges of the door, in moving from fully open to fully closed position. The line *a*—*b* represents the level of the lintel. The line *c*—*d* represents the level of the top of the curvilinear path of the upper edge of the door. In the case of a door seven feet high, the distance from *a*—*b* to *c*—*d* is six inches. Only this much clearance need be provided between the lintel and ceiling of the garage. The line *w*—*x* is a vertical line through the forward edge of the door when in fully open position. The line *y*—*z* represents the vertical through the foremost point of the trajectory of the forward edge of the door in descending. The forward movement will not exceed two inches for a seven foot door.

In the case of a two car garage in which the door may be sixteen feet wide, double spring strength may be employed by providing a balance plate 31 pivotally connected to the section 19 of the lifting arm. See Figure 5. To this balance plate, duplicate springs 12 are attached at points equidistant and on opposite sides with respect to the pivotal connection 32. The lower ends of these springs may be hooked to the same link of the chain 15.

While I have in the above description disclosed what I believe to be a preferred and practical embodiment of the invention, it will be understood by those skilled in the art that the specific details of construction and arrangement of parts, as shown and described, are by way of illustration and not to be construed as limiting the scope of the invention.

What I claim as my invention is:

1. Mounting for a tilt-up door, adapted to be connected to a side edge of the door and to the adjacent jamb, said mounting including a bracket plate securable to the jamb, a lifting arm composed of a transverse portion journaled in said plate and long and short sections extending radially oppositely from said transverse portion on opposite sides of said bracket plate, the long arm being on the door side, a bar adapted to be secured along an intermediate portion of the side edge of the door, the end of said long section being pivoted to the lower portion of said bar, said bar being in a vertical position, a counterbalance spring connected to said short section adapted to be secured to the jamb below said short section, and a guiding arm shorter than said lifting arm pivoted at its ends to the upper portion of said bar, and to said plate, cooperating with said lifting arm to support said bar in substantially horizontal position when said spring is in its minimum length position, and to support said bar substantially vertical when said spring is in its maximum length position, the axis of rotation of said lifting arm when said spring is in maximum length position being below the point of connection of said spring to said lifting arm and substantially in line with the direction of pull of said spring, and said guiding arm being inclined downwardly from its pivotal connection with said plate toward its pivotal con-

nection with said bar, whereby the door must be bodily lifted until said guiding arm passes its horizontal position before said spring begins to exercise its counterbalancing function.

2. Mounting for a tilt-up door adapted to be connected to a side edge of the door and to the adjacent jamb, said mounting including a flat plate securable to the inside face of said jamb, a bar of right angle cross-section adapted to be secured in an intermediate position to the side of the door with a longitudinal depending flange adjacent the jamb, a counterbalanced spring adapted to be secured at one end to said jamb, a lifting arm comprising a relatively long section positioned on the door side of said plate and a relatively short section on the opposite side of said plate, the remote ends of said long and short sections being connected respectively to said flange and to the other end of said counterbalance spring, said sections being journaled in said plate in diametrically opposite positions by the following instrumentalities, said plate having a circular bearing aperture therethrough, a disk rotatably fitted within said aperture, a washer on

each side of said aperture coaxial therewith, of larger diameter and bearing against said plate, said disk, washers, and the proximate ends of said lifting arm sections being provided with coaxial similar polygonal apertures, a bolt having a corresponding polygonal shank passing through the polygonal apertures of said apertured members fixing them against relative rotation, and a tightening nut on the end of said bolt, said longer section of said lifting arm being movable in a plane parallel to the inside face of said jamb.

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