April 17, 1934. E. W. CLARK 1,954,987

SLIDING DOOR CONSTRUCTION

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Fig. 4.

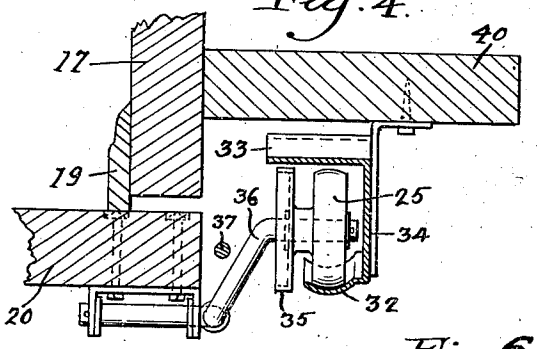


Fig. 5.

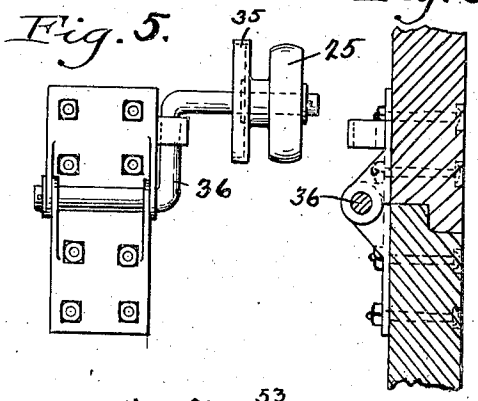


Fig. 6.

Fig. 7.

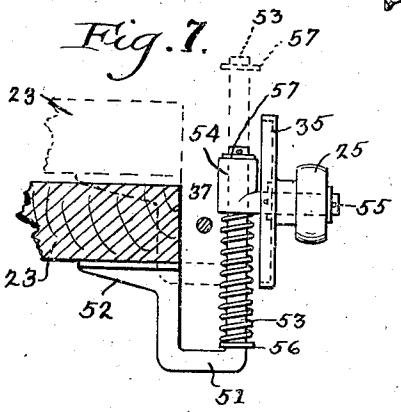
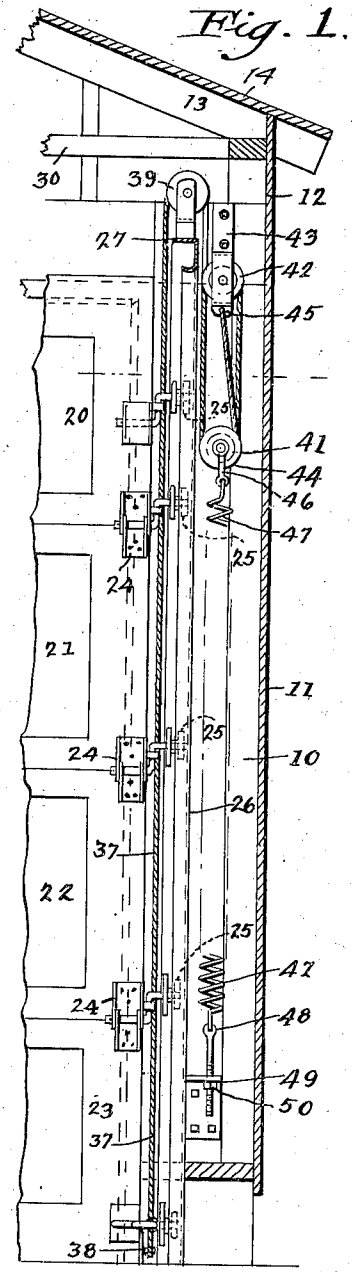


Fig. 1.



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Fig. 2.

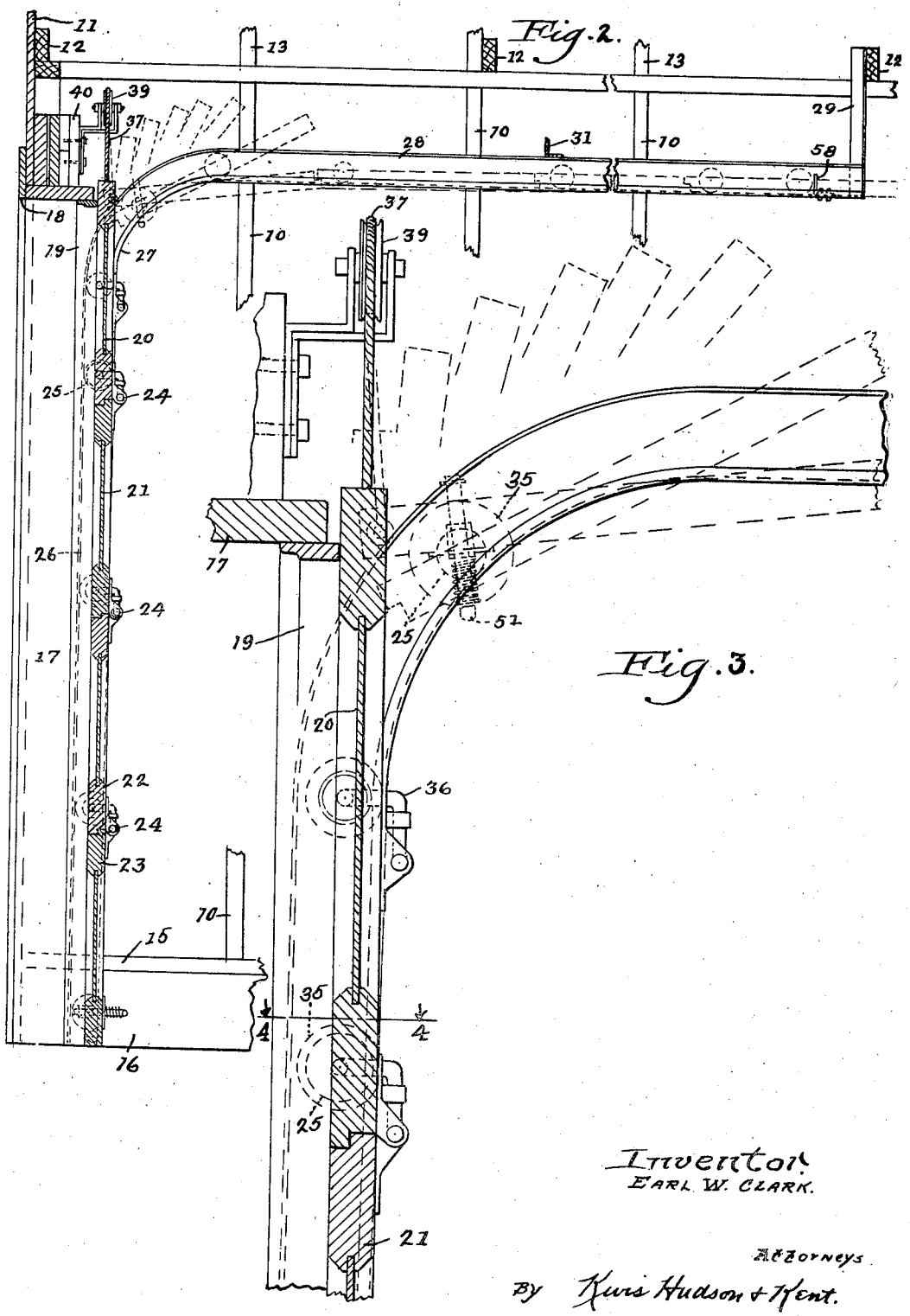


Fig. 3.

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UNITED STATES PATENT OFFICE

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SLIDING DOOR CONSTRUCTION

Earl W. Clark, Warren, Ohio, assignor, by mesne assignments, to National Manufacturing Company, Sterling, Ill., a corporation of Illinois

Application August 17, 1929, Serial No. 386,621

12 Claims. (Cl. 20—20)

This invention relates to sliding door constructions, and more particularly to a modified arrangement of the type adapted to slide along a predetermined path from a closed position to an open position, or vice versa.

The invention is of general application and is adapted to sliding doors of various sizes, such as doors for certain types of furniture, or for boathouses, hangars, and warehouses, but it has particular adaption with respect to garage doors.

Space around a sliding door is generally at a premium, and it is also desirable to provide a door which is sealed when the door is in the closed position. In the preferred embodiment adapted to a garage, the door is vertical in a closed position and travels upward around a curve in a track to a horizontal position housed within the garage, underlying the roof thereof. Means are provided for automatically urging the door against its jamb as the door is lowered into closed position.

An important object of the invention is to automatically seal the door as it reaches its closed position, in a modified manner.

Another object of the invention is to provide a modified arrangement of a door of this character which, in its open position, is housed within the building or compartment for which the door is provided.

A still further object of the invention is a modified counterbalance arrangement which, after an initial opening movement has been given to the door, will automatically function to continue the opening movement and retract the door into its open position.

Other objects and features of novelty will be apparent as the following description proceeds, reference being had to the accompanying drawings, in which

Fig. 1 is an interior partial elevation of a structure provided with a door according to the present invention;

Fig. 2 is an interior side elevation, showing the door in vertical section;

Fig. 3 is an enlarged detail view of the guide structure shown in Fig. 2;

Fig. 4 is a detail cross-sectional view taken along the line 4—4 of Fig. 3;

Fig. 5 is an elevation of the hinge structure and guide roller shown in Fig. 4;

Fig. 6 is an elevation of the structure shown in Fig. 5, parts being broken away and shown in section; and

Fig. 7 is a partial transverse section through the lower section of the door, showing the novel mounting for the lower roller.

Referring more particularly to the drawings, the invention has been illustrated in connection with a garage, but it is to be understood at the outset that the specific illustration given is not to limit the broader interpretation of the claims.

The garage building is of usual construction, having studding 10, siding 11, cross ties 12, rafters 13, and roof boards 14. The studding 10 is supported by a sill 15 fitted on the foundation 16.

A door jamb 17 is fitted in the front of the building and is provided with trim 18. A door stop or sealing member 19 is fitted at the inner edge of the door jamb 17 and projects slightly inward therebeyond, forming an abutment for the door.

The door proper, according to the present invention, comprises a plurality of sections 20, 21, 22 and 23. These sections are flexibly connected by hinges 24 and are also provided with guide rollers 25 which operate in a track. The track comprises a substantially vertical portion 26, a smoothly rounded curved portion 27, and a straight horizontal portion 28 which underlies the roof of the garage in a plane above the top of the door opening. A separate track is, of course, provided for each side of the door, to extend rearwardly underlying each side of the roof. The portion 28 is suspended by track hangers 29 which may be secured to the plate 30, rafters 13, or studding 10, as desired. Stay members 31 extend transversely to retain the portions 28 parallel to each other.

Referring now to Fig. 4, it will be noted that the track is generally channel-shaped and comprises a flange having a groove 32, a flat flange 33 opposite thereto, and a connecting web 34. The roller 25 engages the grooved portion 32. Associated with the roller is an annular flange 35 arranged to cooperate with the flat flange 33 to prevent the roller 25 from rattling. The roller 25 and the flange 35 are journaled on a rod 36, one associated with each of the sections of the door.

Referring now to Fig. 2, it will be noted that the rollers are of decreasing diameter toward the bottom of the door, whereas the flanges 35 are of increasing diameter in the same direction. In other words, the radius of a roller added to the radius of its associated flange is substantially equal to the distance between the groove 32 and the flange 33. Thus the flange 35 insures that the rollers 25 will follow the groove 32 and yet permit the respective rollers to be of varying

diameters. The varying diameter of the rollers is important, in connection with the vertical sealing member 19 and the inclined section 26 of the track, for sealing the door as it approaches the closed position.

Means are provided for counterbalancing the weight of the door. The counterbalancing means is duplicated at each side of the door and for this reason only one side will be described. A cable 37 has one end secured to a projection 38 carried by the lower section 23 of the door, and extends upwardly along the side thereof to pass over a fixed pulley 39 journaled in a bracket secured to the casing 40. From the pulley 38 the cable 37 passes under a movable pulley 41, up over a fixed pulley 42 journaled in a bracket 43 also carried by the casing 40. The cable 37 then passes under a movable pulley 44 which has a common journal with the pulley 41 and then passes upward and is secured to an eye 45 in the bracket 43. The pulleys 41 and 44 carry a depending eye 46 in which is secured one end of a heavy coil spring 47. The other end of the spring is received by an eye-bolt 48 which passes through a bracket 49 secured to the garage structure and adjustable by means of a nut 50.

A special roller mounting is provided for the lower section 23, as shown in Fig. 7. A U-shaped member 51 is provided with a flange 52 by which it is secured to the inner side of the door section 23. The outer arm 53 of the U-member 51 is perpendicular to the plane of the section 23 and is spaced to one side thereof. Slidable upon the arm 53 is a sleeve 54 carrying a laterally projecting pin 55 on which the roller 25 and the flange 35 are journaled. A coil spring 56 is interposed between the member 51 and the sleeve 54 and normally urges the sleeve 54 outwardly against a stop or head 57. From this description it will be obvious that while the track prevents the movement of the roller 25 and the flange 35, the spring 56 will yield and permit the door section 23 to take the position indicated in dotted lines in Fig. 7.

In operation, assuming that the door is in the closed position shown in Figs. 1 and 2, the operator will lift upwardly on the door and the rollers associated with the upper section 20 will immediately swing this section inwardly along the curved portion 27 of the track. Successive positions of the upper section are shown in dotted lines in Fig. 2. After the upper roller has passed the curved section 27 onto the straight portion 28, the section 20 will be horizontal. The sections therebelow will follow around the track until all of the sections, except section 23, are supported by the section 28 of the track. The roller associated with the section 20 will abut against a stop 58 mounted inside the track section 28. At this time the lower section 23 is supported by its roller, which is in the curved portion 27 of the track. This would normally cause the section 23 to depend below the plane of the remaining sections. However, at this time the weight of the preceding sections is entirely supported by the horizontal track 28. The strength of the spring 47 is, accordingly, all directed to the single section 23. As a result, the force of the spring 47 is much greater than the strength of spring 56, which will cause the section to take the position shown in dotted lines in Fig. 7, the spring 56 being compressed to its limit. This will permit the section 23 to snap upward into the position shown in Fig. 3, substantially in alignment with the remaining sections. By this arrangement, adequate head room is assured.

To return the door to closed position, the operator will exert an outward and downward pull on the section 23, which will cause all the sections to follow each other along the track back to the closed position indicated in Fig. 2. However, all of the sections will abut against the vertical sealing member 19, and at the same time the rollers are of varying diameter and engage an inclined track section. The result is that a wedging action is exerted to force the respective sections against the sealing member 19 and thoroughly seal the door against the weather.

The scope of the invention is not limited to any of the details shown or described but includes such embodiments of the broad idea as fall within the scope of the subjoined claims.

Having thus described my invention, I claim:

1. A sliding door construction comprising a series of hinged sections, a guide track, rollers of varying diameters moving in said guide track and connected to the respective sections, and annular flanges for preventing said rollers from engaging the other side of the track, said flanges varying in diameter.

2. A sliding door construction comprising a series of hinged sections, a guide track, rollers of varying diameters moving in said guide track and connected to the respective sections, and annular flanges for preventing said rollers from engaging the other side of the track, said flanges varying in diameter inversely as the diameters of the rollers.

3. In combination with a sliding door structure, a track for guiding the door structure from an open position to a closed position out of alignment therewith, means for sealing said door structure automatically with the closing movement of the door, comprising spaced rollers of different diameters engaging one side of said track, and means for preventing said rollers from engaging the other side of said track.

4. A sliding door construction comprising in combination, a sectional door, guiding means for said door extending vertically and horizontally, and means carried by said door and cooperating with said guiding means, said door carried means including an element on the lower portion of said door slidable with respect to said door and at an angle to said door.

5. A sliding door construction comprising in combination, a sectional door, guiding means for said door extending vertically and horizontally, and means carried by said door and cooperating with said guiding means, said door carried means including a member on the lower portion of said door having a stem perpendicular to the inner surface of said door, an element slidably carried by said stem, and a member rotatable on said element and engaging said guiding means.

6. A sliding door construction comprising in combination, a sectional door, guiding means for said door extending vertically and horizontally, and means carried by said door and cooperating with said guiding means, said door carried means including a sleeve slidable in a direction perpendicular to the inner surface of said door, and a rotatable member carried by said sleeve and engaging said guiding means.

7. In a sliding door construction in combination a door, a guide track, rollers in said track connected to said door, and means for connecting one of said rollers to said door, comprising a member having a stem perpendicular to the plane of the

door, and a sleeve slidably mounted on said stem and carrying a lateral arm forming a journal for said roller.

8. In a sliding door construction comprising a series of hinged sections, a guide track having a curved portion, rollers in said track connected to the sections, and means for permitting one lower section to swing into alignment with the other sections while the roller thereof is on the curved portion of the track, comprising a yieldable mounting for said roller slidable perpendicular to the plane of said section.

9. A door for garages and the like comprising a plurality of sections hinged together, a wedging roller and a guide roller arranged in pairs on each section, the wedge rollers increasing in diameter from the bottom to the top of the sections and the guide rollers decreasing in diameter from the bottom to the top of the sections, a channel guideway adapted to be secured adjacent a door frame in substantially vertical position, but with its upper end further away from the frame than the lower end, engaging said rollers, said guideway being horizontal at its upper part and connected to the vertical portion by a curved portion, and means for counterbalancing said door sections.

10. A door for garages and the like comprising a plurality of sections hinged together, a wedge roller and a guide roller arranged in pairs on each section, the wedge rollers increasing in diameter from bottom to top of the sections and the guide rollers decreasing in diameter from bottom to top of the sections, a channel guideway one flange of which is higher than the other engaging said rollers and adapted to be secured adjacent a door frame in substantially vertical position but with its top portion further away from the frame than the bottom, said guideway being horizontal at its upper part and connected to the vertical part by a curved portion, and means for counterbalancing said door sections.

11. A door for garages and the like comprising a plurality of sections, hinges connecting the sections, the pins of which extend beyond the edges of the sections, a wedging roll and a guide roll on each pin, the wedge rollers increasing in diameter from the bottom to the top of the sections and the guide rollers decreasing in diameter from the bottom to the top of the sections, a guideway adapted to be secured to an adjacent door frame in substantially vertical position but with its upper end further from the frame than the bottom, said rolls engaging said guideway, said guideway being horizontally arranged at its upper end and connected to the vertical portion by a curved portion, and means for counterbalancing said door.

12. A door for garages and the like comprising a plurality of sections, hinges connecting said sections, the pins of which extend beyond the edges of the sections, a wedging roll and a guide roll on each pin, said wedging rolls increasing in diameter and said guide rolls decreasing in diameter from the bottom to the top of the door, a channel guideway adapted to be secured to an adjacent door frame in substantially vertical position but with its upper part further from the frame than the bottom, one flange of said channel being higher than the other with said rolls engaging the guideway, said guideway being horizontally arranged at its upper part and connected to the vertical part by a curved portion, and means for counterbalancing said door.

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