March 6, 1962 E. N. HOWELL, SR 3,023,804

ARTICULATED DOOR CONSTRUCTION

Filed July 30, 1959

Fig. 1.

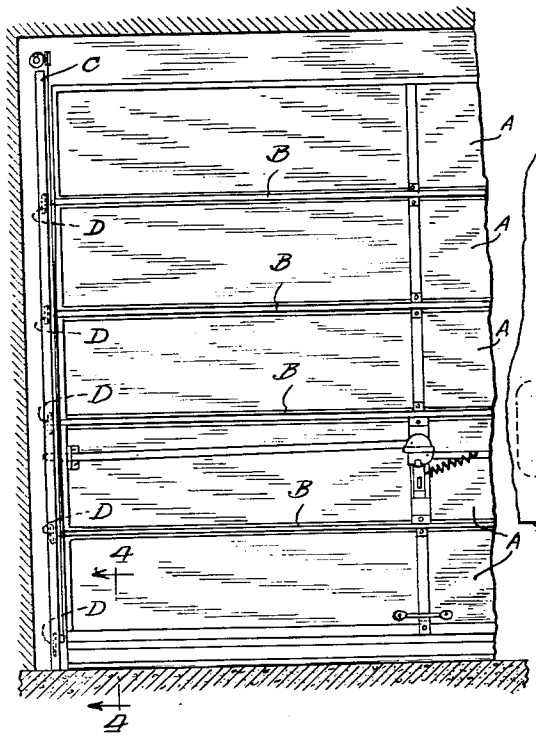


Fig. 2.

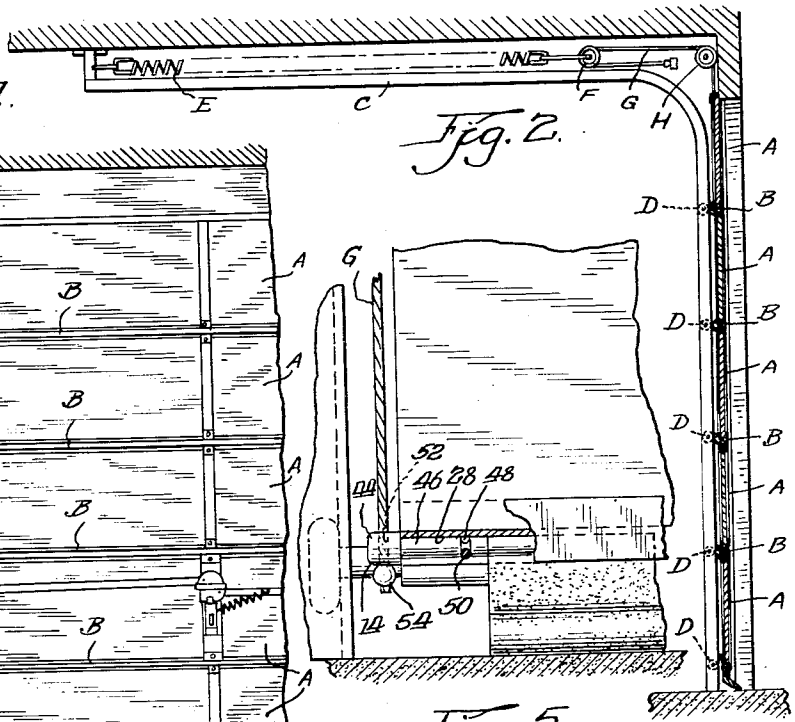


Fig. 5.

Fig. 3.

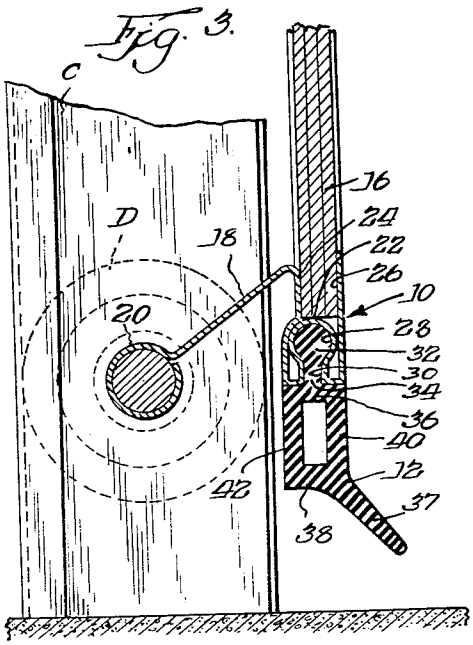
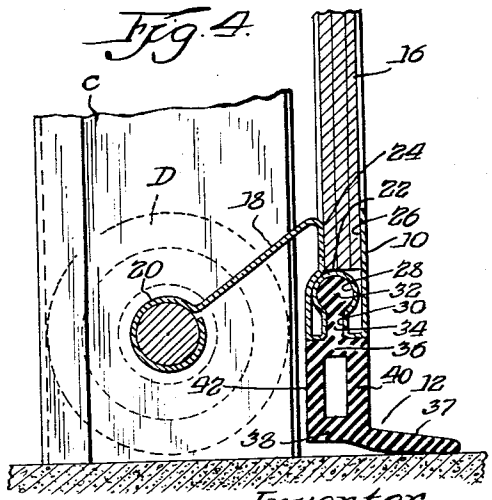


Fig. 4.



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ARTICULATED DOOR CONSTRUCTION

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1 Claim. (Cl. 160—40)

This invention relates to an improved construction for an articulated door structure, and more particularly, to improvements in the type of door conventionally referred to as an overhead door.

In overhead doors conventionally employed for domestic garage doors, the common practice is to use a plurality of panels extending transversely of the garage door opening, arranged in vertical linear array with adjacent edges of the panels of the array hingedly connected by various pairs of hinge forming members connected to adjacent panels. The panels are also provided with roller mounting means for positioning rollers in guide tracks in which the door is supported in its vertical and in its overhead horizontal position. In order to provide door panels of suitable stiffness having moderate weight, it has been conventional to employ light panels supported in a relatively heavy frame. Various improvements in door construction have rendered obsolete the use of the relatively heavy frames and have utilized various metallic channel arrangements to offer suitable support for the relatively light panel members. Ofttimes, these metallic channel arrangements have been combined with the hinging function to provide a relatively simple, easily constructed arrangement.

Generally, these overhead doors are rendered more easy to raise and lower by the use of counterbalancing means, including horizontal springs members secured to the lower end of the door on either side by means of cables extending through appropriate pulleys.

It is the primary object of this invention to provide a channel member for the lower edge of an articulated door, which includes means for sealing weather out, which provides for quiet operation of the door into the closed position, which significantly reduces the shock to the door when it is lowered into the closed position and which provides an efficient attaching means for the counterbalancing cables.

Further objects of the invention will be evident from an examination of the particular description and the drawings in which:

FIGURE 1 is a fragmentary elevational view of an articulated door looking forwardly from the rear of the door, showing an embodiment of the improved lower channel construction.

FIGURE 2 is a side elevational view of the construction shown in FIGURE 1.

FIGURE 3 is an enlarged detailed view in cross section of the improved lower channel construction showing the articulated door in a partially raised position.

FIGURE 4 is an enlarged detailed view in cross section of the improved lower channel construction, showing the articulated door in the lowered or closed position.

FIGURE 5 is an enlarged fragmentary front view, partily cut away, showing the attachment means for the counterbalancing cable.

The door assembly as shown in FIGURES 1 and 2 includes a plurality of door panels A positioned in linear array and with their adjacent uppermost and lowermost edges in abutting relationship. The panels are rigidly supported by transversely extending metallic channel members adapted to receive the respective edges of the panels A, and are formed with cooperating hinge forming portions B adapted to cooperate with the corresponding hinge portions of the adjacent channel members to

provide pivoting action between successive channels as the door is moved upwardly and downwardly around the guide tracks C. The cooperating hinge forming portions are each also adapted to receive a roller D, which rolls in the guide tracks C on either side of the door to control the movement of the door from the lowermost vertical position to the uppermost horizontal position.

An extension spring member E is secured with relation to each of the tracks, and is provided with a pulley F adapted to receive counterbalancing cable G. One end of each of the cables G is secured with relation to said channel forwardly of the forwardmost position of travel of said pulley F. The counterbalancing cable extends from this position around pulley F around pulley H and downwardly substantially vertically for attachment to a pivoted stud attached adjacent the lowermost edge of the lowermost panel.

While the foregoing description does not relate specifically to the subject matter of the instant invention, it is believed necessary in order to properly understand the advantages of the improved lower channel arrangement of the subject invention.

From the foregoing, it is seen that the lowering and raising of the door is facilitated by the use of the counterbalancing arrangement, involving the use of the extension springs E. It is also seen that the extension springs E serve to aid in preventing extremely rapid movements of the door into the closed position and further minimize the force needed to raise the door from the closed position.

However, even though the counterbalancing arrangement serves to reduce the rapid movement of the door into the closed position, the acceleration of the door to the closed position is not prevented and indeed, even with the arrangement shown, achieves a rapid downward movement toward the closed position, which results in the doors "slamming" fairly forcefully against the floor surface of the garage. This "slamming" of the door not only subjects the entire door to undesirable stresses tending to weaken the arrangement, but particularly tends to damage the lower edge of the lowermost panel and cause a disquieting "banging" sound and by damaging the lower edge, serves to disrupt the sealing relationship of the door to the garage floor.

Therefore, the instant invention is concerned with providing adequate protection for the lower edge of the lowermost panel and for providing an edge which will seal weather out, and which includes an arrangement for providing efficient means for fastening the counterbalancing cable.

The arrangement which is the subject of this invention is best seen in FIGURES 3, 4 and 5. An elongated channel strip member **10**, which may be formed by an extrusion process, or by stamping or rolling of sheet metal or in any other appropriate manner, is formed to receive the lowermost edge of the lowermost door panel, is further adapted to receive an elongated flexible sealing strip **12** inserted longitudinally from the side of the channel, and also rotatably receives a pivoted stud **14** which prevents longitudinal movement of the sealing strip **12** in relation to the channel and further acts to provide a rotatable fastener for the end of the counterbalancing cable G.

In the embodiment shown in FIGURES 3, 4 and 5, the channel strip member is shown formed out of sheet metal to provide an extending leg **18** terminating in cylindrical portion **20** for receiving the shaft of a guide roller D.

The channel strip member is further formed to provide an elongated channel **22**, having upright parallel side portions **24** and **26** for receiving the opposing faces of the lower panel member **16**. Between the opposing verti-

cal wall portions **24** and **26** and beneath the channel proper to provide a support for the panel and for receiving a sealing strip, the channel strip member is formed with an elongated tube **28** terminating in a downwardly projecting slot **30**, of width substantially less than the diameter of said groove.

The sealing strip **12** is formed by extrusion or any other appropriate means from flexible material such as rubber. The upper mounting portion of the sealing strip **12** is formed into an elongated substantially cylindrical portion **32** fitted within the retaining tube **28**, with a depending web **34** connecting the mounting portion to the body of the sealing strip. The body of the sealing strip is an elongated tubular member having a top portion **36** adapted to abut the lower edge of the lower panel, a bottom portion **38**, and vertical side portions **40** and **42**, forming an elongated opening transversely through the strip. The bottom portion **38** terminates in a forwardly and downwardly projecting lip **37** adapted to rest on the floor of the structure having the door opening, the forward projection of the lip assuring resistance to weather elements tending to enter beneath the door.

The sealing strip **12** is secured to the channel strip member **10** by inserting the elongated cylindrical mounting portion **32** and the connecting strip **34** into the retaining tube **28** and slot **30** and sliding the sealing strip longitudinally in said channel strip until it extends substantially from one end to the other.

The means used to prevent the sealing strip **12** from moving longitudinally in channel strip member **10** are best seen in FIGURE 5. Although FIGURE 5 shows only one end of the arrangement, it is to be appreciated that the other end of the arrangement is identical, only reversed.

The pivotal stud **14** is formed with a head portion **44** adapted to abut the end of the cylindrical tube **28** and with a cylindrical shank **46** extending into the cylindrical tube **28** and fitted loosely enough for rotation relative thereto. The stud shank **46** has an annular groove **48** to receive a cross pin **50** extending through aligned lateral apertures in the sides **24** and **26** of the channel strip member **10**. The pin **50** secures the stud **14** and sealing strip **12** in place, yet permits the stud **14** to rotate whereby the cable G may freely assume varying angles in relation to the lower panel.

The head **44** of the stud **14** is provided with a bore **52** which receives the counterbalancing cable G which is prevented from moving through bore **52** by bead **54** secured to the end of the cable.

In operation, it is seen from FIGURES 3 and 4 that as the articulated door proceeds downwardly toward the floor, the forwardly and downwardly extending sealing lip **37** progressively contacts the floor to assure a weathertight seal therewith and the body of the seal, due at least in part to the increased resiliency provided by the elongated central opening, serves to absorb the shock of the lower panel edge contacting the floor.

Also, it is to be noted that as the lowermost panel **16** moves upwardly to a horizontal position on the guide tracks C and downwardly from such position, the changing angle between the lowermost panel side edge and the counter-balancing cable is fully accommodated by the rotation of the stud **14**.

Therefore, it is seen from the foregoing arrangement of elements that a construction has been provided which offers protection for the lower edge of the lower panel of an articulated door, which includes means for effectively sealing weather out, which provides for quiet operation of the door into the closed position, which significantly reduces the shock to the door when it is lowered into the closed position, and which provides an efficient attaching means for the counterbalancing cables. It is to be particularly noted that in the arrangement shown, the means for securing the sealing strip also provides a channel for rotatably receiving the means for securing the counterbalancing cables. The cables anchor studs in turn secure the sealing strip in the channel to provide a highly efficient arrangement of elements, necessitating few parts, and consequently, significantly minimizing the cost of achieving the advantages.

I claim:

In an articulated door having a plurality of panels aligned in linear array, and including a lowermost panel and counterbalancing means having a cable secured to said lowermost panel to aid in the raising and lowering of the door between a substantially horizontal opening position, and a vertical closing position the combination of an elongated channel strip member formed with a pair of opposed upright parallel side portions forming a channel receiving the opposing surfaces of the lower panel member therebetween, said channel strip member also forming an elongated substantially cylindrical retaining tube having a downwardly projecting elongated slot along its entire length; a sealing strip having an upper elongated cylindrical mounting portion longitudinally disposed within said retaining tube and having a resilient body portion terminating in a lip projecting downwardly and forwardly therefrom, with a connecting web between said mounting portion and said body received longitudinally in said slot, and a fastening pin having a head portion secured to said cable and a cylindrical stud projecting into and rotatable in relation to said retaining tube, said stud having an annular groove, said channel member having apertures aligned laterally with said groove, and a cotter pin through said apertures and said groove.

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