

May 12, 1970

J. R. GRAHAM ET AL

3,511,301

DOOR SECTIONS HAVING UNITIZED HARDWARE

Filed Oct. 26, 1967

4 Sheets-Sheet 1

FIG. 1

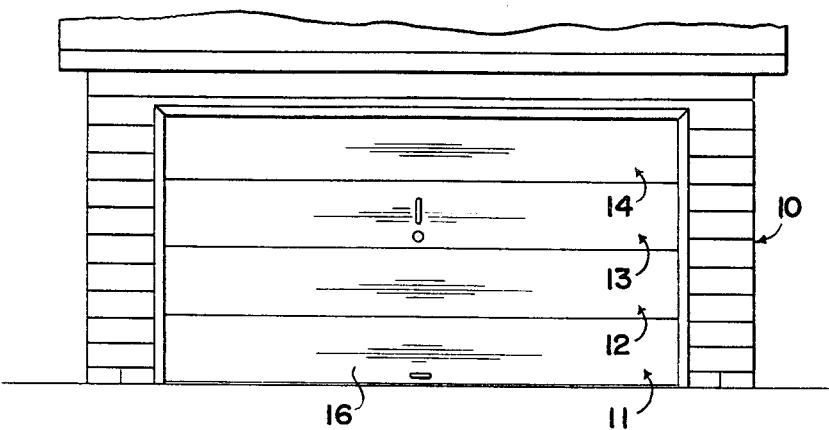


FIG. 2

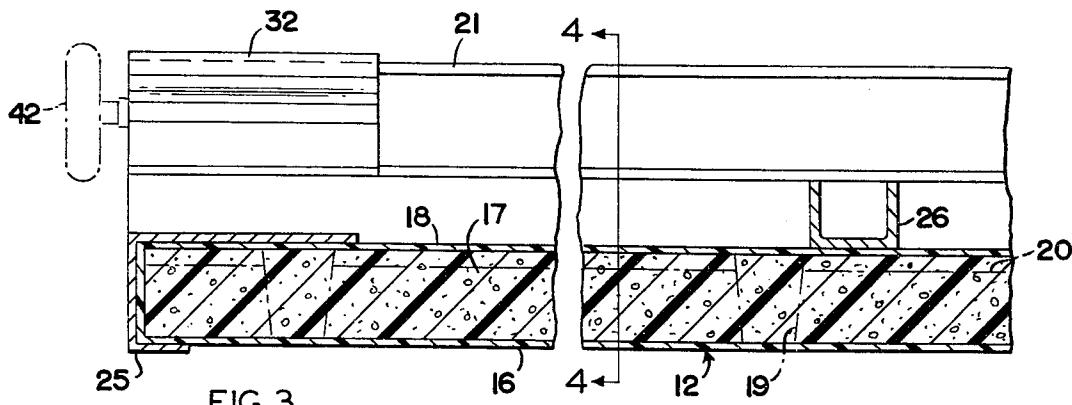
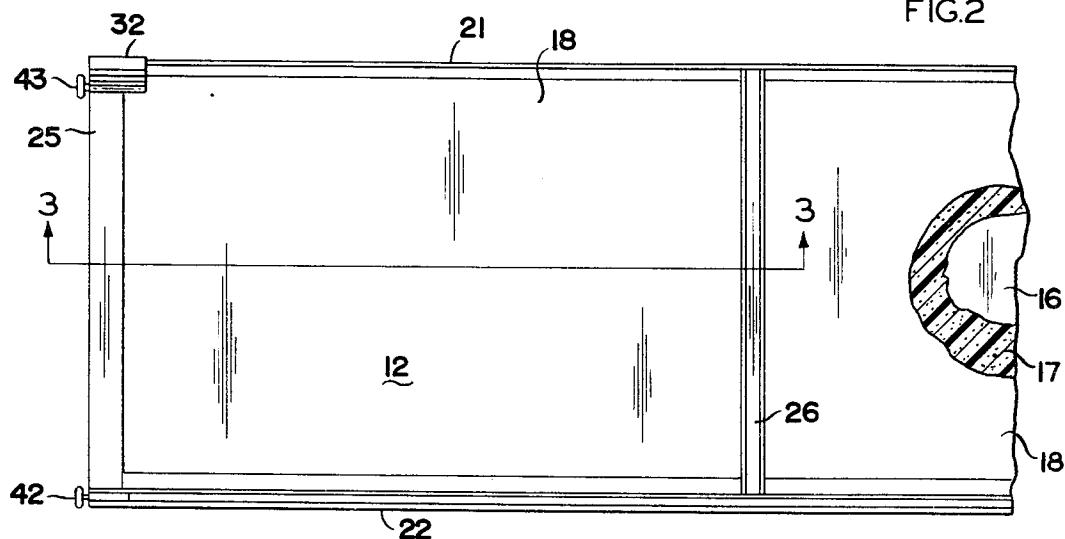


FIG. 3

INVENTORS
JOHN R. GRAHAM
WALTER K. MALEK
ROBERT H. COMP
HENRY Z. SUBSTELNY

BY
Richard H. MacLutcheon
ATTORNEY.

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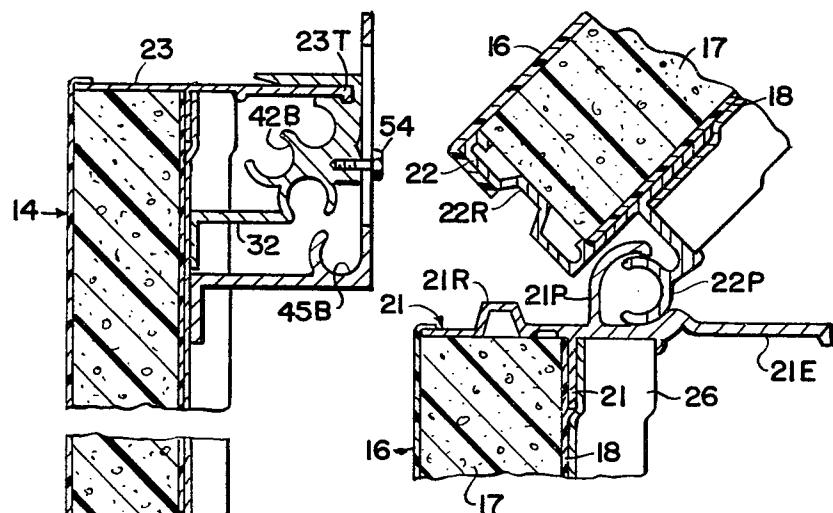


FIG. 5

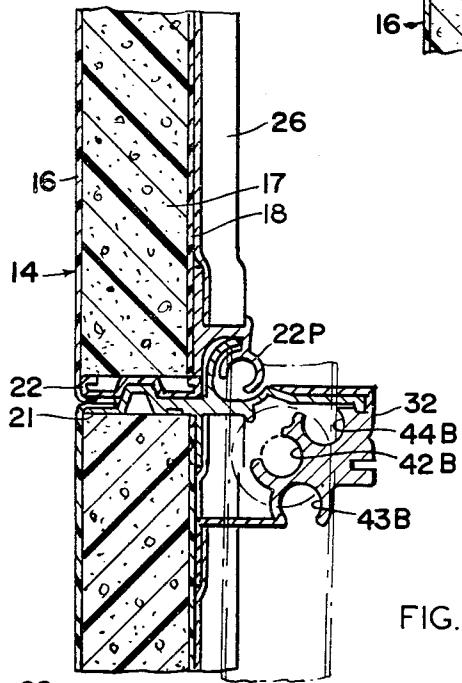


FIG. 4

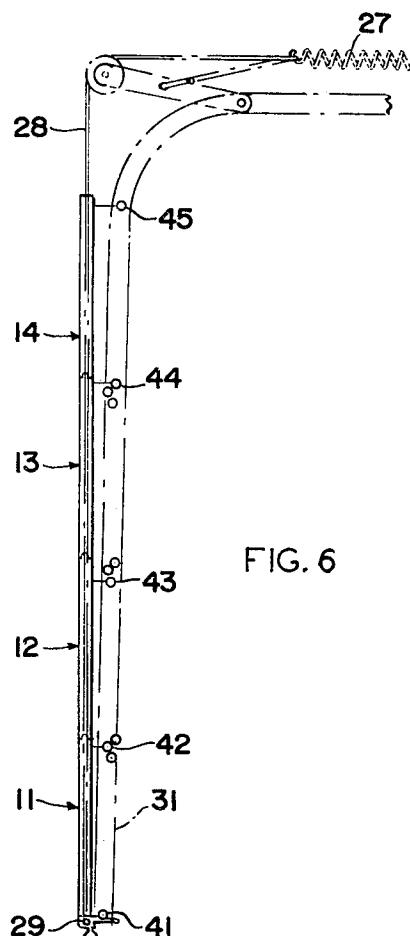
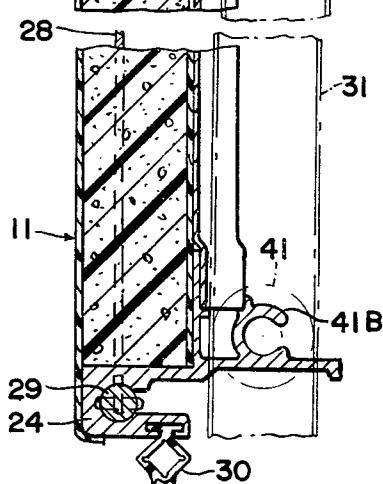


FIG. 6

INVENTORS
JOHN R. GRAHAM
WALTER K. MALEK
ROBERT H. COMP
HENRY Z. SUBSTELNY

BY
Richard H. MacLutcheon
ATTORNEY.

May 12, 1970

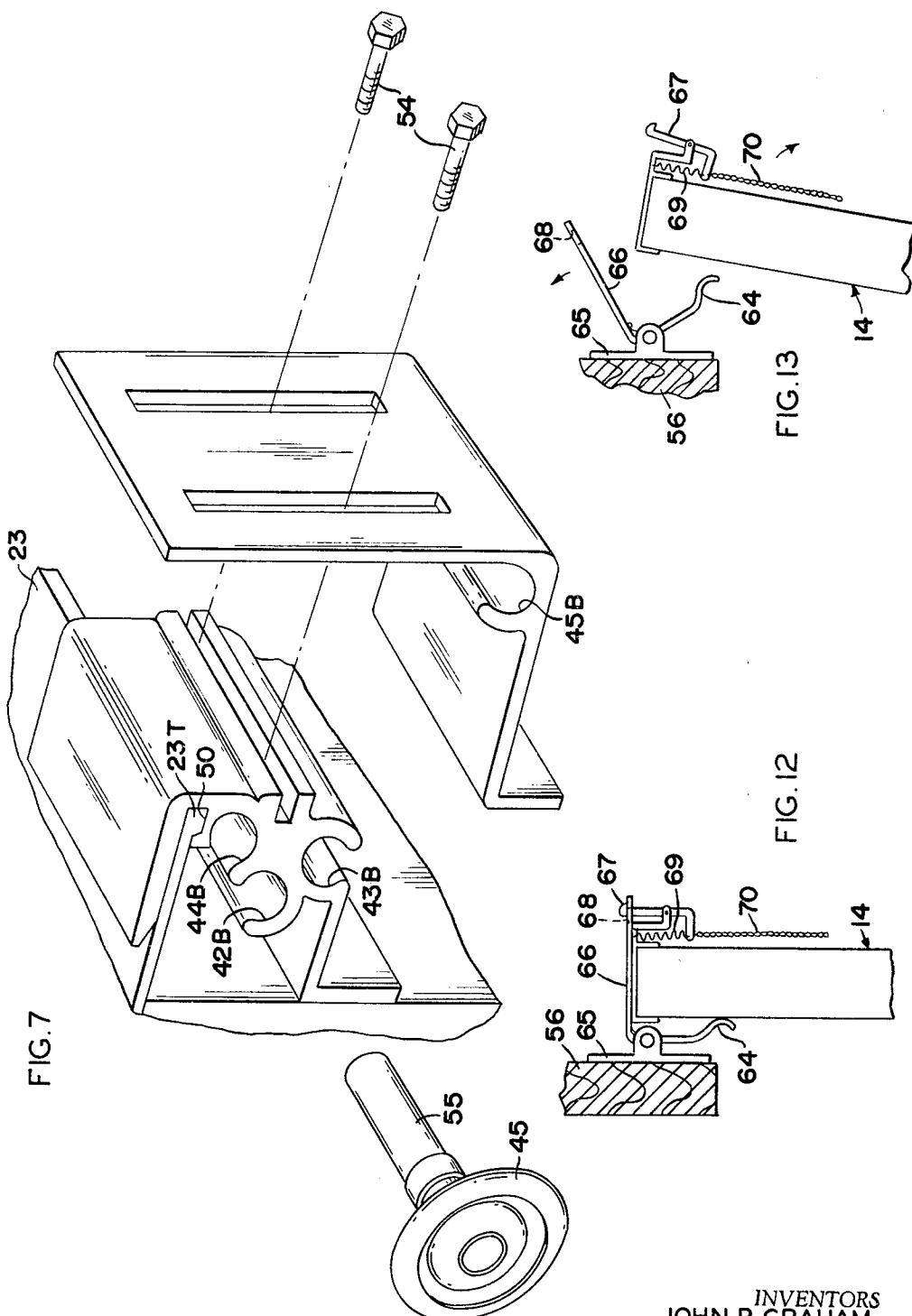
J. R. GRAHAM ET AL

3,511,301

DCOR SECTIONS HAVING UNITIZED HANDWARE

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INVENTORS
JOHN R. GRAHAM
WALTER K. MALEK
ROBERT H. COMP
HENRY Z. SUBSTELNY

BY
Richard H. MacLutcheon
ATTORNEY.

May 12, 1970

J. R. GRAHAM ET AL

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DOOR SECTIONS HAVING UNITIZED HARDWARE

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4 Sheets-Sheet 4

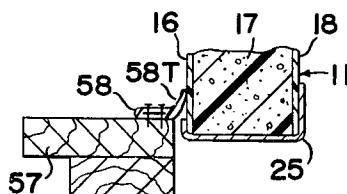
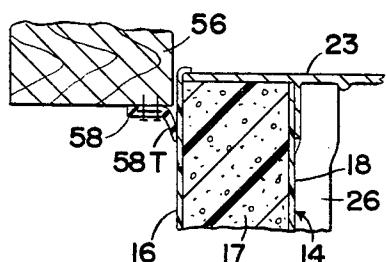
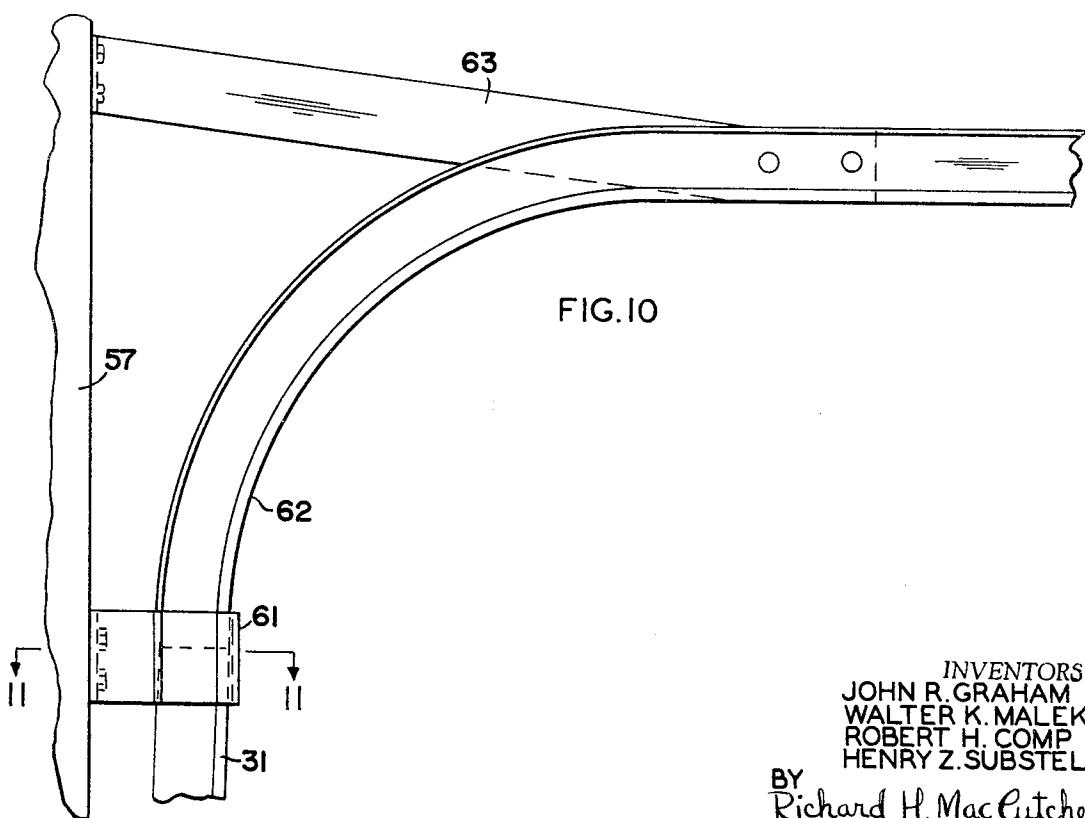
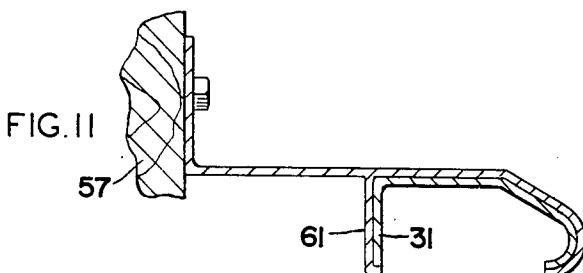


FIG. 9

FIG. 8



INVENTORS
JOHN R. GRAHAM
WALTER K. MALEK
ROBERT H. COMP
HENRY Z. SUBSTELNY
BY
Richard H. MacLutcheon
ATTORNEY.

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3,511,301

DOOR SECTIONS HAVING UNITIZED HARDWARE

John R. Graham, Chagrin Falls, Walter K. Malek, Hinckley, Robert H. Comp, Cleveland Heights, and Henry Z. Substelny, Cleveland, Ohio, assignors, by mesne assignments, to Graham Door Company, Cleveland, Ohio, a corporation of Ohio

Filed Oct. 26, 1967, Ser. No. 678,239

Int. Cl. E05d 5/08, 15/16

U.S. Cl. 160—209

4 Claims

ABSTRACT OF THE DISCLOSURE

Overhead door sections have top and bottom rails which have backward extensions acting as trusses and providing optional placements for track wheel shafts. At intermediate positions, the rails have mating rabbets, which provide double air seals, and respectively have mating male and female continuous hinge portions readily assembled from the back without extraneous hardware and forming a third air seal.

BACKGROUND OF THE INVENTION

The present invention relates to door sections of the type useful, for example, in an overhead garage door. More particularly, this invention relates to upwardly opening doors having a continuous pinless hinge at the back of the rails cooperating with rearwardly directed truss flanges. In such manner, the door sections may easily be assembled together by a single person.

Heretofore, for overhead garage doors, many of the problems both of installation, hence cost, and operation have been caused by unnecessary weight due to using heavy wood framing rather than light metals which have a much better strength to weight ratio. This has caused strained backs and hearts particularly with double-width doors which are so popular, and it has been caused largely because of the ease of adding brackets, conventional hinge pieces, weatherstripping, and other hardware by screwing it into wood, plywood, hardboard or other relatively heavy facing or framing or other sublamina. Wood door sections have had the further disadvantage of changing weight by absorption of moisture and even when dry have been most difficult to assemble on the job site. It has also been difficult and usually impossible to assure good sealing between door sections when the door is in the closed position and it is desired to retain heat or other weather conditioning inside the garage.

It is an object of the present invention to provide simple means for overcoming the above mentioned difficulties.

BRIEF DESCRIPTION OF THE DRAWING

Other objects and numerous advantages will become apparent and the invention may be better understood from consideration of the following description taken in connection with the accompanying drawings, in which:

FIG. 1 is a front view of a four section garage door;

FIG. 2 is an enlarged scale view of a portion of one of the sections as made according to the invention and viewed from the back;

FIG. 3 is a further enlarged sectional view taken on the line 3—3 of FIG. 2;

FIG. 4 is a transverse (to the showings in FIGS. 1, 2 and 3) vertical section;

FIG. 5 is a view of the connection between panels as seen, for example, when they are being readily assembled in novel manner entirely from the back;

FIG. 6 is an end view of a completed door with bot-

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tom, intermediate and top roller brackets, and associate lifting hardware;

FIG. 7 is an exploded view of the top bracket having various features of adjustment for the top roller;

FIG. 8 is a horizontal section detail showing a top weatherstrip seal;

FIG. 9 is a vertical section detail showing a similar seal used as a side weatherstrip;

FIG. 10 is a detail showing roller track connections;

FIG. 11 is a cross section on the line 11—11 of FIG. 10;

FIG. 12 is a detail of a top header lock shown in closed position;

FIG. 13 shows the top header lock in open position.

DESCRIPTION OF A PREFERRED EMBODIMENT

Referring to FIG. 1, a two-car garage 10 has a single overhead door made up of a bottom section 11, intermediate sections 12, 13, and a top section 14. Each section is flush from the front, and, as seen in FIGS. 2-5, has a front skin 16, a solid core 17, and a back skin 18. For light weight and good moisture resistance the skins may be of aluminum, or of a plastic material such as vinyl, and for light weight and good thermal transfer resistance the core may be of almost weightless "bead-board" (a foamed plastic such as expanded polystyrene). As described and claimed in U.S. Pat. 3,338,013 of Aug. 29, 1967, such a core may be provided with perforations 19 and grooves 20.

In accordance with the present invention the top and bottom of each section is provided with unitized sealing and hinge hardware preferably made of a light metal such as aluminum. By "unitized" is meant hardware designed to unite and which is uniform across the door section and factory-installed rather than spaced out or otherwise like ordinary mounted-on-the-job-site hinges. As shown, such unitized hardware includes top and bottom rails (and their extensions which act as truss members to prevent deflection when the door is in horizontal, open, position). Everywhere except at door top and door bottom these rails form multiple weather seals, and hinge portions and include, at the top of sections 11, 12 and 13, a top rail 21 having a weatherproofing male rabbet portion 21R (see FIG. 5) and hinge portions which include a curved prong 21P and a base extension 21E. In the illustrated embodiment, prong 21P taken with 21E acts as the female portion of a continuous hinge.

At the bottom of sections 12, 13 and 14, a bottom rail 22 has the female portion 22R of the weatherproofing rabbet joint and a curved piece 22P interfitting (which 21P and 21E) as the male half of the continuous hinge which has the advantage of providing an added weather seal and also the advantage that no extraneous hardware (such as a hinge pin and numerous individually applied hinges) need be added on the job site or at the practically nonaccessible ends of the panels.

At the top of top section 14, is a flat topped truss bar 23 assumed of a light metal such as aluminum (see FIGS. 4 and 7).

At the bottom of bottom section 11, is a bottom rail 24 assumed of aluminum.

As seen in FIGS. 2, 3 and 4, end reinforcing stiles 25 and intermediate reinforcing stiles 26, preferably of aluminum, extend between, and part overlay, the top and bottom rails (21, or 23, and 22, or 24, as the case may be). Because of the light weight of the plastic (or aluminum) skins, the foam core, and aluminum frame just described (e.g., as contrasted with prior art wood rails and stiles and hardboard or plywood facings) considerably smaller spring 27 (see FIG. 4) need be pro-

vided for counterbalance. Such a spring may be V connected to two ropes or cables 28 each secured to a lifting pin 29 held in bottom rail 24, as in FIG. 4, which also shows rail 24 provided with a slot for holding a soft plastic diamond shaped astragal substitute 30. This diamond shape has the advantage, for example over the half-moon shape of the prior astragal; that the material has some place to go during compression thus to provide both better mechanical cushioning action during closure and better sealing when the door is closed.

In conventional manner and in order to make the door move back away from the frame during lift, a pair of roller rails or tracks 31 (see FIG. 6) taper back towards the top, so that the individual rollers must likewise be progressively stepped back from the position of a bottom roller 41, or shaft bracket 41B, shown in FIG. 4 provided as an integral portion of bottom rail 24, to the position of a top roller 45 journalled in a top bracket 45B. To facilitate this, at all of the intermediate joints each top rail 21 (at the top of the lower section) is provided with a universal roller bracket 32 having three locations for receiving roller shafts and whereby a middle position 42B receives one roller shaft, a lower position 43B receives the shaft of the roller next above, and a top position 44B receives the shaft of the roller next above that which is journalled in 43B.

At the door top, the flat top truss bar 23 has a tongue portion 23T (see FIG. 7) which mates with a groove 50 in (e.g., for standardization) a like universal roller bracket 32 providing the bracket positions 42B-44B, (here unused) and also having tapped holes (not shown) for receiving screws 54 for adjustably securing an added top roller bracket comprising the position 45B, thus giving good universality since the top roller 45 (FIG. 6) may have its shaft 55 (FIG. 7) located in the journal 45B, which is adjustable up and down to provide proper alignment of top roller with the track and assure that when the door is closed there is no gap for wind entry at the top or between sections which can't close or at the bottom of the door, for example after a service adjustment made necessary by ground heaving up in the winter.

Novel sealing is used throughout, and as shown in FIG. 8, looking sideways at the top, and FIG. 9, looking downward along the side of the door, a stationary garage doorway head jamb 56 and side jambs 57 may each have nailed thereto a respective continuous weatherstrip 58 which is a soft plastic (e.g., soft vinyl, or rubber) centrally reinforced with a flat steel strap. The plastic body and the strap may have factory provided nail holes and the body has integral therewith a flexible tongue portion 58T slideably engaging the front skin 16 of the associate door section. One advantage of such a part metal encasing soft plastic seal is that it can take the place of both the stop molding and the weather seal units separately applied and used in the past.

As a means of eliminating some of the field assembly by nuts and bolts of the prior art, vertical track 31 (see FIGS. 10 and 11) may be factory welded within one half of a track splice bracket 61. Then the track splice bracket is fastened to the jamb 57 as with conventional lag bolts, a so-called horizontal track section 62 next slid into the bracket 61 until it abuts the vertical track and then a usual horizontal front track support 63 lag bolted to door frame or jamb.

FIGS. 12 and 13 show an anti-wind-bang combined with header-lock feature. When the door goes from the part open position of FIG. 13 to the closed position of FIG. 12, the top section 14 hits an arm portion 64 journalled in, and shaft spring biased with respect to, a bracket 65 mounted on head jamb 56. Integral with 64 is an arm portion 66 which is thus forced down until a chicken head shaped latch 67 is forced into a slot 68 provided in arm 66. Chicken head 67 is assumed spring 69 biased (clockwise) so it then secures the door, against

both horizontal and vertical movement, until it is released by placing tension on the chicken and spring as through a chain 70 assumed connected to the usual through the door latch and lock mechanism (see FIG. 1).

SUMMARY OF OPERATION AND ADVANTAGES

There is thus provided a construction of the class described capable of meeting the intended objects. There results a practically maintenance free garage door (it never needs to be painted, but it can be painted) of low cost, extremely light weight, and having good appearance advantages. The light weight, for example as compared to a wood frame door, results in reducing freight costs, contributes immensely to ease of handling and installation, and requires much less hardware than the prior art doors which required large counterbalance springs rather than the relatively small ones now required. Further, unlike doors of wood, the door of the invention does not change weight due to moisture absorption and is made of materials which are neither hard to work nor expensive nor subject to rust or rot or warp. Further, the combination of the rabbet female half and the rabbet male half plus the combination of the continuous (rather than as in the prior art transversely spaced apart) close fit hinge affords a novel triple seal to prevent wind leakage when the door is closed. And still the door is much less expensive than those of the prior art both to maintain and to install, the latter because during installation substantially no hardware need be screwed on or otherwise affixed to the individual panels which are simply slipped together, as by resting a male portion 22P (see FIG. 5) of the rear-entry continuous hinge on the top truss extension 21E of a lower section when the lower section is in vertical position, then pushing forward so that 22P engages in the female portion of the hinge, and then turning the upper section to vertical position to complete the interlock, so that minimum work need be done in the field in order to assemble the sections. As a further example, the bottom-most rail (24) itself contains integral means for supporting lifting pins (without the prior time consuming practice of attaching brackets) and rollers (without attaching brackets) and the astragal improvement (without prior time consuming practice of nailing on an astragal).

We claim:

1. In an upwardly opening door having a plurality of hingedly connected sections, said sections including adjoining rails, each rail having substantially aligned vertical walls forming the rear edges of said sections, one of said rails including a rearwardly extending horizontal stiffening flange, an outwardly and rearwardly curved female hinge knuckle element extending from said flange immediately to the rear of said vertical walls, and a male pin element secured to the rear side of the vertical wall of the other of said rails cooperating with said female knuckle element hingedly to connect said sections; said female hinge knuckle element forming with the adjacent surface of said stiffening flange an opening extending lengthwise of said one of said rails, said opening being sufficient to accommodate said male pin element when supported on such adjacent surface of said stiffening flange and pushed into said female hinge knuckle element during assembly, both elements being rearwardly of the plane of said sections with the outer surface of said curved female hinge element lying rearwardly adjacent the vertical wall of the other of said rails.

2. A door as set forth in claim 1 including retainer means on said stiffening flange engaging and retaining said male pin element in proper position with respect to said knuckle element.

3. A door as set forth in claim 1 including roller brackets secured to said horizontal stiffening flange and including at least two track roller mounting sockets where-

by rollers supported therein may be spaced at different distances from said door.

4. A door as set forth in claim 1 wherein said male pin element projects toward said stiffening flange and is supported by a flange projecting rearwardly from the vertical wall of the other of said rails. 5

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DENNIS L. TAYLOR, Primary Examiner

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