July 14, 1959 D. J. RUST ET AL 2,894,579

SCREEN DOOR WITH METALLIC FRAME

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Fig. 1

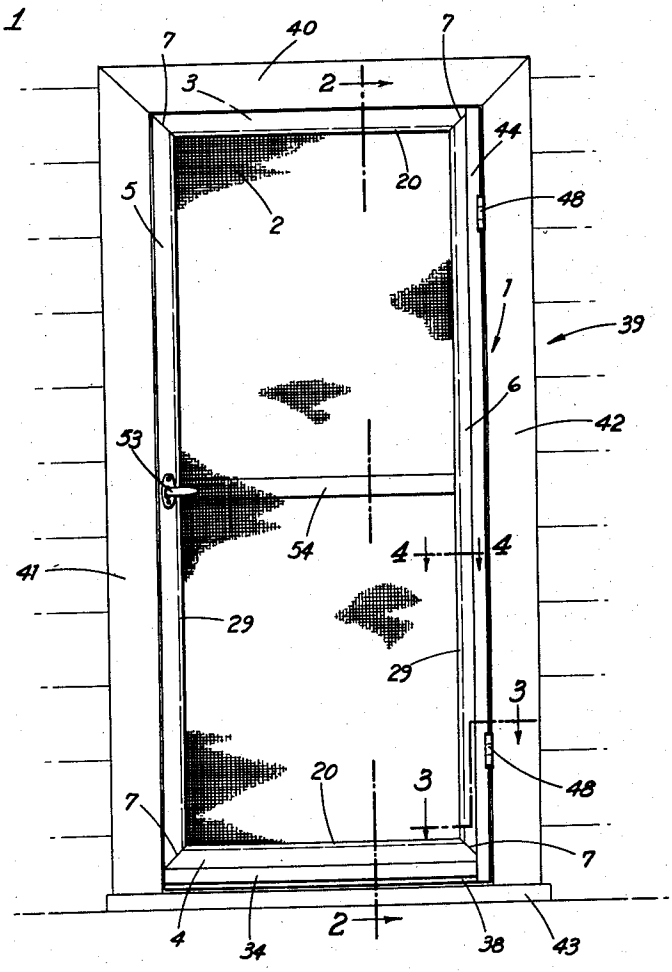


Fig. 3

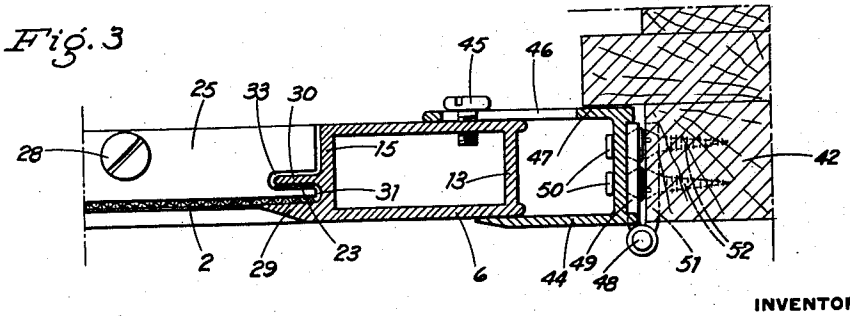
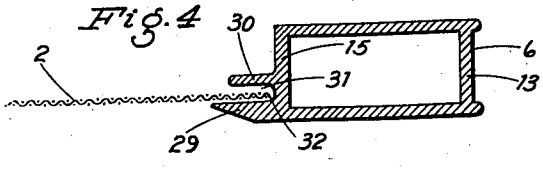


Fig. 4



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Fig. 2

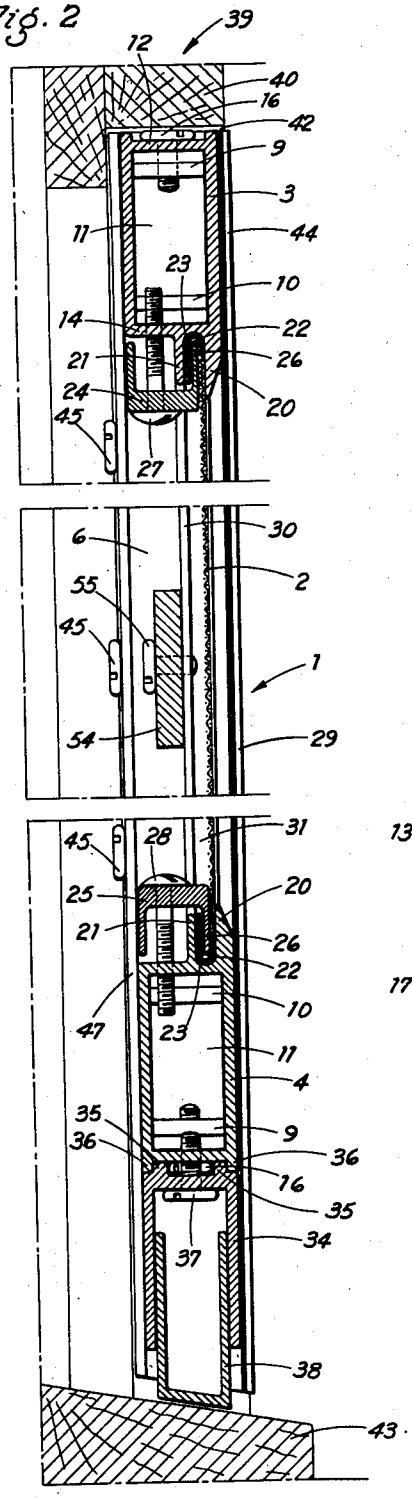


Fig. 5

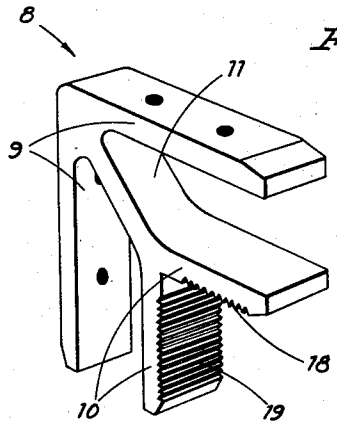
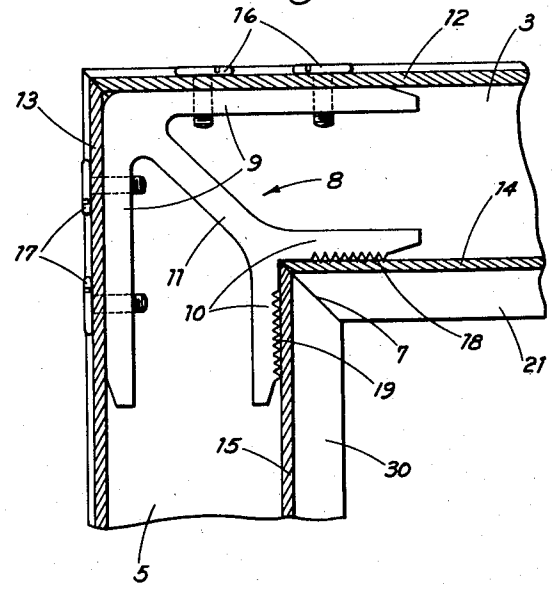


Fig. 6



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SCREEN DOOR WITH METALLIC FRAME

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Application July 22, 1954, Serial No. 444,948

1 Claim. (Cl. 160—378)

The present invention is directed to, and it is a major object to provide, a screen door having a novel, metallic frame; the frame members being—in the main—extrusions of light-weight aluminum alloy or the like.

Another important object of the present invention is to provide a novel arrangement for removably securing the screen in the frame; the screen being attached, under tension, only to the top and bottom rails of the frame, while at the side edges the screen extends in unconnected relation into vertical, laterally inwardly opening channels in the stiles of said frame. This latter feature is of substantial importance in that it permits the screen to give and take laterally, as engaged or pushed by hand, without tearing or ripping the side edges, and which commonly occurs in screen doors wherein the screen is tacked or stapled to the door stiles.

An additional object of this invention is to provide a screen door, with metallic frame, which is adjustable both vertically and horizontally, selectively; such adjustment being provided to compensate for slight differences which may exist in a standard size casing in which the door is to be mounted.

A further object of the invention is to provide a screen door, with metallic frame, which is reversible; i.e., can be assembled and mounted for right or left hand opening by a simple rearrangement of the parts which comprise the door frame.

It is also an object of the invention to provide a screen door, with metallic frame, which is designed for ease and economy of manufacture, and ready installation.

Still another object of the invention is to provide a practical, reliable, and durable screen door, with metallic frame, and one which will be exceedingly effective for the purpose for which it is designed.

These objects are accomplished by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claim.

In the drawings:

Fig. 1 is a front elevation of the screen door as mounted for use.

Fig. 2 is an enlarged vertical transverse section taken on line 2—2 of Fig. 1.

Fig. 3 is an enlarged fragmentary sectional plan view taken on line 3—3 of Fig. 1.

Fig. 4 is a similar view taken on line 4—4 of Fig. 1; the mounting post being omitted from this view.

Fig. 5 is an enlarged perspective view of one of the novel bracket units which are used to connect the frame at the corners.

Fig. 6 is an enlarged fragmentary sectional elevation showing one of the bracket units, as in Fig. 5, as used to connect adjacent ends of the top rail and one stile at an upper corner of the frame.

Referring now more particularly to the drawings, and to the characters of reference marked thereon, the screen door comprises a vertically elongated, rectangular, metallic frame, indicated generally at 1, and which frame

carries the screen 2. The frame 1 includes a top rail 3, a bottom rail 4, and—at opposite sides—stiles 5 and 6.

The rails 3 and 4, and the stiles 5 and 6, are each cut from an extrusion of light-weight aluminum alloy or the like; such extrusion being of hollow box form, as shown.

Adjacent ends of the rails and stiles are miter-jointed, as at 7, and said ends are connected together in rigid relation by bracket units, each indicated generally at 8, and one of which is shown perspectively in Fig. 5, and in elevation in Fig. 6.

As the bracket unit and the manner of connecting the rails and stiles at each of the miter-jointed corners thereof is identical, a description of one bracket unit—as shown in Fig. 5—and the manner of its use—as in Fig. 6—will suffice for all.

In Fig. 6 the top rail 3 and stile 5 abut at the miter-joint 7, and one of the bracket units 8 engages in the adjacent end portions of said rail and stile.

Each bracket unit 8 comprises a relatively large right-angle bracket 9 and a relatively small right-angle bracket 10; the bracket 10 being disposed in symmetrical but spaced relation within the bracket 9, and both of said brackets being connected in rigid relation by an integral diagonal leg 11.

When each bracket unit 8 is in place, as shown in Fig. 6, the diagonal leg 11 extends in alinement with the miter-joint 7, with the legs of said brackets 9 and 10 projecting into adjacent end portions of the rail 3 and stile 5. The relatively larger right-angle bracket 9 bears against the inside of the outermost flanges 12 and 13, of the top rail 3 and stile 5, respectively, while the relatively smaller right-angle bracket 10 bears against the inside of the innermost flanges 14 and 15 of said rail and stile, respectively.

The relatively larger right-angle bracket is secured to the flanges 12 and 13 by screws 16 and 17, while the relatively smaller right-angle bracket is serrated, as at 18 and 19, on the faces which engage the flanges 14 and 15; said serrations affording adequate frictional or holding-engagement between the parts.

With each corner of the frame 1 secured together by one of the bracket units 8, such frame is quite stable and has no tendency to rack.

The screen 2 is secured in the frame 1 in the following novel manner:

The top rail 3 and bottom rail 4, being of like cross section, although inverted one relative to the other, each includes—at the edge which borders the door opening—a pair of inwardly projecting, full length flanges; the foremost of said flanges being indicated at 20, the rearmost at 21, and the channel therebetween at 22.

The screen 2, at both its upper and lower ends, is cradle-folded, as at 23, and the corresponding or adjacent folded end of said screen engages in the channel 22 of the top rail 3 and bottom rail 4.

Upper and lower transversely extending, channel shaped screen securing and tensioning bars, indicated at 24 and 25, respectively, are disposed in the frame opening immediately adjacent the top rail 3 and bottom rail 4; the bar 24 opening upwardly, while the bar 25 opens downwardly.

The foremost flange 26 of each of the bars 24 and 25 seats on the corresponding cradle-folded end 23 of screen 2 and forcefully urges such end into the related channel 22, whereby to tension the screen 2. The screen tensioning force is applied to the bars 24 and 25 by transversely spaced screws 27 which run through the bar 24 and into the top rail 3, and screws 28 which run through the bar 25 into the bottom rail 4. By tightening the screws 27 and 28, the screen 2 is placed under relatively

high tension, from top to bottom, so that it lies smoothly within the frame 1.

As heretofore indicated, the stiles 5 and 6 are of the same configuration in transverse section as the top rail 3 and bottom rail 4; the flanges and channel of said stiles, corresponding to the flanges 20 and 21, and the channel 22, of said rails, being indicated at 29 and 30, and 31, respectively.

The side edges of the screen 2, one of which is indicated at 32, each project in unconnected or free relation into the corresponding vertical channel 31, preventing passage of insects between the screen and frame. However, upon anyone imparting hand pressure against the screen 2, either from the inside or the outside of the door, such screen, although held under tension top to bottom, can yield laterally some distance, as each edge 32 is free. Immediately upon the hand pressure on the screen being released, the screen can spring back or expand laterally, assuming its initial or normal position flat in the frame; all without injury to said screen.

When the bars 24 and 25 are placed under tension by the screws 27 and 28, respectively, there would be a tendency—unless preventive means were provided—for such bars to rock rearwardly on said screws due to the pull imparted by the screen 2. However, such undesirable rocking of the bars 24 and 25 is here prevented by notching each bar at the ends, as at 33, and in such position that the notched portion straddles the adjacent flange 30 (see Fig. 3). This effectively maintains the bars 24 and 25 in position for adjustment by the screws 27 and 28, respectively, yet without the possibility of said bars rocking rearwardly.

The bottom rail 4 is fitted with a depending secondary bottom rail 34 which is of inverted or downwardly opening channel shape in cross section. The secondary bottom rail 34 is formed at the top with transversely spaced, longitudinal ribs 35 which lie inside of corresponding ribs 36 on the lower edge of the bottom rail 4. With this arrangement the bottom rail 4 and secondary bottom rail 34 are maintained in perfect alinement; the rails 4 and 34 being secured together by screws 37.

A vertically adjustable shoe rail 38, of upwardly opening channel shape in cross section, frictionally engages in the secondary bottom rail 34 from below; the lower edge of the shoe rail being inclined from rear to front, as shown.

The screen door, as above described, is adapted to be mounted in a door casing, indicated generally at 39, which includes a header 40, jambs 41 and 42, and a sill 43, in the following manner:

The frame 2 engages, at one side—here the side which includes the stile 6—in normally fixed but adjustable relation into a mounting or attachment post 44 of laterally inwardly opening channel shape. Adjustment of the extent of projection of the frame 1 into the attachment post 4 is accomplished by means of vertically spaced screws 45 which extend into the stile 6 through transversely elongated or horizontal slots 46 in the rear flange 47 of said attachment post 44. By the simple expedient of adjusting the extent of projection of the frame 1 into the post 4, the door can be properly dimensioned to fit—with respect to width—into the door casing 39; i.e., between the jambs 41 and 42.

The dimensioning of the screen door to properly vertically fit into the casing 39—i.e. between the header 40 and sill 43—is accomplished by adjusting the shoe rail 38 either up or down in the secondary bottom rail 34; the slope of the lower edge of the shoe rail 38 substantially corresponding to the slope of the sill 43 so that these parts, by adjustment of said shoe rail, may be disposed in relatively close relation when the screen door is in its normal position.

The screen door is hung in the door casing 39 by means of vertically spaced hinges 48; one leaf 49 of each hinge being riveted, as at 50, to the post 44, while the other leaf 51 is attached by screws 52 to the jamb 42.

A latch 53 mounted on the stile 5 maintains the screen door normally in its closed position.

If desired, a transverse push bar 54 may be secured to the frame 1 rearwardly of the screen 2; such push bar spanning between and being secured to the stiles 5 and 6 by means of screws 55.

The above described screen door can be mounted for either left-hand or right-hand opening without the need of any additional parts; this being accomplished merely by up-ending the door one way or the other and by securing the secondary bottom rail 34, and the shoe rail 38 carried thereby, to the rail 3 or 4 whichever is lowermost; both of said last named rails being identical in cross section, as aforesaid, and each being tapped for reception of the screws 37.

The present invention therefore provides a screen door, with metallic frame, which is readily manufactured, easily adjustable for width or height to accommodate slight variations in the door casing, and which can be readily mounted in said door casing with either right-hand or left-hand opening.

Also, the screen 2 can always be maintained taut by tightening the screws 27 and 28, and if replacement of such screen is necessary this is accomplished easily by removing such screws and the bars 24 and 25, whereupon the screen can be withdrawn without obstruction from the frame and a new screen inserted and re-tensioned in the manner described.

From the foregoing description it will be readily seen that there has been produced such a device as will substantially fulfill the objects of the invention, as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claim.

Having thus described the invention, the following is claimed as new and useful, and upon which Letters Patent are desired:

In a screen door which includes a frame having vertically spaced rails and stiles extending between and connected to said rails at the ends; a screen extending from one rail to the other rail, said rails being formed with full-width channels on their adjacent edges, said channels opening toward each other and each being defined by a pair of spaced inwardly projecting flanges, the ends of the screen being cradle-folded and engaged in corresponding channels, horizontal screen securing and tensioning bars extending inwardly of the corresponding rails and said bars having vertical flanges projecting into the channels within said cradle-folded ends of the screen, and screws adjustably securing the bars to corresponding rails whereby tightening of the screws causes relative separation of the bars and tensioning of the screen, the stiles including vertical members lapping the adjacent side edge portions of the screen and said side edge portions remaining free; said vertical members on the stiles being inwardly projecting vertical flanges; the screen securing and tensioning bars being notched at the ends, and said vertical flanges engaging in the notches.

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