April 8, 1930. R. E. BLACKBURN 1,753,683

WIRE SCREEN FRAME AND METHOD OF MAKING THE SAME

Filed Sept. 9, 1926 2 Sheets-Sheet 1

Fig. 1




Fig. 2




Fig. 3

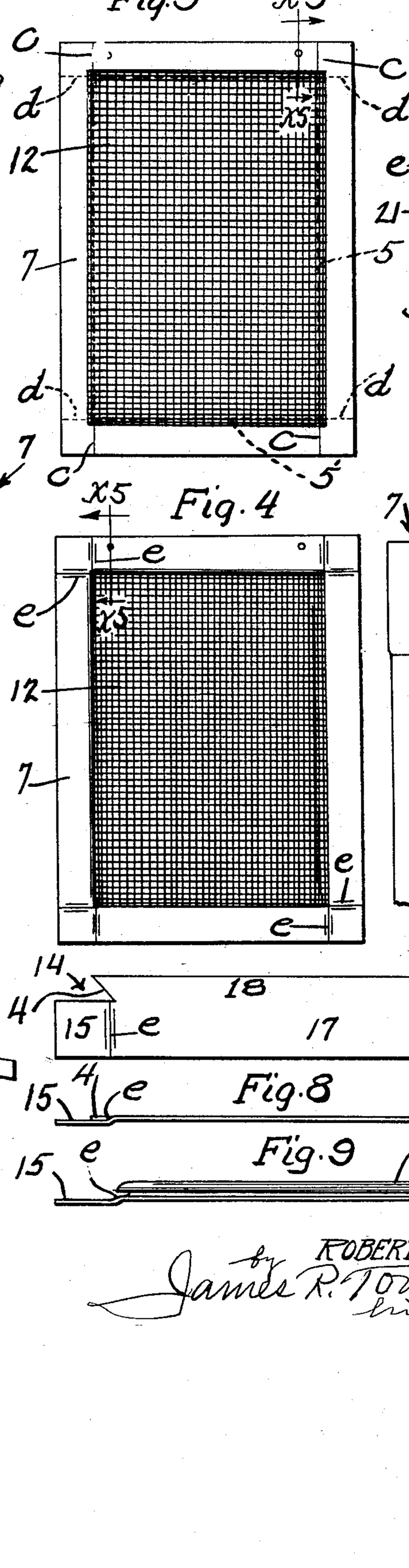



Fig. 5

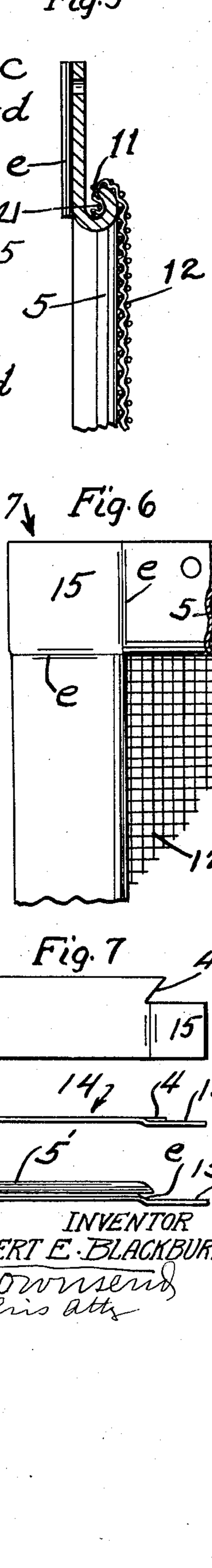



Fig. 4




Fig. 6




Fig. 7




Fig. 8




Fig. 9




WITNESS
Robt. S. Woolsey

INVENTOR
ROBERT E. BLACKBURN
by James R. Townsend
his atty

April 8, 1930. R. E. BLACKBURN 1,753,683

WIRE SCREEN FRAME AND METHOD OF MAKING THE SAME

Filed Sept. 9, 1926 2 Sheets-Sheet 2

Fig. 10

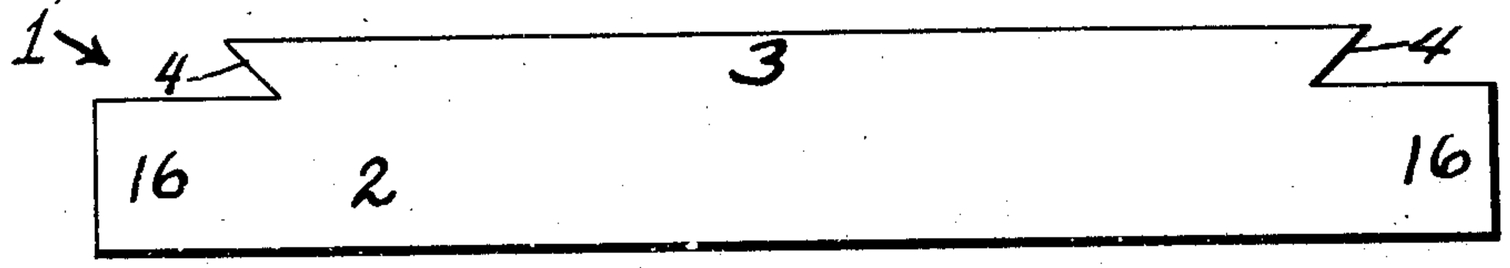



Fig. 11

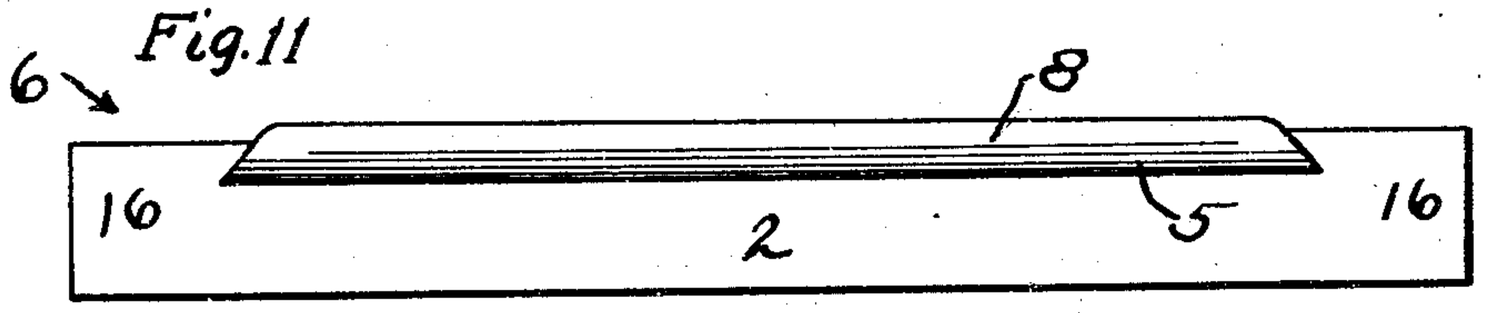



Fig. 12

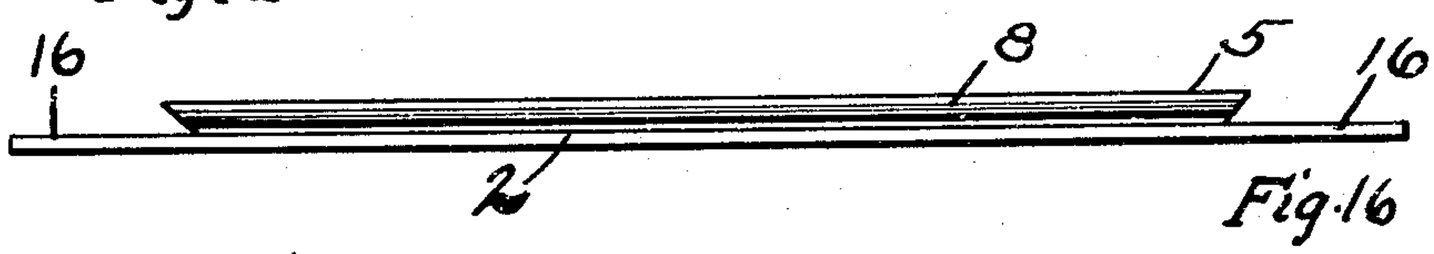



Fig. 16

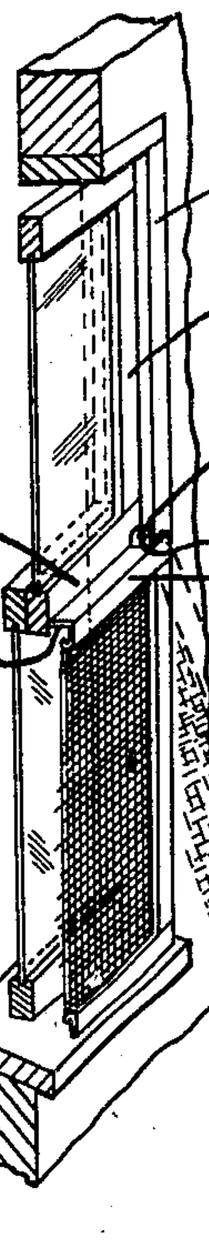


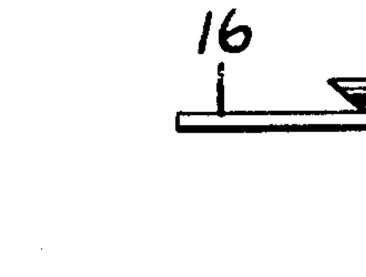
Fig. 13




Fig. 14




Fig. 15







INVENTOR
ROBERT E. BLACKBURN
by James R. Townsend
his attn.

WITNESS
Robt. S. Woolsey

Patented Apr. 8, 1930 1,753,683

# UNITED STATES PATENT OFFICE

ROBERT E. BLACKBURN, OF LOS ANGELES, CALIFORNIA

## WIRE-SCREEN FRAME AND METHOD OF MAKING THE SAME

Application filed September 9, 1926. Serial No. 134,419.

In general practice, in fitting buildings with window openings, window sash, and wire screens, it is common to make window sash of standardized width and length, but in common practice, window frames made for the same size of sash may vary both in width and length so that the maker of window screens is compelled to make such screens especially for each window frame in the average dwelling, and this involves considerable extra cost in labor and in screen misfits over what would be required if the window frames were standardized.

The window screen frames of standard lengths and widths as made by window screen makers usually have to be trimmed in order to fit into the opening; and in some cases such screen frames are too narrow for the opening, so that in case such screen is mounted in such opening, there will be a crack between the edges of the screen and the inner edges of the window casing; and if too short there will be a crack between the window sill and the bottom of the screen.

An object of this invention is to avoid the trouble and expense of fitting the screen frame into the opening in a window frame.

It is customary to fit the screen frame between the inner edges of the outside casing of the window frame, and the screen frame is not flush with such frame, but is usually one-sixteenth of an inch thicker than the outside casing of the window frame and I have taken care of this common feature to supply a metal screen that will seldom require to be fitted into the open space between the edges of the outside casing.

In the present instance I provide a window screen frame that has on one side thereof a projecting endless bead over which the web or sheet of screen cloth is stretched leaving a flat margin all around the screen cloth to fit on the face of the outside casing.

Another object is to provide a screen frame having a high coefficiency of edgewise resistance which will hold the wire screen cloth with greater cloth tension than is possible with a wooden frame and to make provision whereby portions of such frame may be easily bent flatwise to conform to any irregularities of the outside window casing.

It is highly necessary with screen frames, that the same be so constructed that the side which fits against the window casing be flat when the screen is closed, so that it will contact with the window casing all around and leave no opening between it and the window frame through which insects may enter, and an object of this invention is to provide a substantial light metal screen which will be rigid when fastened shut, and will fit closely all around against the window frame.

In this invention I provide a composite frame formed of strap metal stiles and rails with welded corners, and flat at its edges upon one surface and provided on a surface with flanage rolls forming hollow beads terminating in edges adjacent to but spaced from the frame strips or straps, thus forming an endless external recess into which the edges of the wire web or screen cloth covering the bead may be bent, thus straining the web and giving it a strong tension to hold it absolutely tight; and the finished screen comprises the combination with strap metal frame members integrally united at the corners and having at their inner edges rolls to form a recessed bead into which the edges of a web or wire screen cloth stretched over the frame may be tucked to fix the web to the frame.

The invention includes the completed screen frame, the flanged sheet metal stampings, the sheet metal blanks adapted to be put together to form the frame; and the cross welded lapped corners and miter weld corner bead channel frame.

The invention further provides a complete rectangular frame composed of only four initial pieces, and such pieces are metal strips integrally united being welded together and internally self braced and may be applied, insect tight, against the outside of a window casing without forming any projection therefrom greater than has heretofore been customary with wooden screens as hereinbefore stated.

Another feature of advantage is that the screen frame is adapted to avoid the appear-

ance of any crack between the screen and the window frame.

An advantage of this invention is that the screen frame is adapted to be fitted to either the outside or inside face of the window frame, or on the blind stops between the jambs as may be desired or as occasion may require.

The invention is also applicable to sliding half screens.

The improved screen may be manufactured in different ways and an object of the invention is to provide a novel method of making the screen so as to provide a screen of this character in the simplest, easiest and most expeditious manner.

Other objects, advantages and features of invention may appear from the accompanying drawings, the subjoined detailed description and the appended claims.

The accompanying drawings illustrate the invention.

Figure 1 is a view of a screen embodying this invention hung outside a window casing, and shown with a greatly exaggerated inward bow. The window casing is shown in section.

Fig. 2 is an elevation of the screen brought into place on the casing which is shown in section.

Fig. 3 is an inside view of the screen shown in Figs. 1 and 2, looking at the projecting screen and the flat face of the screen frame therearound, that is adapted to fit against the flat window casing as in Fig. 2, or to slide in grooves as indicated in Fig. 15.

Fig. 4 is a view of the screen on the side that is outward and toward the right in Figs. 1 and 2.

Fig. 5 is a section on enlarged scale on line $x^5$, Figs. 3 and 4, looking in the direction of the arrow.

Fig. 6 is an enlarged fragmental external view of the corner of the screen as shown at the upper left hand corner of Fig. 4.

Fig. 7 is an outside view of a rail stamping.

Fig. 8 is an edge view of the rail stamping shown in Fig. 7.

Fig. 9 is an edge view of the rail blank with bead formed of the stamping of Figs. 7 and 8 when the edge extension has been rolled up.

Fig. 10 is a plan of a stile stamping.

Fig. 11 is a plan of a stile blank formed of said stamping with its extension rolled.

Fig. 12 is an outside edge view of the blank stile with its extension rolled to form the screen web holding bead.

Fig. 13 is an end view of the stile blank on enlarged scale.

Fig. 14 is a face view to illustrate a step in making the frame out of the stile and rail blanks, whereby an edgewise internal outward strain is imposed on each stile to resist the tension of the wires.

Fig. 15 is a fragmental vertical section of a sliding half screen in a window frame, fragments of which are shown.

Fig. 16 is a fragmental perspective view of an upper corner of a screen constructed in accordance with this invention and adapted to use as a suspended half screen.

The stile stampings 1 (see Fig. 10) are alike and consist of a main strip or strap body 2 and an edge extension 3 that has miter ends 4, and is adapted to be bent into a roll over the strap 2 to form the beads 5 of the stile blanks 6 for the completed frame 7.

Each stile blank 6 differs from the stile stamping 1 in that the edge extension 3 of the stile stamping is rolled over and forms the bead or roll 5, the free edge 8 of which is spaced from the main strap body 2, to leave a slot or open mouth 9 to a recess 10 into which the edge 11 of the screen web 12 is tucked after the ends of the stile blanks and rail blanks have been connected to form the screen frame 7 having the continuous flange 13 outside the bead.

The rail stampings 14, (see Figs. 7 and 8) are like each other and are substantially like the stile stampings; differing therefrom in that each has an offset lap portion 15 adapted to receive lap ends 16 of the stiles so that one face of the completed screen frame is smooth and may be fitted flat against the flat face of a window casing or the bead stop, not shown. Each rail stamping also comprises a main strap body 17 and miter-end edge extension 18, between the end lap offsets 15.

The screen rail blanks are provided with rolls or beads 5′ like the rolls or beads 5 of the stiles, and form web receiving slots and recesses corresponding to the slots and recesses 9 and 10 for the stiles.

To make the frame in the form at present preferred, the ends of the stile blanks for one screen frame are first placed on the offset end portions of one of the rails and the stile blanks are spread apart at their further ends as indicated at 19, in Fig. 14, and then the stile ends applied to the rail blank are welded thereto by some suitable form of welding; as by spot welding or its equivalent.

By this means I have provided for the manufacture of a rectangular screen frame, an assembly of one rail and two stiles welded together with the stiles divergent so that in order to weld a like rail to the free ends of such divergent stiles it is necessary to spring the stiles edgewise and thus put them under an internal edgewise strain that tends to bow the middle of the stiles edgewise from each other thus tending to give the stiles a high coefficient of edgewise resistance to the strain that will be brought upon the frame by the tension of the wire cloth when that is applied in finishing the screen.

The frame thus constructed includes four

sheet metal members, the ends of which are fixed together, and two opposite ones of which members are under edgewise tension.

I have found in actual practice that no greater skill, time or labor is required to thus give to the screen frame the high coefficient of edgewise resistance than is required for welding the members together without imposing upon the frame the said edgewise tension resistance.

It is thus seen that by making the assembly and then springing the ends of the stiles toward each other and fastening the stiles to the second rail, the work of producing a strong edgewise strain resisting screen frame is made possible with practically no additional expense over a frame devoid of such edgewise resistance, thus permitting the use of light sheet metal for making strong frames.

Then the stiles are brought under strain into position in the offset end portions of the other rail, and are then welded in place with the miter joints 20 fitting together at the corners of the rolls or beads, thus, a frame composed of stile and rail strips, forming an outer border or flange 2, and having a continuous externally channeled bead inside such border is formed. That is to say, the frame comprises a continuous outwardly opening hollow bead and a continuous outwardly extending flange formed of the straps, and flat and smooth on the side from which the bead projects.

Then the wire cloth or screen web 12 is spread on the continuous bead, and the edges of the cloth are then tucked under into the open slot, thus forming an edge clinch 21 and completing the screen.

By this method of construction the wire web is drawn very tight by the tucking process, and the wires are practically clinched underneath the shell formed by the bead.

In Fig. 14, the broken lines *a* indicate the location of the inner bead edges of the stiles when the screen frame is completed, and broken lines *b* indicate the location of the outer edges of the flange when the frame is completed.

In Fig. 3, the thin vertical lines *c* indicate the union of the inner edges of the stile ends with the rails, and the broken horizontal lines *d* indicate the union of the inner edges of the rails with the stiles.

In Fig. 4, the bends at the junction of the rails and stiles are indicated at *e* and these bends are on the side opposite the projected bead and are indicated by the character *e* at different places in other figures.

When the invention is applied to sliding half screens, (see Fig. 15) the top rail is provided with a flange 22 extending at right angles to the plane of the screen so as to abut against the bottom meeting rail 23 of the top sash 24.

In Fig. 16, 25 indicates an ear extending upwardly from the parting rail flange 25′ and provided with a hole to receive a screw 27 driven into the blind stop 28 or into the casing 29, whereby the screen can be pivoted between the blind stops or casing of a window.

It is thus seen that I have made provision for accommodating a swinging screen to close openings varying in widths and lengths to an extent practically equal to the projection of the flat frame flange or border outside the bead, and have also made provision for both sliding and swinging half screens.

When the wire cloth has been tucked into the slot and the screen is in place on the window frame, the space between the wire cloth and the flange is practically unnoticeable and therefore no fillets are required to give the finished appearance.

The thickness of the strips or straps from which the stiles and rails are formed, may not exceed $\frac{1}{16}$ of an inch in order to give the required strength, and therefore when the swinging screen, shown in Figs. 1 and 2, is brought flat against the window casing the projection formed by the screen is about the same as that which is customary with standard wooden screen frames now in use.

It is thus seen that in the completed screen the internal strain of an opposite two of the frame members, that is to say, the internal edge-wise strains of said members tend to bow the members edge-wise from each other, thus practically forming a trussed frame; although such opposite members are in parallelism, being held so by the tension of the wire cloth.

I claim:—

1. A screen frame comprising metal stiles and rails, each of said stiles formed with an outwardly opening hollow bead and a flat flange extending edgewise from said bead, said flange and bead having an internal strain tending to bow the stiles edgewise from each other, said stiles being welded to rails having internal beads and edgewise outwardly extending flanges to resist the internal strain of the stiles; and a screen wire web strained on the beads of said stiles and rails; the tension of said web being resisted by the strain of the stiles.

2. A screen frame comprising stiles and rails, said stiles formed with lap ends and inner edge extensions having mitered ends, said rails provided with off-set lap ends and inner edge extensions having corresponding mitered ends, the off-set ends of said rails adapted to receive the lap ends of said stiles and be welded thereto, so that one surface of the completed screen is smooth and the mitered edge extensions of said stiles and rails being rolled over to form a continuous bead around the opening of the frame and the free edge of which is spaced from the main body of the frame to form a recess into which the edges of the screen are tucked.

3. The method set forth of making a window screen frame which consists in stamping sheet metal strips into form for the stiles and rails of the frame, forming at the meeting ends of the rails and stiles offsets so that the frame will have lap ends and one flat side; and overlapping and welding the meeting ends together.

4. The method of making a frame which consists in welding to a rail, adjacent ends of two stiles spread apart at their further ends and then bringing the further ends into position on a like rail and welding the same thereto, thus producing an edgewise strain in the stiles of the completed frame, tending to bow them from each other so as to resist the tension of the wire screen stretched thereon.

5. A screen frame assembly consisting of three members comprising two stiles and a rail for a frame; said stiles being fixed to the rail and arranged divergent to each other so that in order to form a completed screen by welding to the ends of the stiles a second rail for the formation of a rectangular frame, it will be necessary to place the stiles under edgewise tension or strain in bringing them into position to be welded in the formation of a rectangular frame.

6. A sheet metal frame comprising four sheet metal members the meeting ends of which are fixed to each other, and the bodies of an opposite two of which members are under edgewise internal strain tending to bow the members edgewise from each other so that when the wire cloth is strained onto the screen frame said members may be drawn into parallelism and yet remain under edge-wise outward strain.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 1st day of September, 1926.

ROBERT E. BLACKBURN.