Jan. 9, 1951 L. E. WILLETT 2,537,109

METAL SCREEN FRAME

Filed March 23, 1946 2 Sheets-Sheet 1

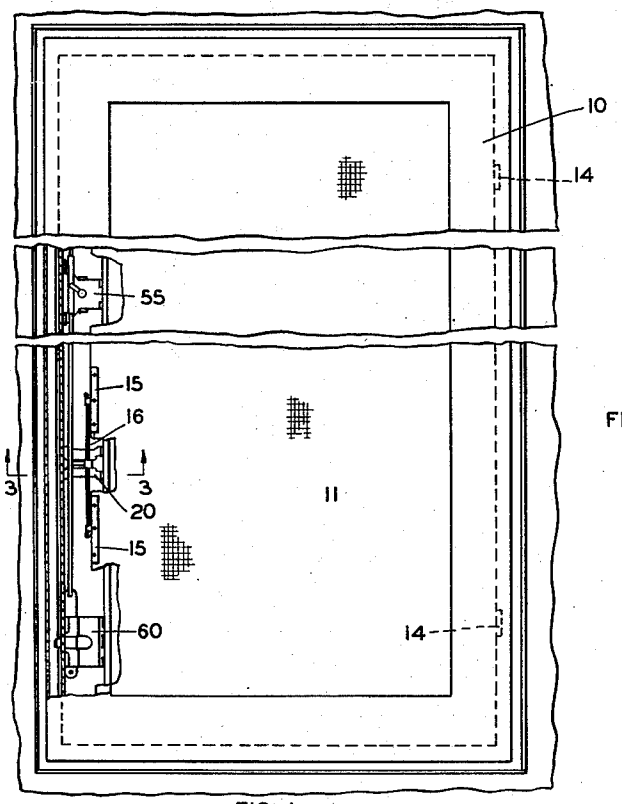


FIG.-1

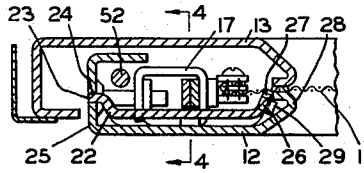


FIG.-3

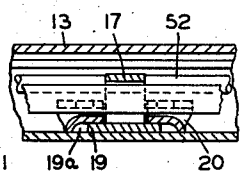


FIG.-4

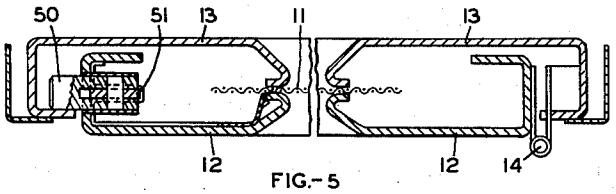


FIG.-5

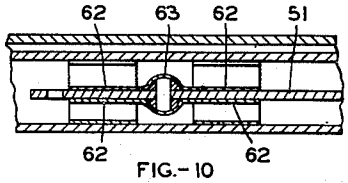


FIG.-10

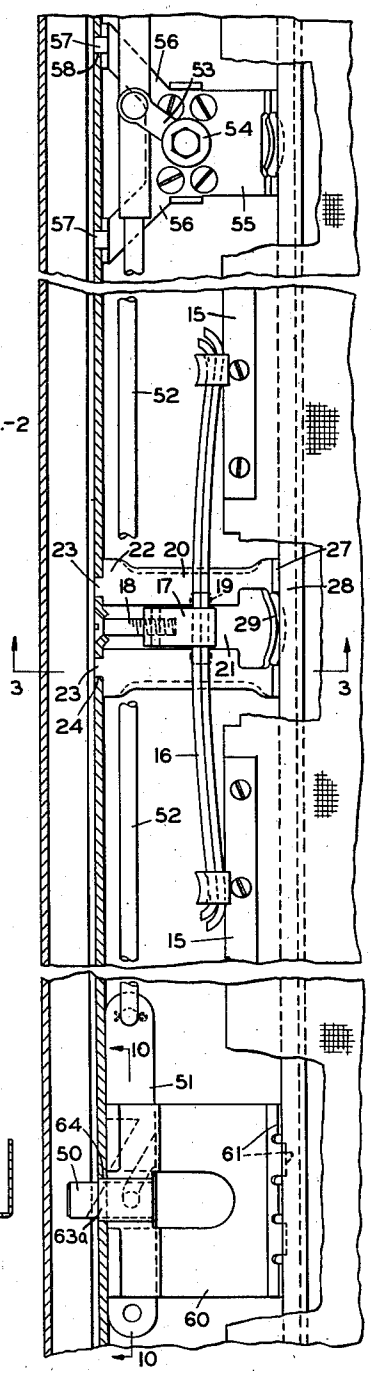


FIG.-2

INVENTOR
LEON E. WILLETT

BY Hyde, Meyer, Baldwin and Sloan
ATTORNEYS

Jan. 9, 1951 L. E. WILLETT 2,537,109

METAL SCREEN FRAME

Filed March 23, 1946 2 Sheets-Sheet 2

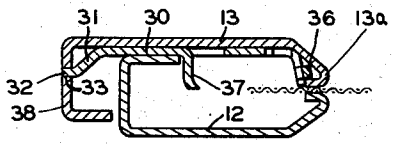


FIG.-7

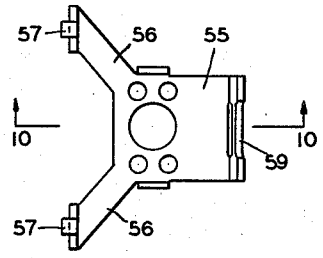


FIG.-8

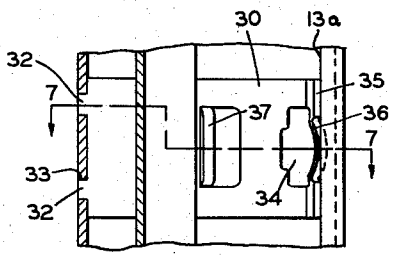


FIG.-6

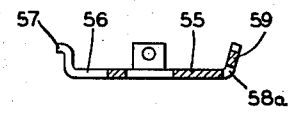


FIG.-9

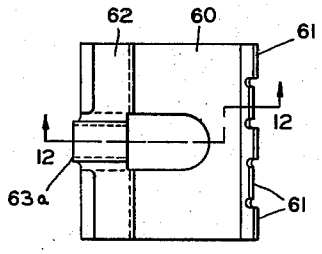


FIG.-11

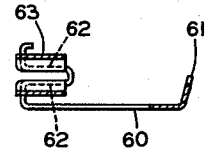


FIG.12

INVENTOR
LEON E. WILLETT

BY Hyde, Meyer, Baldwin and Sloan

ATTORNEYS

Patented Jan. 9, 1951 2,537,109

UNITED STATES PATENT OFFICE

2,537,109

METAL SCREEN FRAME

Leon E. Willett, Detroit, Mich., assignor to Chamberlin Company of America, Detroit, Mich., a corporation of Michigan

Application March 23, 1946, Serial No. 656,644

8 Claims. (Cl. 160—371)

1

The invention relates to metal screens and more particularly to the screen frame, which is usually made up of one or more sheet metal members of generally channeled form.

One object of the invention is to provide an improved metal screen frame, including one or more bracing, reinforcing or supporting members or elements mounted in the frame channel and of such form as to enable them to be manufactured at low cost and to be more or less permanently assembled with or attached to the frame by a simple bending operation, thereby entirely dispensing with welding or riveting operations and avoiding the use of screws, nuts, bolts or the like.

Still another object of the invention is to provide an improved screen frame element, of the character described, made of pressed sheet metal and formed on one side to interlock with one wall of the screen frame and deformable along its other side for permanent securement to the frame.

Still another object of the invention is to provide an improved screen frame member, of the character described, including one or more lugs or projections on one edge arranged to register with and enter cooperating recesses or openings on one wall of the frame channel, and provided along its opposite edge with a locking portion which is readily deformable in such manner as to effect more or less permanent securement or attachment of the member to the frame.

Still another object is to simplify and improve the general construction of the frame as a whole, enabling it to be made and assembled at low cost, doing away with otherwise necessary welding or riveting operations or any use of screws, bolts, rivets or the like.

Further objects of the invention in part are obvious and in part will appear more in detail hereinafter.

In the drawings:

Fig. 1 is an elevation partly broken out and in section, showing one form of detention screen embodying the invention;

Fig. 2 is a detail view, on a larger scale, showing a mounting and adjusting parts for the screen panel, and certain of the locking parts, including several of the elements embodying the present invention;

Fig. 3 is a detail cross section on the line 3—3, Figs. 1 and 2;

Fig. 4 is a sectional view taken on the line 4—4, Fig. 3;

2

Fig. 5 is a sectional view showing the hinge and the lock arrangements;

Fig. 6 is a detail view showing another element embodying the invention;

Fig. 7 is a sectional view taken on the line 7—7, Fig. 6;

Figs. 8 and 9 are views corresponding to Figs. 6 and 7, and showing still another embodiment;

Fig. 10 is a sectional view taken on the line 10—10, Fig. 2;

Figs. 11 and 12 are views corresponding to Figs. 6 and 7, and showing yet another embodiment.

While the present invention may be embodied in or used in connection with any shape or kind of screen for any building opening, such as either doors or windows, and in a frame of either light construction, such as an ordinary insect screen, or the heavier screens used as strong barriers, for convenience of illustration, and in no sense of limitation, the invention has been shown embodied in a detention screen, designed to prevent unlawful or unauthorized passage into or out of the building, such as might be accomplished, for example, by an insane patient or other confined person attempting to escape through a screen from the inside of the building, or by a thief attempting to enter from the outside. Such screens usually consist of a strong wire screen panel mounted in a metal frame anchored in the building. The detention screen shown in the drawings is of the same general form illustrated and described in a prior U. S. Patent No. 2,417,711 granted March 18, 1947, to Frank R. E. Smith and Leon E. Willett for Detention Screen, to which reference may be had if desirable or necessary.

The screen shown comprises a four sided metal frame, marked generally 10, in which is mounted the wire mesh screen panel 11.

The metal frame consists of inner and outer members 12, 13, each extending around the four sides of the opening, said members being mitered at the corners and lying opposite to each other with the open sides of their channels facing each other when the screen frame is closed, as shown for example in Fig. 5. The two frame members are hinged together on a vertical axis at 14. Thus, one of the frame channels, that marked 13, is stationarily secured to the building, while the other channel, marked 12, can be swung inwardly about the hinge axis to open up the frame. This latter swinging member is the one which supports the screen panel 11, as well as the locking and other operating members of the screen,

Of the four frame parts or members embodying the present invention, and instances of which are utilized in the screen shown in the drawings, the first to be described will be that used as a part of the supports for the screen panel.

As in the prior application before referred to, the screen panel, here marked 11, has its several peripheral edges held in clamping members 15, Figs. 1 and 2, each suspended or mounted on one end of several long, leaf springs 16. Each spring leaf passes through an open yoke or loop 17 into a threaded opening in which are screwed the threads of a screw 18 for adjusting the spring tension. Each of these loops 17, as shown in the drawings, is provided with lateral feet or projections 19 which travel back and forth in recesses 19a underneath the side portions of a plate metal guide member 20 having a longitudinal slot 21, the parallel side edges of which guide the yoke in its movement. The guide plate 20, in the form shown (Figs. 2, 3 and 4) has one end edge portion bent upwardly to provide a flange 22 from which extend two lugs 23 spaced apart lengthwise of the frame channel and which lugs, in the assembled device, enter openings 24 in the outer wall 25 of the frame channel 12. The opposite end edge portion of said plate guide is bent up to form a flange 26, portions of which, marked 27, Fig. 2, serve as abutments engaging the outwardly extending return edge flange of the inner inclined wall 28 of member 12 (Fig. 3). Opposite to the end of the slot in plate 20, the two flange portions 27 are joined by a fairly narrow bridge portion 29, capable of being bent readily, as by the pressure or impact of a tool, or in a machine, to the curved form shown in the drawings, so that it extends beneath the edge of the frame wall 28, as shown in Fig. 3. By inserting the lugs 23 into their openings and then bending the bridge 29, with the yoke in place, said plate and the yoke are both substantially permanently attached to the frame, with the yoke of course slidable along the plate. This is a very simple construction enabling the slidable yoke to be permanently confined against escape, but without the use of welding, riveting, bolts or screws, or other more expensive modes of attachment.

Figs. 6 and 7 of the drawings show another frame plate member, here marked 30, one end of which is bent to form a flange 31 having lugs 32 adapted to enter openings 33 in frame wall 38, while the opposite end portion of said plate is cut away to form an opening 34, beyond which is a flange 35 adapted to abut the edge 13a of frame wall 13 and also a bendable bridge 36 which, when the plate 30 is laid in place, may be bent to extend beneath and interlock with wall 13a, for permanent securement of the plate to the wall.

This particular plate 30 has a portion near its center punched out and bent up to form a flange 37 which, when the two channels of the screen frame are closed together, serves as a brace and stop, preventing the two channels from being bent or distorted relatively to each other, in the plane of the screen, as by the insertion of a screw driver between them, and also preventing inward bending of the flat body walls of the channels toward each other, by the abutment of the end edge of flange 37 with the inner surface of frame channel 12.

The frame channels are locked together, in closed position, by locking mechanism of the same general form shown in said prior application. As shown in Figs. 1, 2 and 5, along the swinging edge of the swinging frame member are located one or more bolts 50 actuated by cam plates 51 operated by rods or links 52, which in turn are operated by a crank arm 53 carried by a rotatable operating member 54, to which a handle or key may be attached for turning it.

As shown in Fig. 2, each operating member 54 is mounted to turn in an opening in a plate member 55, corresponding to members 20, 30, before referred to and similarly permanently anchored in the frame. Plate member 55 is provided with two diverging end arms 56, Figs. 8 and 9, each of which is flanged upwardly and provided with a lug 57 adapted to enter an opening 58, Fig. 2, in the channel wall, as before, while at its opposite end the plate is provided with an opening 58a and a bendable bridge portion 59, which, similarly to bridge 36, is used for permanently locking the plate in the frame channel.

Again, in Figs. 2, 10, 11 and 12, is illustrated a fourth plate member 60, which here is provided along one edge with a series, five being shown, of lugs 61, part of which extend above the frame wall 28, and part of which may be bent or deformed, during the final act of assembly, to extend underneath the edge of said frame wall 28. (See lower end of Fig. 2.) Said plate 60 also has a part thereof bent to form two walls 62, lying parallel to each other, and between which the cam plate 51 slides, and portions of which walls 62 are bent to form a cylindrical housing 63 for the bolt 50, a portion 63a of which housing extends into an opening 64 of the outer wall 23 of the frame member, thus serving the same purpose as the lugs 23, 32 and 57. The bolt is slotted to receive the cam plate 51, and is provided with a cross pin 65 traveling in an inclined slot 66 in the bolt, as is usual.

This plate 60 is assembled in the frame, by putting the bolt in place in said plate, and then inserting the cam plate and cross pin. Then the plate 60 is inserted into the frame channel with the housing member 63a entering opening 64. Then the bendable flange portions 61 are bent up, to lock the parts in place, as before.

In all forms, the frame plate member or element, such as any of plates 20, 30, 55 and 60, is provided at one end with a deformable part and at the opposite end with a lug part entering an opening in a wall of the frame channel member. It also extends some distance, say an inch or two, lengthwise of the channel so that it cannot cock or twist by turning movement. Each, when its deformable portion is bent as described, is firmly and permanently attached and cannot be removed without distorting some of the parts. When in place, each serves its particular purpose, either as a brace, or as a support for a movable operating device of one kind or another, such as the yoke 17, movement of which adjusts the spring tension, or the movable bolt 50 or cam plate 51, or the bolt operating member 54. All of the plate parts may be made cheaply from sheet metal by cutting, punching and forming operations and consequently at low cost.

Further advantages of the invention will be apparent to those skilled in the art.

What I claim is:

1. In a detention screen structure of the type wherein a planar mesh screen panel has its edge portions resiliently suspended from peripheral supporting and retaining means, a screen supporting frame of channeled contour comprising a base portion disposed generally parallel to the plane of the screen panel, and first and second flanges spaced from each other and rigid with

said base and extending from said base in angular relationship thereto, the second said flange having a continuous inturned free edge portion extending towards the first said flange, a plate member disposed between said flanges, the first said flange having an aperture therein, an edge portion of said plate having a projection fitted to be insertible in said aperture, the edge of said plate opposite said projection having a portion abutting said inturned free edge, and another portion disposed beneath said free edge.

2. In a detention screen structure of the type wherein a planar mesh screen panel has its edge portions resiliently suspended from peripheral supporting and retaining means, a screen supporting frame of channeled contour comprising a base portion disposed generally parallel to the plane of the screen panel, and first and second flanges spaced from each other and rigid with said base and extending from said base in angular relationship thereto, the second said flange having a continuous inturned free edge portion extending towards the first said flange, a plate member disposed between said flanges, the first said flange having an aperture therein, an edge portion of said plate having a projection fitted to be insertible in said aperture, the edge of said plate opposite said projection having a portion abutting said inturned free edge, and another readily deformable portion, said readily deformable portion being disposed beneath said free edge.

3. In a detention screen structure of the type wherein a planar mesh screen panel has its edge portions resiliently suspended from peripheral supporting and retaining means, a screen supporting frame of channeled contour comprising a base portion disposed generally parallel to the plane of the screen panel, and first and second flanges spaced from each other and rigid with said base and extending from said base in angular relationship thereto, the second said flange having an inturned free edge portion extending towards the first said flange, a plate member disposed between said flanges, the first said flange having two spaced apertures therein, an edge portion of said plate having two spaced projections respectively fitted to be insertible in said apertures, the edge of said plate opposite said projections having a portion abutting said inturned free edge, and another portion deformably disposed beneath said free edge.

4. In a detention screen structure of the type wherein a planar mesh screen panel has its edge portions resiliently suspended from peripheral supporting and retaining means, a screen supporting frame of channeled contour comprising a base portion disposed generally parallel to the plane of the screen panel, and first and second flanges spaced from each other and rigid with said base and extending from said base in angular relationship thereto, the second said flange having an inturned free edge portion extending towards the first said flange, a plate member disposed between said flanges, the first said flange having an aperture therein, an edge portion of said plate having a spaced projection fitted to be insertible in said aperture, the edge of said plate opposite said projection having spaced abutment portions abutting said inturned free edge, and a bridge portion extending between said abutment portions, said bridge portion being deformable and being disposed beneath said free edge, said plate being provided with surface contour means adapted to receive screen retaining and securing means.

5. In a detention screen structure of the type wherein a planar mesh screen panel has its edge portions resiliently suspended from peripheral supporting and retaining means, a screen supporting frame of channeled contour comprising a base portion disposed generally parallel to the plane of the screen panel, and first and second flanges spaced from each other and rigid with said base and extending from said base in angular relationship thereto, the second said flange having an inturned free edge portion extending towards the first said flange, a plate member disposed between said flanges, the first said flange having spaced apertures therein, an edge portion of said plate having spaced projections fitted to be insertible in said apertures, the edge of said plate opposite said projections having spaced abutment portions abutting said inturned free edge, and a bridge portion extending between said abutment portions and deformably disposed beneath said free edge, said plate being provided with a slot adapted to receive and guide screen retaining and securing means.

6. In a detention screen structure of the type wherein a planar mesh screen panel has its edge portions resiliently suspended from peripheral supporting and retaining means, a screen supporting frame of channeled contour comprising a base portion disposed generally parallel to the plane of the screen panel, and inner and outer flanges spaced from each other and rigid with said base and extending from said base in angular relationship thereto, the inner said flange having an inturned free edge portion extending towards the outer said flange, a plate member disposed between said flanges, the outer said flange having spaced apertures therein, an edge portion of said plate having spaced projections fitted to be insertible in said apertures, the edge of said plate opposite said projections having spaced abutment portions abutting said inturned free edge, and a bridge portion extending between said abutment portions and deformably disposed beneath said free edge, said plate being provided with a slot, and resilient screen supporting means having a guide portion slidable in said slot.

7. In a detention screen structure of the type wherein a planar mesh screen panel has its edge portions resiliently suspended from peripheral supporting and retaining means, a screen supporting frame of channeled contour comprising a base portion disposed generally parallel to the plane of the screen panel, and inner and outer flanges spaced from each other and rigid with said base and extending from said base in angular relationship thereto, the inner said flange having an inturned free edge portion extending towards the outer said flange, a plate member disposed between said flanges, the outer said flange having spaced apertures therein, an edge portion of said plate having spaced projections fitted to be insertible in said apertures, the edge of said plate opposite said projections having spaced abutment portions abutting said inturned free edge, and a deformable bridge portion extending between said abutment portions and disposed beneath said free edge, said plate being provided with surface contour means adapted to receive screen frame lock operating means.

8. In a detention screen structure of the type wherein a planar mesh screen panel has its edge portions resiliently suspended from peripheral supporting and retaining means, a screen supporting frame of channeled contour comprising a base portion disposed generally parallel to the

plane of the screen panel, and inner and outer flanges spaced from each other and rigid with said base and extending from said base in angular relationship thereto, the inner said flange having an inturned free edge portion extending towards the outer said flange, a plate member disposed between said flanges, the outer said flange having spaced apertures therein, an edge portion of said plate having spaced projections fitted to be insertible in said apertures, the edge of said plate opposite said projections having spaced abutment portions abutting said inturned free edge, and a deformable bridge portion extending between said abutment portions and disposed beneath said free edge, said plate being provided with means adapted to receive screen locking bolt means.

LEON E. WILLETT.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,059,677	Lund	Apr. 22, 1913
1,201,338	Orr	Oct. 17, 1916
1,245,044	Scott	Oct. 30, 1917
1,665,475	Plym	Apr. 10, 1928
1,797,511	Mensik	Mar. 24, 1931
2,024,928	Johnson	Dec. 17, 1935
2,101,349	Sharp	Dec. 7, 1937
2,197,489	Trulock	Apr. 16, 1940