H. W. & W. W. WATSON.

METAL SCREEN.

APPLICATION FILED JULY 27, 1905.

956,239.

Patented Apr. 26, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

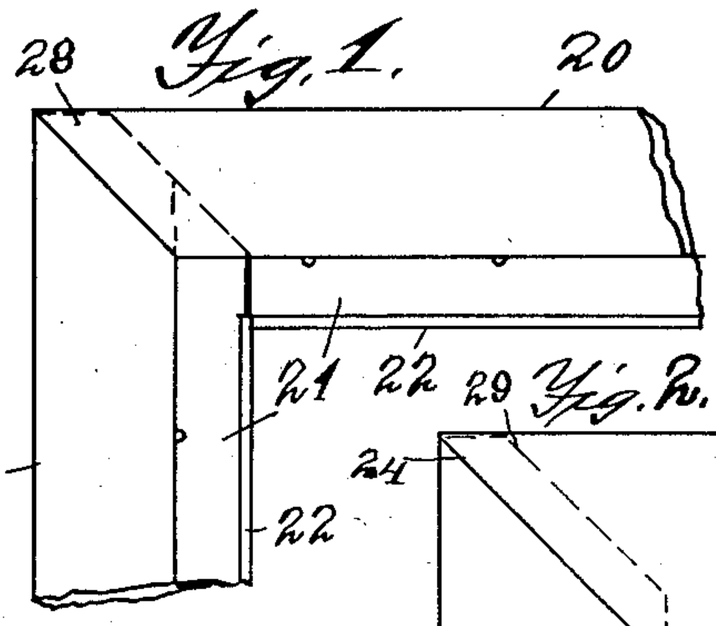


Fig. 2.

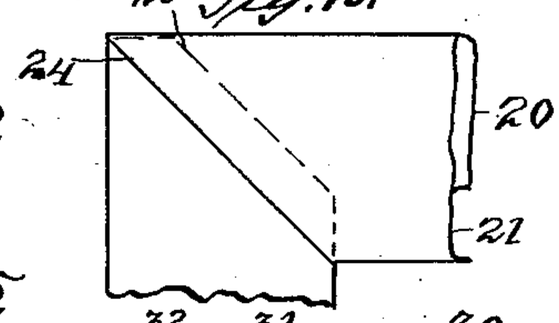


Fig. 3.

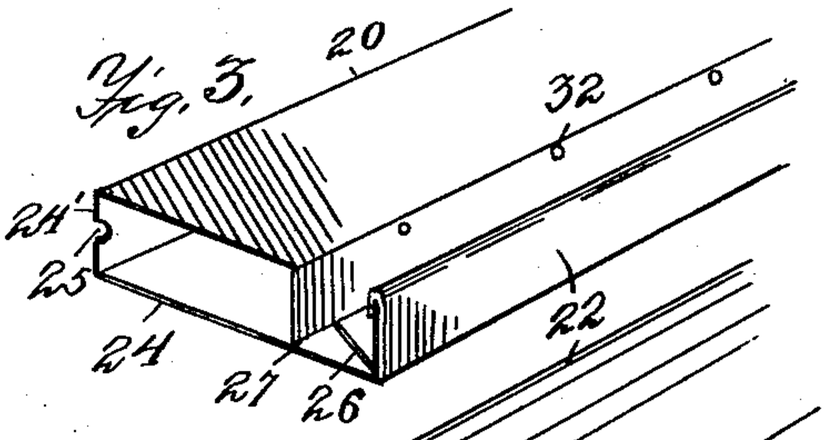


Fig. 4.

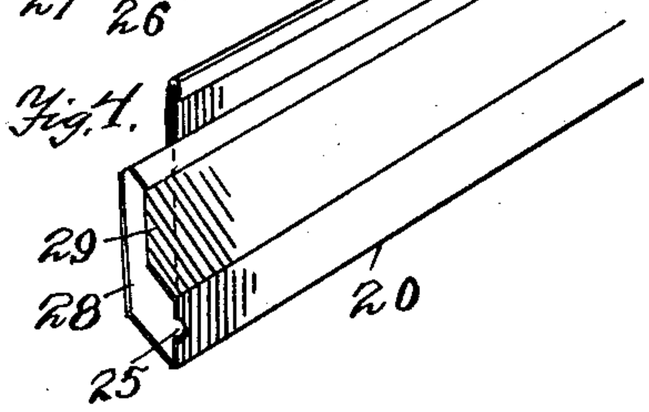


Fig. 5.

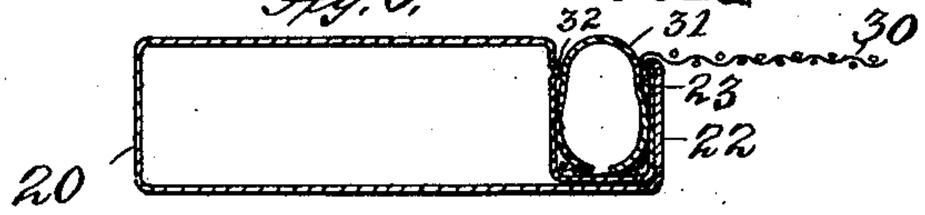


Fig 6

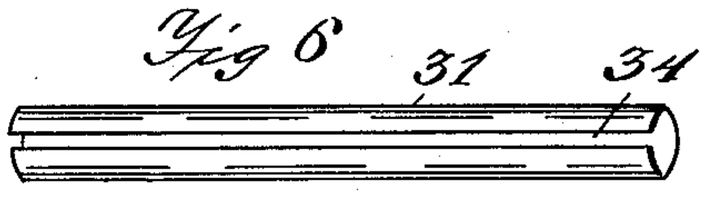


Fig. 7

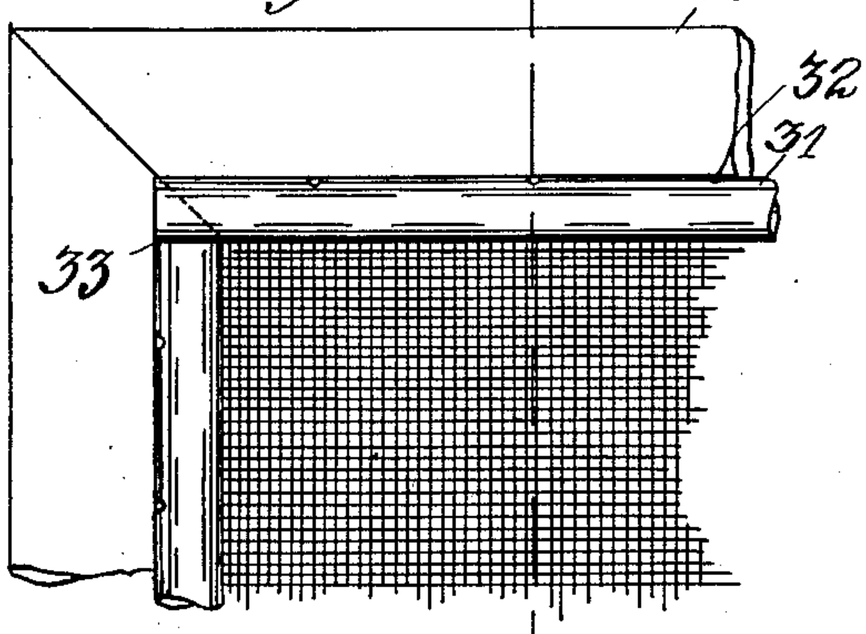


Fig. 8.

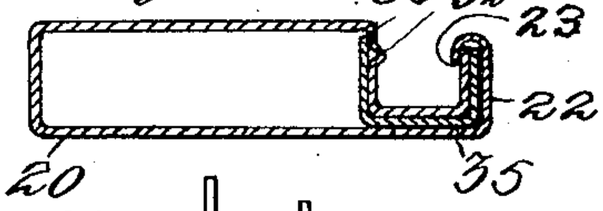


Fig. 9.

Fig 10

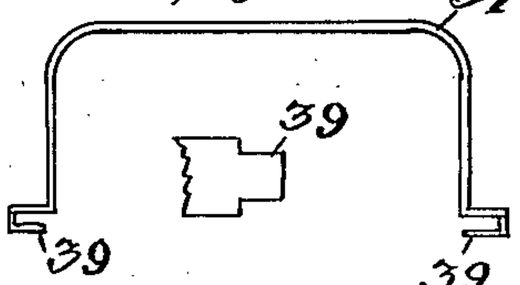
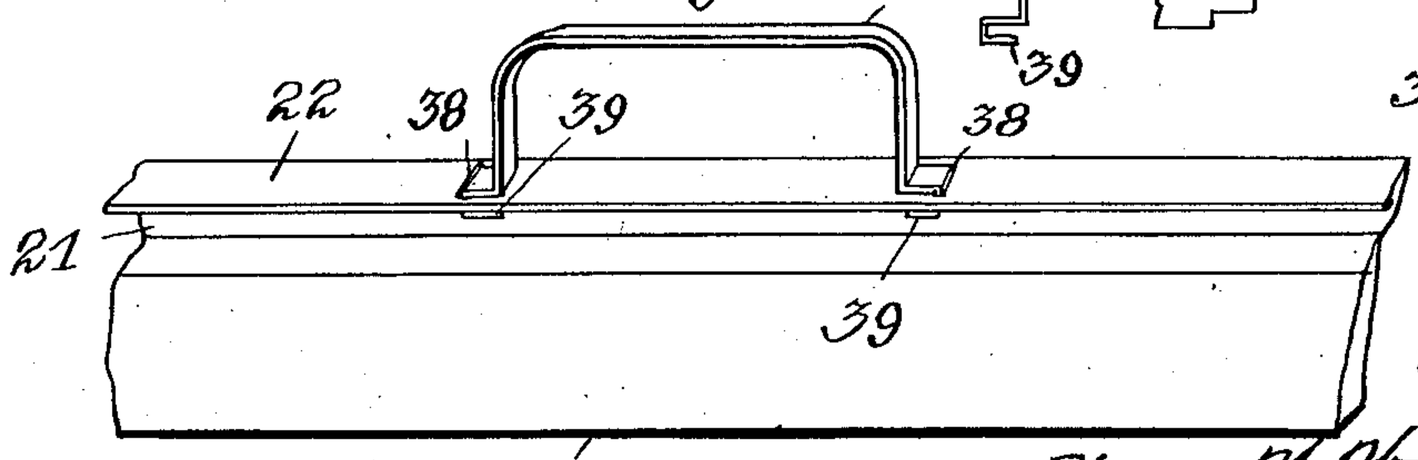


Fig 11



Witnesses

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2 SHEETS—SHEET 2.

Fig. 12.

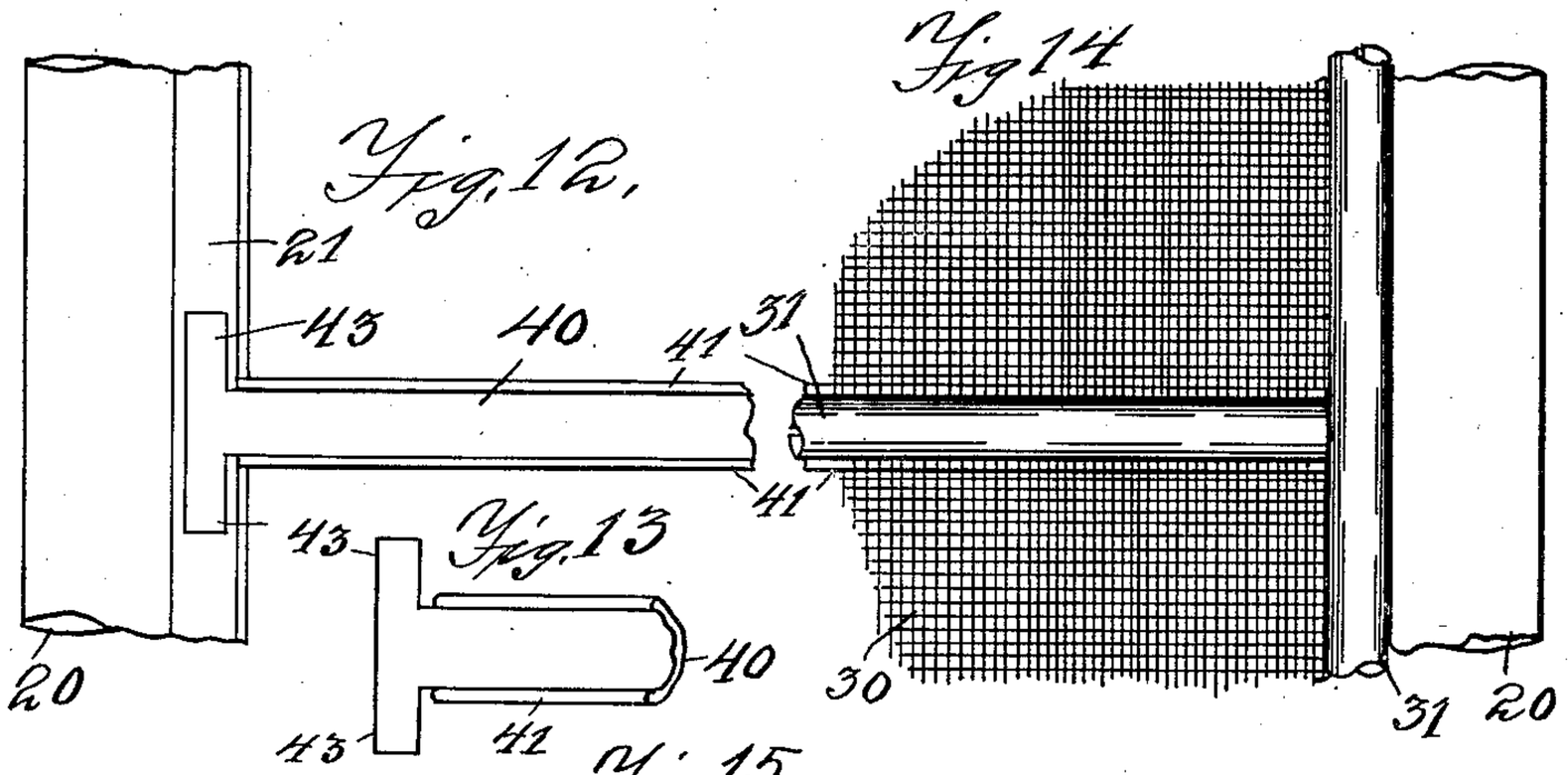


Fig. 13.

Fig. 14.

Fig. 15.

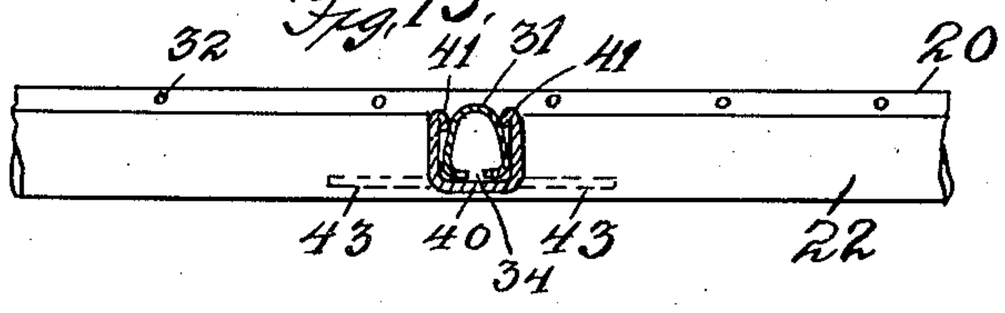
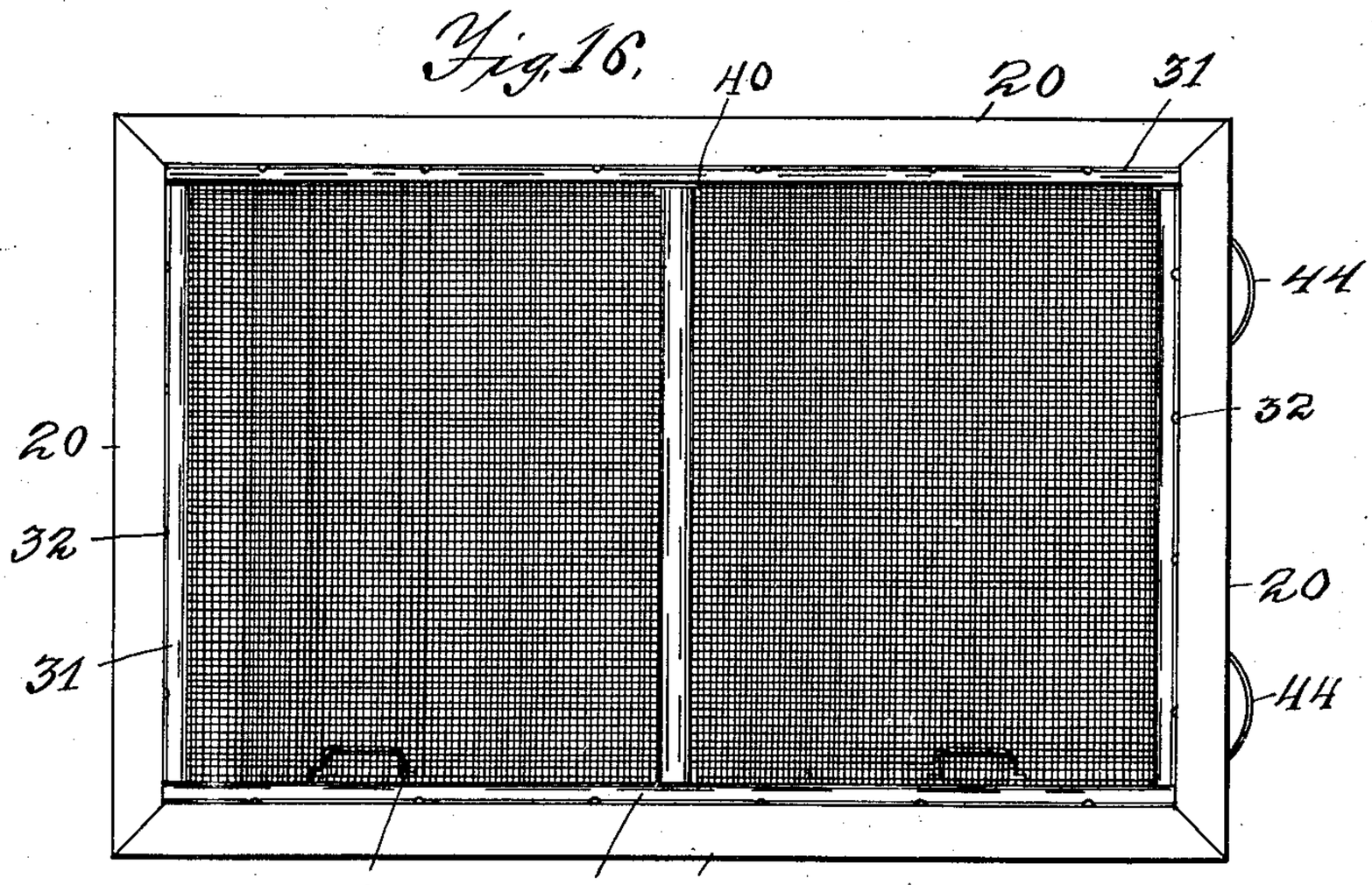


Fig. 16.



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UNITED STATES PATENT OFFICE.

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METAL SCREEN.

956,239. Specification of Letters Patent. Patented Apr. 26, 1910.

Application filed July 27, 1905. Serial No. 271,416.

To all whom it may concern:

Be it known that we, HENRY W. WATSON and WILLIAM W. WATSON, citizens of the United States, and residents of Jamestown, in the county of Chautauqua and State of New York, have invented new and useful Improvements in Metal Screens, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

The invention relates to metallic screen construction for doors, windows, and like openings, and has for its objects to simplify and improve the construction of the tubular or sheet metal frame and the means for attaching the screen wire to the frame.

In the drawings, Figure 1 is an elevation of the inner side of a frame corner without the screen wire, and Fig. 2 is an outer elevation of the same. Fig. 3 is a perspective view of one of the ends of the tubular frame sides and Fig. 4 is a perspective view of the opposite end which fits into the end shown in Fig. 3. Fig. 5 is a sectional view at line X X in Fig. 7. Fig. 6 is a perspective view of the cleft tubular spring locking strip. Fig. 7 is an elevation of the inner side of the screen corner with the screen wire locked in place by tubular strips. Fig. 8 is a sectional view of the tubular frame side with a reinforcing strip and Fig. 9 is an end view of the reinforcing strip. Fig. 10 is a side elevation of one of the lifts, and the tongued end of the same for attaching to the frame side. Fig. 11 is a perspective view of the lift attached to the frame side. Fig. 12 is an elevation of the inner side of a cross piece showing the manner of attaching the end to the frame side and Fig. 13 is a detail of the end of the cross piece removed from the frame. Fig. 14 is a similar view to Fig. 12, with the screen wire and locking strips in place. Fig. 15 is a sectional view of the cross brace and inner side of the tubular frame. Fig. 16 is a plan view of a screen with cross brace.

Similar numerals refer to corresponding parts in the several views.

The numeral 20 indicates the tubular metal frame, which is cut and bent from the flat sheet metal strips by means of suitable dies and presses. The closed tube of frame side 20 is preferably made in the rectangular form and has along its inner edge a lengthwise recess or groove 21 formed from the strip by extending both edges of the sheet metal out in the lengthwise angular flange 22, as shown; the inner edge of the sheet metal being left short and the outer edge extending inwardly over the same and forming the locking edge 23, for a purpose hereinafter set forth. It is apparent that the lengthwise bend in the two joined edges as they extend out in angular flange 22 in combination with locking edge 23, formes an angular lock for the two edges which closes the tube of frame side 20.

The opposing ends which form a corner are made in the following manner: end 24 is cut at the regular angle of a forty five degree miter with the exception of the outer edge 24′ which is allowed to project slightly to cover the opposing end. One half of the drip hole 25 is cut in end 24′, the other half in the opposing end. The bottom of the inner plate forming the groove 21 is cut squarely across as at 26 and a slotted opening 27 is thereby left to receive the projecting sheet metal of the opposite end. The opposing end is formed with projecting flanges 28 and 29 and both these flanges pass within tubular end 24, as shown in dotted outline in Fig. 1, the flange 28 entering the slot 27 and pressing against the square end 26, thereby forming a smooth bottom to the channel 21 at each corner and locking the corner. Flanges 28 and 29 also give plenty of surface for soldering this joint securely and the thin sheet metal is easily covered thereby so as to make a perfectly smooth joint and one of great strength. This construction of the frame side leaves the inner side perfectly smooth so that the drainage to the drip hole 25 is perfect, there being no obstruction.

The screen wire 30 is attached to the frame in channel 21 by means of a tubular spring strip 31 which is formed of a strip of sheet metal bent in the tubular form with the edges a slight distance apart as at 34, so that they may spring together when pressed into channel 21. The sheet metal is pressed out in small, locking projections 32 in the rear wall of channel 21 at suitable distances, and the edge of the sheet metal 23 on the outer flange 22 forms with projections 32 oppositely placed locking means which engage the spring tube when pressed into said channel; projection 32 might be made continuous and not depart from my invention.

It is apparent that the screen wire 30 can be cut the desired size to fit the frame and

the tubular strips 31 may be cut the desired length to fit evenly within the channels 21. Said tubular strips may be cut with miter joints, as shown in dotted line in Fig. 7, but are preferably cut with square ends, as shown at 33, since it is easier accomplished and holds the screen wire better than the miter joint. The cleft or opening 34 in strip 31 is preferably placed at the bottom of channel 21, but it would not depart from the invention to place said opening at any part of the strip. As for example, it might be made at the rear side and serve the purpose.

It is found that the two thicknesses of sheet metal form a sufficiently strong channel with flange 22 for small screens. In large screen work where it is desired to have exceedingly stiff flanges 22 for the inner edge of channel 21, a reinforcing strip 35 is bent to fit the channel form and slipped within the same, as shown in Figs. 8 and 9. The flange 22 is thereby braced against outward strain since the side of the reinforcing strip within the tubular frame braces against the sheet metal, as shown at 36 in Fig. 8. It is obvious that great strength is thus given to flange 22.

Lifts 37 are provided for the screen and attached to the flange 22 by means of spaced slots 38 cut in said flange and tongued ends 39 for lifts 37. The tongues 39 are inserted within slots 38 and then clenched on the inner side of flange 22, as shown in Fig. 11. Where the flange 22 is not sufficiently strong to receive lift 37, reinforcing strip 35 may be provided along the side of the screen frame to which the lifts are attached and the tongued ends 39 extend through flange 22 and strip 35.

In order to give sufficient stiffness to large window or door screens, cross bars are necessary and provision is made for such cross bar construction, as shown in Figs. 12 to 16. Cross bar 40 is made in the channel form, as shown in section in Fig. 15, the edges 41 being turned inwardly to form locking edges for the tubular spring locking strip 31. The end of cross bar 40 is attached to the frame side 20 by cutting an opening in flange 22 the size of cross bar 40 so that the end of the cross bar fits within the opening for the tube. The end of cross bar 40 is provided with side projections or wings 43 which extend out each way in the bottom of channel 21 so that when spring strip 31 is pressed into place locking wire 30 within the channel cross bar 40 and the channel 21, the T-shaped end formed by the wings 43 is also locked securely in place.

It is apparent that tubular strip 31 may be sprung out of channel 21 and the channel cross piece 40, and the screen wire may thus be released whenever desired. This is convenient for renewing or changing the screen wire. Cross bar 40 is also released with the tubular locking strips 31 and the screen wire. Suitable holding springs 44 may be attached in any suitable manner to the screen edge, as shown in Fig. 16.

The angular lock of the edges of the strip in flange 22 in forming channel 21 closes the tube and forms a complete tube and channel from a single strip. The edges of the sheet metal are held from slipping under torsional strain to the frame mainly by said angular lock, but the locking ends 39 of lifts 37, which extend through both edges of the strip and are pressed onto the same, greatly assist in locking the two plates against such a slipping movement and thus add to the stiffness of the frame.

We claim as new:—

1. In a window screen, a frame, each of the side pieces of said frame consisting of a sheet metal strip formed in a closed tube, the two lengthwise edge portions of said strip placed adjacent and loosely connected and formed in a flange, said flange forming a channel beside said tube, screen wire, and retaining strips to fit said channel and hold said wire therein.

2. In a window screen, a frame, the side and end pieces of said frame each consisting of a tube formed from a strip of sheet metal, the lengthwise edges of said strip loosely interlocked and formed in a continuous channel around the inner edge of said frame, screen wire, and retaining strips to fit said channel and hold the wire.

3. In a window screen, a frame consisting of sheet metal strips bent in tubular form, the lengthwise edges of said strips formed in a recess, screen wire, and a retaining strip consisting of a metal tube divided along one side to form separated edges, said tube adapted to fit said recess.

4. In a window screen, a frame consisting of sheet metal strips bent in rectangular form, the lengthwise edges of said strips formed in a recess, screen wire, a cleft tube to fit said recess and secure said screen wire, and locking projections on the walls of said recess for said retaining tube.

5. In a window screen, a frame consisting of sheet metal strips bent in rectangular form, the edges of said strips formed in a lengthwise recess, one end of said strips at each frame corner cut away at a mitral angle and the other un-cut end inserted and soldered within said mitered end to form the corner, screen wire, and retaining strip for said wire in said recess.

6. In a window screen, a frame consisting of sheet metal strips bent in tubular form, the lengthwise edges of said strips formed in a recess, a sheet metal channel strip inclosed between said edges to reinforce and brace said recess, projections on the outer and inner walls of said recess, a screen wire,

and a locking strip to fit said recess and hold said wire within said locking projections.

7. In a window screen, a frame consisting of sheet metal side and end pieces, the inner edges of said pieces formed in a lengthwise recess, the opposite outer flanges of said recessed pieces having openings therein, and a sheet metal cross bar bent in a channel form to fit said opening and having T-shaped ends engaging said recesses, screen wire, and retaining strips for said wire in said recesses and channeled cross bar.

8. In a window screen, a frame, each of the side pieces of said frame consisting of a strip of sheet metal formed in a tube, a lengthwise recess formed beside said tube by the angular flange formed in the joined edges of the strip, spaced slots through said flanged edges, and a lift having tongued ends locking in said spaced slots to hold said edges.

9. In a window screen, a frame consisting of the tubular side and end pieces 20 having an end at each corner cut away at a mitral angle 24 and the projecting ends 28 and 29 inserted and attached within said mitered end, the lengthwise edges of said pieces formed in a recess 21 having an outer flange 22, locking projections 23 and 32 on the walls of said recess, spaced slots 38 in said flange, a lift 37 having tongued ends 39 locking in said spaced slots, screen wire 30, and cleft tubular locking strips 31 to retain said wire in said recesses, substantially as and for the purpose specified.

10. In an improved window-screen the combination of the frame with groove enlarged inwardly, the resilient slotted tubes forming a filling-piece adapted to be inserted in said groove, the wire fabric to be engaged therein, substantially as described.

11. The combination with a screen frame having a recess, and a piece of screen wire fitted over the frame, of a resilient tubular locking strip engaging and holding the fabric in said recess, said locking strip being longitudinally split to form separated adjacent edges permitting the strip to expand and contract upon the application and release of pressure.

12. A window screen comprising a frame provided with grooves, a piece of screen wire, and locking members for the wire, each of said grooves extending inwardly at right angles to the plane of the wire, and each of said members being closed on all sides except one with the edges of the unclosed side normally out of contact to enable the locking member to be compressed into said grooves and to thereafter expand and lock the wire screen in place.

13. A window screen having a frame with side and end pieces, said pieces each having a groove, a piece of screen fabric, and tubular members with edges separated along one side, said members adapted to be compressed into the grooves to bind the edges of the screen fabric against the walls thereof.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

HENRY W. WATSON.
WILLIAM W. WATSON.

Witnesses:
F. E. BALDWIN,
A. W. KETTLE.