

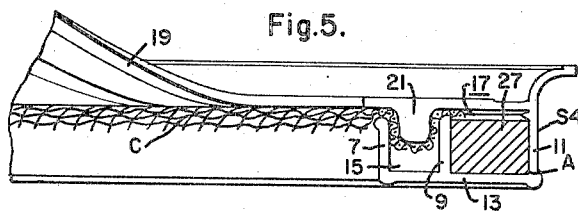
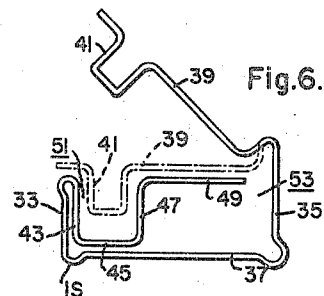
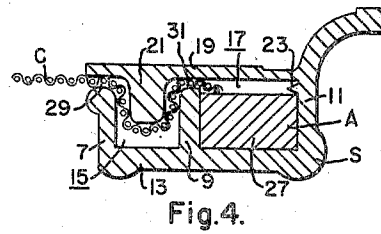
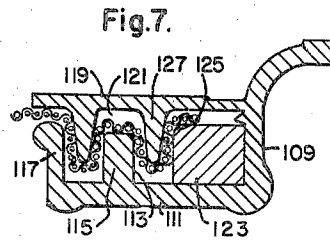
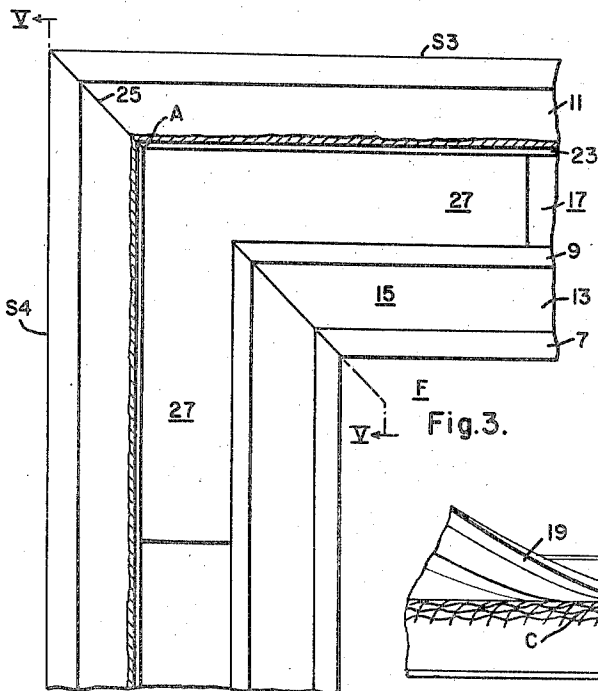
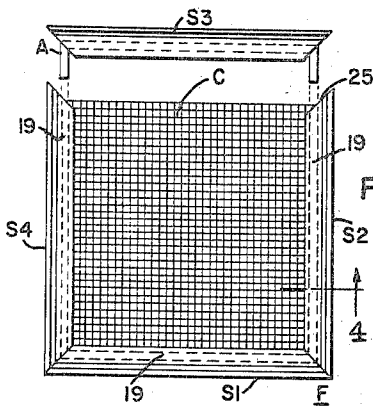
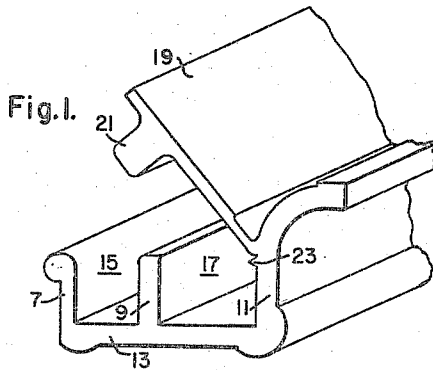
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WINDOW SCREENS

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WINDOW SCREENS

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8 Claims. (Cl. 160—381)

My invention relates to open work structures and has particular relation to window screens.

There are at the present time available screens of several types in accordance with the teachings of the prior art of which I am aware. One frequently encountered screen comprises a frame composed of a plurality of adjoining strips usually arranged in a rectangle between which a screen cloth is held. The strips of each frame are provided with grooves and the screen cloth is at its edges bent into loops to fit into the grooves. The strips are usually formed with mitered ends and in accordance with the teachings of the prior art these ends are secured together to form the frame by butt-welding. The cloth is held in the grooves by rods or pins which are slipped into the loops and hold the cloth against the bases of the groove. Alternatively the screen may be formed from a square or oblong molding or frame within which the screen cloth is secured. The molding may be produced from a strip of metal which is bent into the desired rectangular form and after the screen is in place the frame may be welded along mitered junctions. The screen cloth is in a screen of this type held between a rolled dull edge and a clamping leg both of which extend from the inner edge of the side of the molding. A screen of this type is shown in Plym Patent 1,665,475, April 10, 1928.

The screens of the prior art type just discussed and others like them have a number of deficiencies. The screen cloth has a tendency to pull out. This defect not only reduces the effectiveness of the screen but it also produces a dangerous condition because the protruding portions of the screen cloth are sharp and one handling the screen may be cut or otherwise injured. Screens of the prior art type are also relatively costly primarily because their cost of manufacture includes a high labor cost. The labor involved in forming a molding such as that disclosed by Plym, welding it and thereafter grinding or sandpapering the weld is high. The corresponding operations for the screen of the other type disclosed also requires substantial labor. In addition, regardless of how carefully the welds are cleaned, they have a tendency to leave projections which are visible under the finish and are unsightly.

It is, accordingly, an object of my invention to provide a window screen in which the screen cloth shall be held tightly and shall not have a tendency to pull out and produce a dangerous condition.

Another object of my invention is to produce a window screen of low cost.

A further object of my invention is to produce a window screen, the manufacture of which shall require a minimum of labor.

A still further object of my invention is to provide a window screen which shall have a pleasing appearance.

A specific object of my invention is to provide a novel extruded strip for a window screen.

A further specific object of my invention is to provide a novel rolled strip for a window screen.

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In accordance with my invention, I provide a window screen comprising a plurality of adjoining strips between which the screen cloth is held. Each of the strips has a plurality of walls defining a plurality of longitudinal spaces; a space adjacent the open work which may be called the inner space and a space remote from the open work which may be called the outer space. The inner space preferably extends substantially along the whole length of each of the strips. The outer space may also extend along the whole length of the strip but may extend only a relatively short distance from each of the mitered edges. In addition to the walls defining the spaces, each of the strips has a longitudinal portion which overhangs the spaces and which has a longitudinal projection. This overhanging portion may be depressed so that the projection extends into the inner space. The strips are mitered at their ends and when they are joined the mitered edges engage. The screen cloth is placed over the walls defining the inner spaces of the strips and the overhanging portion of each strip is depressed so that its projection engages the edges of the screen cloth forming a loop in the screen cloth in the inner space. The screen cloth is pinched along the two lines of each strip between each of the walls defining the inner space and the adjoining edge of the projection. This double pinching of the screen cloth holds it securely and prevents it from pulling out. In being depressed on the screen the projection of each of the overhanging portions of the strips pulls the screen cloth downward and the cloth is thus tautened.

The strips are held together in a frame by angles having relatively short legs which extend into the outer spaces of adjoining strips on each side of the mitered joints. When the overhanging portions of the strips are depressed downward, the angles are secured in the outer spaces and held against movement perpendicular to the surface of the overhanging portion. In addition the outer wall defining the outer space adjacent each leg of an angle is pressed inward so that it tends to hold the adjacent leg tightly against movement parallel to this surface. This effect may be increased by a ridge along the edge of the outer wall of the outer space which in addition to pulling the outer wall inward holds the adjacent leg of the angle in the position in which it is set. The frame assembled with the angles which are held by the pressing downward of the overhanging portion is thus a rigid structure which does not require welding or like processes for assembly. The pressing operation may be performed as a single operation for the whole window screen after the cloth is in place and the labor cost of this operation is relatively small.

In accordance with a specific aspect of my invention, the strips for my window screen are formed by extruding aluminum. In accordance with another aspect of my invention, these strips are formed by rolling and bending a strip of metal, such as steel for example, into the desired configuration with the two spaces as described. My invention, of course is also applicable to screens of which the frame is formed from non-metallic strips. For example, the strips may be formed by extruding or otherwise forming a plastic such as a phenolic condensation product or any other material.

While my invention in its most specific aspect contemplates the features described above including strips having a plurality of walls defining a pair of spaces one of which serves to double-pinch the screen and the other to provide for holding the strips in a frame, my invention in its broader aspects contemplates only one or the other of the above described features. Thus a screen including the double-pinch feature for which the strips are held together in a frame in accordance with one or the other of the teachings of the prior art is within the

scope of my invention. Similarly a screen in which the screen cloth is held in accordance with the teachings of the prior art but for which the strips are held together in a frame as disclosed herein is within the scope of my invention.

The novel features that I consider characteristic of my invention are set forth generally above. The invention, itself, however, both as to its organization and its method of operation together with additional objects and advantages thereof will be understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which:

Figure 1 is a fragmentary view in perspective of a screen strip in accordance with my invention;

Fig. 2 is a view in front elevation of a screen in accordance with my invention in the process of being assembled;

Fig. 3 is a view in front elevation enlarged, with the screen cloth broken away, of a corner of a screen frame in accordance with my invention;

Fig. 4 is a view in section taken along line 4 of Fig. 2 after the structure shown therein has been assembled;

Fig. 5 is a view in section taken along line V—V of Fig. 3;

Fig. 6 is a view in transverse section of a strip in accordance with a modification of my invention; and

Fig. 7 is a view in transverse section of a strip in accordance with a further modification of my invention.

The window screen shown in Figs. 1 through 5 comprises a frame F formed by a plurality of adjoining strips S₁, S₂, S₃ and S₄ locked together. The strips S₁ through S₄ will be referred to herein generically by the letter S.

Each of the strips S is preferably composed by extrusions from aluminum or a similar metal or material and comprises a plurality of walls 7, 9, and 11 which extend from a common wall 13 to define a plurality of longitudinal spaces open at the top; an inner space 15 and an outer space 17. Each of the spaces 15 and 17 extends along the whole length of the strips S. The strips S further include an overhanging portion 19 which has a projection 21 near its inner end. The overhanging portion 19 extends from the outermost wall 11 of the strips S and adjacent the junction of this outer wall 11 and the portion 19 there is a ridge 23 which extends along the space defined between the outer wall 11 and a central wall 9. In the strip S as made the portion 19 extends at an angle to the openings in the spaces 15 and 17 as shown in Fig. 1. During assembly it is depressed over the spaces so that the projection 21 extends into the inner space 15. The strips S are mitered at their ends 25. The mitered ends 25 of adjoining strips engage so that the strips S are formed into a frame F.

The strips S are held together in a frame F by angles A, the legs 27 of which extend a short distance from each of the mitered edges 25. The angles A lie with two of their edges and a side against the walls 9, 11 and 13 respectively of the outer space S; the other side lies under the ridge 23. When the overhanging portion 19 is depressed downwardly the angles A are held tightly between the adjacent face of the portion 19, the ridge 23 and between the outer wall 11 which is pressed inwardly and the wall 9.

Within the frame F there is a screen cloth C which, when the overhanging portion 19 is depressed, is pinched along two lines 29 and 31 between the walls 7 and 19 defining the inner space 15 and the projection 21 extending from the overhanging portion 19.

In the manufacture of the screen, the strips S are provided in extruded form as shown and described here. In general the screen frame F is of rectangular shape. Under the circumstances three of the strips S₁, S₂ and S₄ which form the frame F are disposed with their mitered edges 25 engaging and the angles A in the inner spaces 17. The screen cloth C is then slipped into this

three-sided array and lies flatly against the edges of the walls 7 and 9 which define the inner spaces 15 of the three adjoining strips. Angles A are then inserted in the fourth strips S₃ and it is disposed with its mitered edges 25 engaging the corresponding edges of two of the adjacent strips S₂ and S₄ and the legs 27 of the angles A engaging in the adjacent outer spaces 17 of these two latter strips S₂ and S₄. The array is then inserted in a suitable press and the overhanging portion 19 is depressed downward so that its projection 21 enters the inner space 15. As the projections 21 of the four portions 19 move into the screen cloth C, they tauten the screen cloth and at the same time pinch the edges of the cloth along the lines 29 and 31 between the projections 21 and the walls 7 and 9 defining the inner space 15. At the same time the ridges 23 are pivoted towards the angles A engaging the edges of angles A, and the outer walls 11 of the strips are pressed inward to secure the angles tightly between the walls 9 and 11.

The cost of assembling the strips S and the screen cloth C and performing the pressing operation is very low and in effect the cost of the screen is the low cost of the material in it. The screen is held by a double pinch between the projection and the walls 7 and 9 defining the inner space 15 and is therefore held tightly. The frame is held together securely by the angles A which are secured by the overhanging portion 19, by the walls 9 and 11 of the strips S and the ridges 23 and while the assembly is a tight one the screen has a very pleasing appearance.

In Fig. 6 a strip 1S in accordance with my invention, which is formed of a strip of steel or like metal by rolling and overlapping, is disclosed. In this case, the strip 1S is formed into an open rectangular box having rolled sides 33 and 35 and a base 37. Across the open end of the box there is an overhang 39 with a rolled projection 41 which extends from the outer wall 35. As the strip is produced the projection 39 is at an angle to the open side of the box. Within the open box there is a reentrant portion which extends along the inner side 33 of the strip 1S. The reentrant portion has a side 43 parallel to and adjacent the inner side 33, another side 45 parallel and adjacent the base 37 but extending only for a short distance across this base, a third side 47 extending from the side 45 but parallel to side 43 and a fourth side 49 extending from the side 47 but parallel to and spaced from the side 37. An inner space 51 is thus defined between the sides 43, 45, 47 and an outer space 53 between the sides 35, 37, 47 and 49. The projection 41 is so placed as to extend into the inner space 51 when during assembly the portion 39 is depressed.

The strips may be used in combination with a screen cloth in the same manner as the extruded strip shown in Figs. 1 through 5. In this case again the screen cloth is, after assembly, pinched between the edges of the walls 33—43 and 47 and the projection 41 and the angles A are held between the walls 35, 37, and 47 and 49.

In Figs. 7, a strip in accordance with further modifications of my invention is shown. This strip like the strip shown in Fig. 1 may be extruded. It includes a portion having an outer space defined by walls 109, 111, and 113 and a projection 115 which is inward and of which wall 113 comprises one side. The strip terminates in a wall 117. In addition the strip includes an overhanging portion 119 having a groove 121. The position of the groove 121 is such that when the overhanging portion 119 is depressed downward the groove extends over the projection 115.

In screens including the strip the screen cloth is double pinched between the groove 121 and the projection 115. The angle 123 which holds the angles of the frame extends into the spaces between elements 109—111—115 of adjacent strips. This angle 123 is curved on its inner side 125 so that the outer wall 127 of the groove 121 may slide over said side to lock the angle.

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While I have shown certain specific embodiments of my invention, many modifications thereof are possible. My invention, therefore, is not to be restricted except insofar as is necessitated by the spirit of the prior art and the appended claims.

I claim as my invention:

1. A screen comprising a frame made up of a plurality of adjoining strips each strip having a plurality of walls defining an inner space extending along the length of said strip and an outer space extending at least along a portion of the length from the ends of said strip, and each strip having a portion overhanging said spaces which portion has a projection overhanging said inner space, an angle having its legs disposed in the outer spaces of adjacent strips and a screen cloth held by said strips, said overhanging portion of each strip being depressable so that said projection is projected into said inner space and pinches the edge of said screen cloth extending along said strip in said inner space and said overhanging portion of said strip also holds the legs of said angles in said outer spaces of said strip.

2. A screen according to claim 1 wherein a ridge extending along the outer wall of said outer space near the junction of said outer wall and the overhanging portion, which ridge, when the overhanging portion is depressed, firmly holds the leg of the angle which extends into said outer space.

3. As an article of manufacture an extruded strip for a screen frame having a plurality of walls defining inner and outer channels and an integral overhanging wall having a projection, said overhanging wall being depressable so that said projection enters and approximately fills said inner channel.

4. A strip according to claim 3 wherein a ridge extends along the junction of said overhanging wall and the outer wall of the outer channel.

5. A strip for a screen comprising an elongated body of generally rectangular section having an overhanging extension and an integral reentrant portion spaced outwardly from the inner wall of the rectangle of said section and extending along, and partly across the width of said inner wall and along a portion of the width of the wall of said rectangular section adjacent said inner wall and from

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said portion extending parallel to said inner wall to a point even with the outer edge of said inner wall and then extending parallel to said adjacent wall, said overhanging extension having a projection depressable into the space between the reentrant portion and the portion extending parallel thereto.

6. A screen comprising a frame made up of a plurality of adjoining strips, each strip having a plurality of walls defining a space extending along the length of said strip, and each strip having a portion overhanging said space which portion has a projection, and a screen cloth held by said strips, said overhanging portion of each strip being depressable so that said projection pinches the edge of said screen cloth extending along said strip into said space.

7. As an article of manufacture, a strip for a screen frame comprising a plurality of walls defining inner and outer spaces, said inner space extending along the length of said strip and said outer space extending at least a predetermined distance from each of the ends of said strip and an additional wall extending integrally from one of said walls over said spaces, said additional wall having a projection depressable into said inner space.

8. A screen comprising a frame made up of a plurality of adjoining strips, each strip having a space extending at least along a portion of the length thereof from the end of said strip, an angle having its legs disposed in the spaces of adjacent strips, and each strip having an integral portion overhanging said space, said overhanging portion being depressable so that said overhanging portion holds said angle in operative position, and means on said strip for holding a screen cloth.

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