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(54) IMPROVEMENTS IN AND RELATING TO MESH SCREENS

(71) We, MEYERS TAYLOR PTY. LIMITED, a Company incorporated under the Laws of the State of Queensland, Commonwealth of Australia, of 840 Sandgate Road, Virginia, Brisbane, in the State of Queensland, Australia, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to improvements in and relating to mesh screens, and it has more particular reference to insect screens adapted to be secured releasably over openings to be screened, such as windows.

Insect screens have become increasingly popular in recent years, and various designs have been produced, using either roll-up features, or fixed frame constructions, or flexible arrangements which are releasably attachable at least in part. Our present invention is concerned with flexible-type screens of detachable nature, and it has for its principal object to provide such a screen and components and mountings therefor of such nature that effective screening may be attained, with simple removability when desired, while maintaining a minimum cost structure. Other objects and advantages of the invention will be hereinafter apparent.

With the foregoing and other objects in view, our invention resides broadly in a mesh-type insect screen assembly including a mounting frame adapted to be affixed about an opening to be screened and having a substantially rigid outstanding bead structure including a retaining flange, and a screen frame enclosing the mesh screen and adapted to be mounted upon said mounting frame, said screen frame being formed of flexible plastics or the like resilient material and having a groove to accommodate said bead structure, the mouth of said groove being of less width than the width of said bead structure and having an engagement lip, the parts being so made and arranged that when said screen frame is pressed against said mount-

ing frame, said groove mouth opens resiliently to accommodate said bead structure, said engagement lip of said screen frame engaging behind and under said retaining flange to restrain said screen frame against disengagement.

Preferably, the screen frame has an inner edge portion of substantially uniform thickness across its width for attachment to said mesh screen and an outer edge portion of greater thickness provided with said groove to extend towards said mounting frame, said engagement lip being disposed at or adjacent the outermost edge of said screen frame, while it may also be preferred that the screen frame have an outer viewed face which is substantially flat and parallel to the mesh screen. Other features of the invention will become apparent from the following description.

In order that the invention may be more readily understood and put into practical effect, reference will now be made to the accompanying drawings, wherein:—

Fig. 1 is a fragmentary front elevational view, broken away and showing one corner of a screen assembly in accordance with one embodiment of the invention;

Fig. 2 is a sectional end view taken on the line 2—2 of Fig. 1;

Fig. 3 is a sectional plan view, generally similar to Fig. 2 but showing a second embodiment of the invention, with the screen frame separated from the mounting frame,

Fig. 4 is a view similar to Fig. 3, showing a third embodiment of the invention;

Fig. 5 is a perspective view of portion of the mounting frame member illustrated in Fig. 4;

Fig. 6 is another view similar to Fig. 3 showing a fourth embodiment of the invention;

Fig. 7 is a perspective view of part of a corner of the screen frame shown in Fig. 1;

Fig. 8 is a view generally similar to Fig.

2, showing a limit clip securing the screen frame to the mounting frame, and

Fig. 9 is a perspective view of the limit clip shown in Fig. 8.

Referring initially to Figs. 1, 2 and 7, there is provided a mesh-type insect screen assembly adapted to be used to screen a rectangular opening 10 defined by surround members 11 which in this instance are illustrated as wooden strips, though of course they could be of other materials, such as roll-formed metal. The screen assembly includes a mounting frame 12 adapted to be affixed about the opening 10 by attachment to the surround members 11, the mounting frame being constituted by four mounting frame members 13 each extending along a surround member 11. Each frame member 13 in this case consists of a strip of metal of uniform thickness which is roll-formed so that it has a flat strip portion 14 turned at its inner edge, that is to say the edge closest to the opening 10, to provide a substantially rigid outstanding bead structure 15, the edge extremity of the bead structure 15 being spaced from the strip portion 14 and constituting a retaining flange 16. It will be seen from the drawings that the bead structure 15 tends towards part-cylindrical form so that it has a distinct width in cross-section. The flat strip portions 14 are affixed to the surround members 11 by fastening elements 17 which may be screws, rivets, staples or the like.

The screen assembly also includes a screen frame 18 enclosing the mesh screen 19 and consisting of four flexible plastics or the like resilient screen frame members 20 arranged as a rectangle with adjacent members 20 heat fused together at mitred corners as shown in Fig. 7. Each screen frame member 20 has an inner edge portion 21 of substantially uniform thickness across its width for attachment to the mesh screen 19 by heat fusion therewith, and an integral outer edge portion 22 of greater thickness as illustrated and provided with a continuous longitudinal groove 23 to accommodate the bead structure 15 of a respective mounting frame member 13. The mouth of the groove is defined by two lips 24 and 25, the outer lip being an engagement lip 25 extending inwardly of the groove towards the opening 10. A feature of the invention is that the mouth of the groove 23 is of less width than the width of the bead structure 15 and is restricted by the engagement lip 25 so that when a screen frame member 20 is pressed against a mounting frame member 13, the groove mouth opens resiliently to accommodate the bead structure, a snap action taking place with the engagement lip 25 of the screen frame member 20 engaging behind and under the retaining flange 16 to restrain the screen frame 18 against disengagement by inward movement in the plane of the mesh screen 19, this resulting from

a locking action between the said lip 25 and flange 16. As shown in the drawings, each screen frame member 20 has an outer viewed face 26 which is substantially flat and disposed parallel to the mesh screen 19.

As shown in Fig. 1, each corner of the screen assembly has the adjacent ends of the bead structures 15 cut away to provide screen frame gripping edges 27 which further increase restraint against disengagement of the screen frame 18 from the mounting frame 12, the edges 27 tending to "bite" within the grooves 23 to resist relative longitudinal sliding as opposed to a lift-away action. For lifting and removing purposes, a lifting tab 28 of any desired type may be connected fixedly to the corner of the screen frame 18, as shown in Fig. 7, this being used digitally to lift the screen frame 18 to urge the groove mouths open and thus separate from the bead structures 15. As shown in Figs. 8 and 9, a rigid metal limit clip 29 may be secured to a screen frame member 20, with a locking flange 30 engaging under the retaining flange 16 of the bead structure 15 at a desired location therealong to limit the length of screen frame 18 which may be disengaged from the mounting frame 12.

In the embodiment of the invention shown in Figs. 1, 2 and 8, the mounting frame strip portion 14 has the bead structure 15 at the inner edge thereof, so that part of the strip portion 14 is viewable, as illustrated. On the other hand, in the embodiments shown in Figs. 3 to 6, the strip portions have their bead structures at the outer edges thereof so as not to be viewable when the components are assembled. In any of the embodiments shown in Figs. 3 to 6, the flat strip portions may be continued right up to the opening to be screened, and if desired the flat strip portion may have an integral innermost sheet substantially at right angles thereto and adapted to be disposed as a lining sheet within the opening, this being indicated by dotted lines in Fig. 3, wherein the flat strip portion 14a may be continued and extend as a lining sheet 30 into the opening 10a.

Referring to Fig. 3, the illustrated screen frame 18a is identical with that of Figs. 1 and 2, while it will be apparent that the mounting frame 12a would be identical with that of Fig. 1 except that the strip portion 14a extends from the bead structure 15a towards the opening 10a, so that the retaining flange 16a is remote from the strip 14a instead of overlying it. The bead structure 15a nevertheless engages in the groove 23a as before, with the engagement lip 25a locking under the retaining flange 16a.

In the embodiment of the invention shown in Figs. 4 and 5, the mounting frame 12b has a flat strip portion 14b integral with an outstanding plate 31 having tongues 32

and 33 pressed out of it from U-shaped slits, the tongues being pressed alternately in opposite directions, the tongues 33 on the side of the plate 31 remote from the opening 10b constituting the retaining flange for engagement with the engagement lip 25b of the screen frame 18b. It will be seen that the groove 23b is of a shape to accommodate the bead structure 15b defined by the plate 31 and tongues 32 and 33.

The embodiment shown in Fig. 6 is similar to that of Fig. 4 so far as the screen frame 18c is concerned, but the mounting frame 12c is of extruded metal of constant cross-section, having a bead structure 15c which is substantially triangular in cross-section, with a retaining flange 16c to be engaged by an engagement lip 25c of the screen frame 18c.

The method of using the screen assembly will be clear from the foregoing description, taken in conjunction with the drawings, and the assembly will be found very effective in achieving the objects for which it has been devised. The screen itself may be of any desired, relatively flexible material, such as fibreglass, and the components may be modified as to design, as apparent from the several different embodiments described and illustrated. For example as shown in Fig. 6, the screen frame 18c may have an extended edge to facilitate a person pressing it down with the finger more in the middle of the strip and in register with the bead structure. In many instances, it is desired to remove a screen only to an extent permitting a person to reach window hardware, and thus the clips 29 may be placed at desired locations on the vertical or horizontal frame members, preventing accidental removal of the screen or unnecessary over-removal. The invention is to be understood to embrace all variations and modifications within its scope and ambit, as defined by the appended claims.

WHAT WE CLAIM IS:—

1. A mesh-type insect screen assembly including a mounting frame adapted to be affixed about an opening to be screened and having a substantially rigid outstanding bead structure including a retaining flange, and a screen frame enclosing the mesh screen and adapted to be mounted upon said mounting frame, said screen frame being formed of flexible plastics or the like resilient material and having a groove to accommodate said bead structure, the mouth of said groove being of less width than the width of said bead structure and having an engagement lip, the parts being so made and arranged that when said screen frame is pressed against said mounting frame, said groove mouth opens resiliently to accommodate said bead structure, said engagement lip of said screen frame engaging behind and under said retaining flange to

restrain said screen frame against disengagement 65

2. A mesh-type insect assembly according to Claim 1, wherein said screen frame has an inner edge portion of substantially uniform thickness across its width for attachment to said mesh screen and an outer edge portion of greater thickness provided with said groove to extend towards said mounting frame, said engagement lip being disposed at or adjacent the outermost edge of said screen frame. 70 75

3. A mesh-type insect screen assembly according to either of the preceding claims, wherein said screen frame has an outer viewed face which is substantially flat and parallel to said mesh screen. 80

4. A mesh-type insect screen assembly according to any one of the preceding claims, wherein said bead structure of said mounting frame is of roll-formed metal, with an edge extremity constituting said retaining flange. 85

5. A mesh-type insect screen assembly according to any one of Claims 1 to 3, wherein said bead structure of said mounting frame is constituted by tongues pressed from an outstanding metal plate, the tongues being pressed alternately in opposite directions and the tongues on one side of said plate constituting said retaining flange. 90

6. A mesh-type insect screen assembly according to any one of Claims 1 to 3, wherein said bead structure of said mounting frame is of extruded metal with an edge extremity constituting said retaining flange. 95

7. A mesh-type insect screen assembly according to any one of Claims 4 to 6, wherein said mounting frame is of metal strip having a flat strip portion adapted to be affixed about the opening parallel to said mesh screen, one edge of said flat strip portion having said bead structure formed integrally therewith. 100 105

8. A mesh-type insect screen assembly according to Claim 7, wherein said flat strip portion of said mounting frame is disposed outwardly of said bead structure relative to the opening to be screened. 110

9. A mesh-type insect screen assembly according to Claim 7, wherein said flat strip portion of said mounting frame is disposed inwardly of said bead structure relative to the opening to be screened. 115

10. A mesh-type insect screen assembly according to Claim 9, wherein said flat strip portion is integral with an innermost sheet substantially at right angles thereto and adapted to be disposed as a lining sheet within the opening to be screened. 120

11. A mesh-type insect screen assembly according to any one of the preceding claims, including a rigid limit clip adapted to be secured to said screen frame and to be engaged under said retaining flange of said mounting frame at a desired location therealong to limit the length of screen frame 125



and 33 pressed out of it from U-shaped slits, the tongues being pressed alternately in opposite directions, the tongues 33 on the side of the plate 31 remote from the opening 10b constituting the retaining flange for engagement with the engagement lip 25b of the screen frame 18b. It will be seen that the groove 23b is of a shape to accommodate the bead structure 15b defined by the plate 31 and tongues 32 and 33.

The embodiment shown in Fig. 6 is similar to that of Fig. 4 so far as the screen frame 18c is concerned, but the mounting frame 12c is of extruded metal of constant cross-section, having a bead structure 15c which is substantially triangular in cross-section, with a retaining flange 16c to be engaged by an engagement lip 25c of the screen frame 18c.

The method of using the screen assembly will be clear from the foregoing description, taken in conjunction with the drawings, and the assembly will be found very effective in achieving the objects for which it has been devised. The screen itself may be of any desired, relatively flexible material, such as fibreglass, and the components may be modified as to design, as apparent from the several different embodiments described and illustrated. For example as shown in Fig. 6, the screen frame 18c may have an extended edge to facilitate a person pressing it down with the finger more in the middle of the strip and in register with the bead structure. In many instances, it is desired to remove a screen only to an extent permitting a person to reach window hardware, and thus the clips 29 may be placed at desired locations on the vertical or horizontal frame members, preventing accidental removal of the screen or unnecessary over-removal. The invention is to be understood to embrace all variations and modifications within its scope and ambit, as defined by the appended claims.

WHAT WE CLAIM IS:—

1. A mesh-type insect screen assembly including a mounting frame adapted to be affixed about an opening to be screened and having a substantially rigid outstanding bead structure including a retaining flange, and a screen frame enclosing the mesh screen and adapted to be mounted upon said mounting frame, said screen frame being formed of flexible plastics or the like resilient material and having a groove to accommodate said bead structure, the mouth of said groove being of less width than the width of said bead structure and having an engagement lip, the parts being so made and arranged that when said screen frame is pressed against said mounting frame, said groove mouth opens resiliently to accommodate said bead structure, said engagement lip of said screen frame engaging behind and under said retaining flange to

restrain said screen frame against disengagement 65

2. A mesh-type insect assembly according to Claim 1, wherein said screen frame has an inner edge portion of substantially uniform thickness across its width for attachment to said mesh screen and an outer edge portion of greater thickness provided with said groove to extend towards said mounting frame, said engagement lip being disposed at or adjacent the outermost edge of said screen frame. 70 75

3. A mesh-type insect screen assembly according to either of the preceding claims, wherein said screen frame has an outer viewed face which is substantially flat and parallel to said mesh screen. 80

4. A mesh-type insect screen assembly according to any one of the preceding claims, wherein said bead structure of said mounting frame is of roll-formed metal, with an edge extremity constituting said retaining flange. 85

5. A mesh-type insect screen assembly according to any one of Claims 1 to 3, wherein said bead structure of said mounting frame is constituted by tongues pressed from an outstanding metal plate, the tongues being pressed alternately in opposite directions and the tongues on one side of said plate constituting said retaining flange. 90

6. A mesh-type insect screen assembly according to any one of Claims 1 to 3, wherein said bead structure of said mounting frame is of extruded metal with an edge extremity constituting said retaining flange. 95

7. A mesh-type insect screen assembly according to any one of Claims 4 to 6, wherein said mounting frame is of metal strip having a flat strip portion adapted to be affixed about the opening parallel to said mesh screen, one edge of said flat strip portion having said bead structure formed integrally therewith. 100 105

8. A mesh-type insect screen assembly according to Claim 7, wherein said flat strip portion of said mounting frame is disposed outwardly of said bead structure relative to the opening to be screened. 110

9. A mesh-type insect screen assembly according to Claim 7, wherein said flat strip portion of said mounting frame is disposed inwardly of said bead structure relative to the opening to be screened. 115

10. A mesh-type insect screen assembly according to Claim 9, wherein said flat strip portion is integral with an innermost sheet substantially at right angles thereto and adapted to be disposed as a lining sheet within the opening to be screened. 120

11. A mesh-type insect screen assembly according to any one of the preceding claims, including a rigid limit clip adapted to be secured to said screen frame and to be engaged under said retaining flange of said mounting frame at a desired location therealong to limit the length of screen frame 125

- which may be disengaged from said mounting frame.
- 5 12. A mesh-type insect screen assembly according to any one of the preceding claims, wherein said mounting frame and said screen frame each consist of four frame members in rectangular formation with mitred corners, the screen frame members being connected permanently to one another.
- 10 13. A mesh-type insect screen assembly according to Claim 12, wherein said screen frame is provided at at least one corner thereof with a lifting tab to facilitate digital disengagement of said screen frame from said mounting frame.
- 15 14. A mesh-type insect screen assembly according to either of Claims 12 or 13, wherein at least two adjacent mounting frame members at a corner of said mounting frame have their bead structures cut away to provide screen frame gripping members or edges to further increase restraint against disengagement of said screen frame from said mounting frame.
- 20 15. A mesh-type insect screen assembly substantially as hereinbefore described with reference to Figs. 1, 2 and 7 of the accompanying drawings, or modified as described with reference to Fig. 3, or Figs. 4 and 5, or Fig. 6 of the drawings.
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