Oct. 15, 1940. W. A. WHIPPLE 2,218,369

ELECTRIC SCREEN

Filed Oct. 17, 1938 2 Sheets-Sheet 1

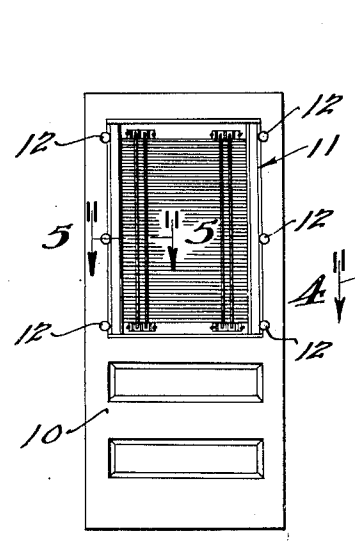


Fig. 1.

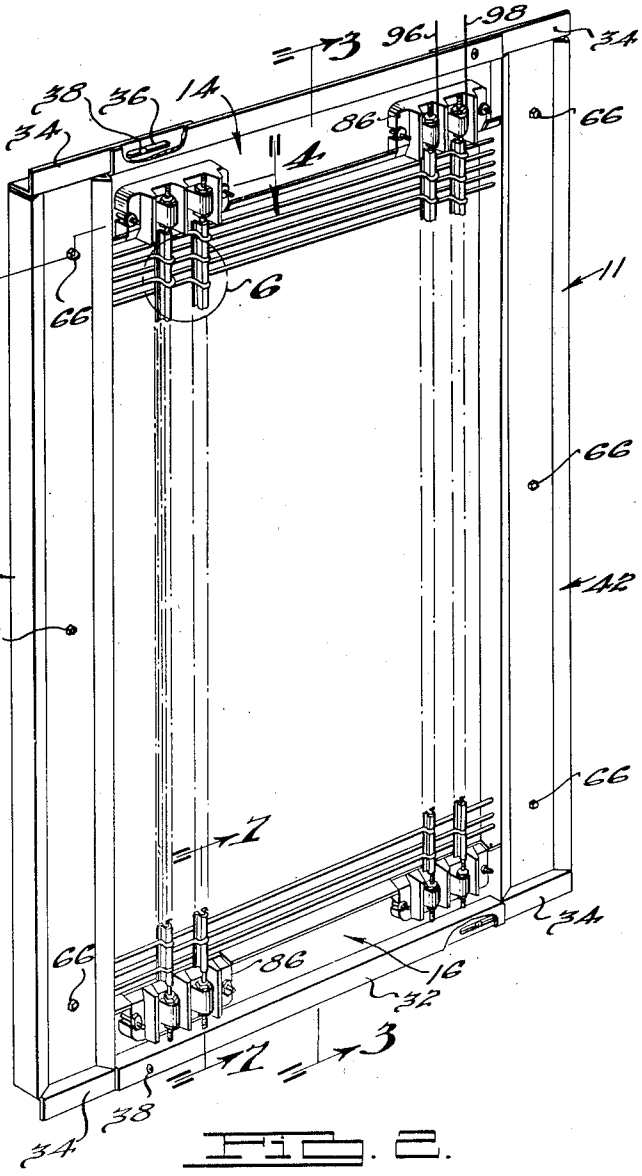


Fig. 2.

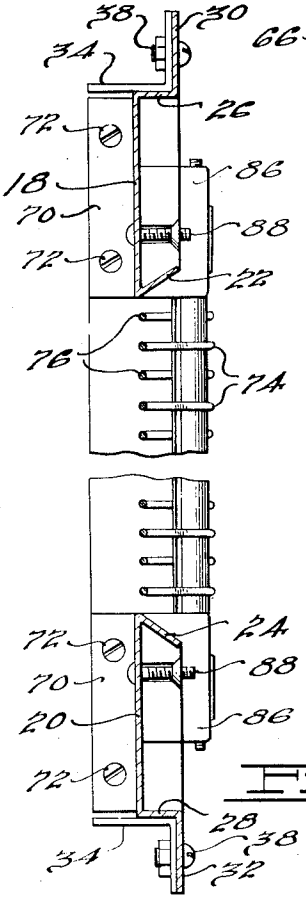


Fig. 3.

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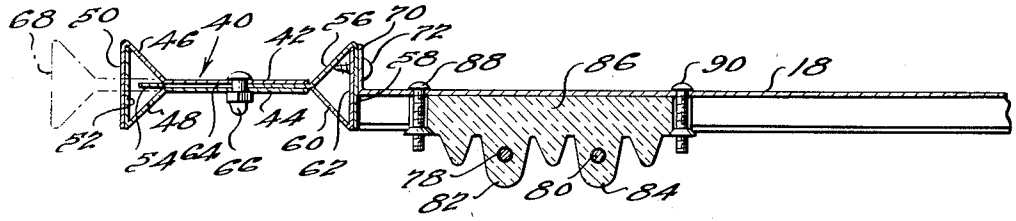


Fig. 4.

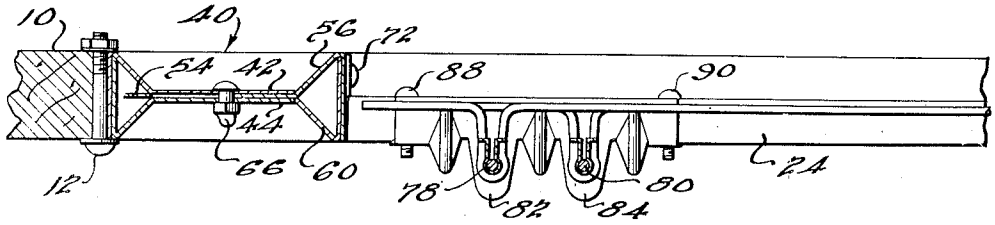


Fig. 5.

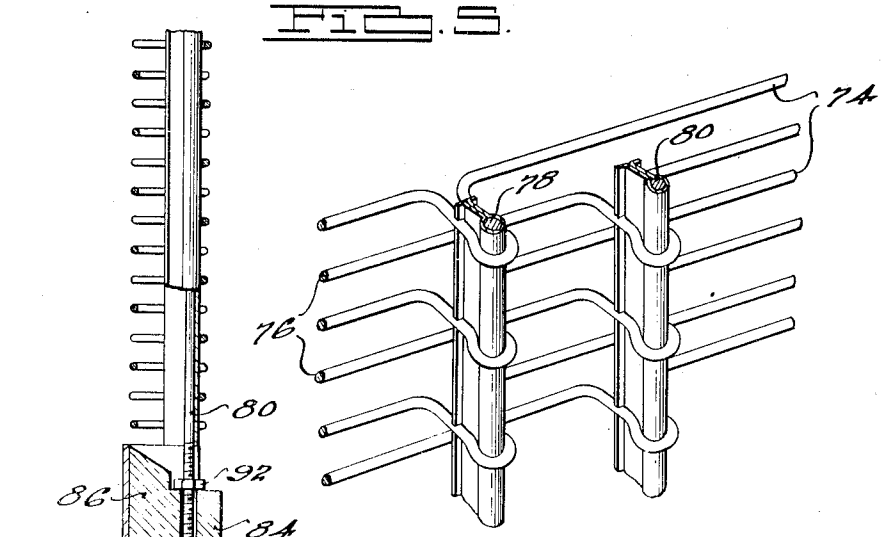


Fig. 6.

Fig. 7.

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2,218,369

ELECTRIC SCREEN

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Application October 17, 1938, Serial No. 235,327

3 Claims. (Cl. 43—112)

This invention relates to electric screens of the character used for the destruction of insects and the like.

The main objects of this invention are to provide an improved electric screen which can be made up in a series of standardized sizes, each of which is adjustable so that by selecting an appropriate one it may be adjusted to snugly fit certain standardized openings, particularly the screen opening in screen doors and the like; to provide an improved surrounding framework for an electric screen which is made entirely of sheet metal and which thereby reduces the fire hazards incident to devices of this character; to provide an improved construction of sheet metal frame which is particularly strong and rigid for the thickness of sheet metal from which it is formed; to provide an improved construction which lends itself readily to manufacture by means of dies, and like production tools; and to provide an improved all metal electric screen frame in which the electrodes are so arranged as to neutralize any induced static charge which may tend to accumulate in such frame.

An illustrative embodiment of this invention is shown in the accompanying drawings, in which:

Figure 1 is a view in elevation of a door having an opening therein equipped with the improved electric screen panel;

Fig. 2 is a view in perspective of the improved electric screen panel;

Fig. 3 is an enlarged fragmentary sectional view taken on the line **3**—**3** of Fig. 2, looking in the direction indicated by the arrows;

Fig. 4 is an enlarged fragmentary sectional view taken on the line **4**—**4** of Fig. 2, looking in the direction indicated by the arrows, the extended or adjusted position of the side frame panel being shown in dotted outline;

Fig. 5 is an enlarged fragmentary sectional view taken on the line **5**—**5** of Fig. 1, looking in the direction indicated by the arrows;

Fig. 6 is an enlarged view in perspective of the construction contained within the circle **6** of Fig. 2; and

Fig. 7 is an enlarged fragmentary sectional view taken on the line **7**—**7** of Fig. 2, looking in the direction indicated by the arrows.

Heretofore, in the use of high tension electric insect screens there has been present a situation which is highly undesirable in that if the frame, which carries and supports the high tension electrode wires or bars, was made of metal, a static charge would be induced in the metal frame so that any one touching the same would receive considerable of a shock, which, under certain conditions, was rather painful, as well as upsetting to the nervous system.

In the present construction, this difficulty has been entirely eliminated by making the entire framework of sheet metal so that all frame members are electrically connected one to the other; having the electrode bars arranged so that the last bar parallel and adjacent to one frame member is connected to the opposite side of the line to that of the last bar at the opposite side of the framework, and then adjusting the distance of these end electrodes with respect to their respective frame members in such a way as to completely neutralize a static charge induced in the frame as a whole.

In the construction shown in the drawings, a door **10**, having a rectangular opening therethrough, is shown provided with one of the improved electric screens generally designated **11**, the screen insert being mounted in the door opening by a plurality of bolts **12**, the heads and nuts of which overlap the marginal edge of the screen, as shown in detail most clearly in Fig. 5.

The screen insert comprises upper and lower frame members **14** and **16**, respectively, of channel shape cross-section with the webs **18** and **20** thereof disposed in a plane substantially parallel to the screen as a whole. The inner flanges **22** and **24** of each of the frame members **14** and **16**, respectively, are inclined inwardly toward their respective webs so that dead insects dropping thereon slide off and do not accumulate in an objectionable manner.

The outer flanges **26** and **28** of the channel members **14** and **16**, respectively, extend at right angles to their respective webs, and then are bent at right angles to provide outwardly extending flanges **30** and **32** which are disposed in a plane substantially parallel to the plane of the screen insert as a whole. The outwardly extending flanges **30** and **32** are disposed and arranged to overlap the marginal edge of the door **11** along the upper and lower edges of the opening therein which receives the screen insert, a detail of which is shown in Fig. 7.

Each end of each of the frame members **14** and **16** is provided with an angle member **34** which nests against the flanges **28** and **32**, as shown most clearly in Figs. 3 and 7, and the flange thereof which rests against the frame flange **32** is provided with a slot **36** and secured by a bolt **38** so as to be adjustably positioned and extensible lengthwise with respect to the frame members. The angle members **34** are all substantially

of the same construction, therefore, a detailed description of one will suffice for all, the only difference being in the location of the slots to make right and left hand pieces for opposite ends of their respective frame members.

The upper and lower frame members 14 and 16 are connected in spaced parallel relation to form a rectangular framework by side frames generally designated 40 and 42 which are of substantially identical construction so that a detail description of one will suffice for both. As shown most clearly in Figs. 4 and 5 of the drawings, side frame 40 comprises an outer portion formed of two strips of sheet metal bent to provide spaced, parallel flanges 42 and 44; outwardly sloping flanges 46 and 48; and inwardly extending flanges 50 and 52, which are in superimposed position and disposed at right angles to the flanges 42 and 44. The flanges 46, 48, 50, and 52 form a triangular head, and the superimposed flanges 50 and 52 are secured together rigidly as by welding, or the like, so as to form an integral member having spaced parallel flanges between which is received a flange portion 54 of an inner frame member.

The inner frame member has an outwardly sloping flange 56, and an inturned flange 58 disposed at right angles to the flange 54. A bracing angle member, having an outwardly sloping flange 60 and an inwardly disposed flange 62 superimposed on the flange 58, is provided for adding rigidity to the construction, and with the flanges 56 and 58 also forms a triangular head structure for the inner member. The embraced flange 54 of the inner member is provided with suitably positioned slots 64 for receiving the body of bolts 66 which pass through registering apertures in the flanges 42 and 44, so that the outer side frame portion of the frame member 40 can be adjusted laterally with respect to the inner portion thereof, as shown in the dotted outline 68 of Fig. 4. Lateral adjustment of the side frames is highly desirable so that a few standardized models of screen insert may be stocked by dealers and the like, and which by adjustment will fit the usual standardized openings in screen doors, and the like.

The ends of the top and bottom frame members 14 and 16, respectively, are provided with right angle flanges 70 which are rigidly secured to the superimposed flanges 58 and 62 by self-threading screws 72, or the like.

The high tension electrodes of this screen insert are shown and described in detail in applicant's Patent No. 2,123,127, dated July 5, 1938, and, therefore, only a general description of their detailed construction will be given herein, reference being made to said patent for further particulars. The electrodes consist of two series of self-supporting stiff wire bars 74 and 76 arranged in alternate order in spaced parallel relation, all of the bars 74 of one series being mounted upon vertically disposed bus bars 78, and all of the electrode bars 76 of the other series being mounted on vertically disposed bus bars 80. The upper and lower ends of the supporting bus bars 78 and 80 are threaded and pass through spaced apertured bosses 82 and 84 of insulators 86 which are secured to the web portions 18 and 20 of the top and bottom frame members 14 and 16, respectively, by attaching screws 88 and 90. The inner flanges 22 and 24 are cut away at these points so that the insulators are embraced between the cut away ends of the flanges and securely held against sidewise movement, thus aiding the attaching bolts 88 and 90 in securely and rigidly holding the insulators in position.

The threaded ends of the supporting bars 78 and 80 are provided with nuts 92 and 94 which bear against opposite sides of their respective bosses 82 and 84, and by which the set of electrode bars carried by and supported upon the bus bars may be readily adjusted to vary the spacing between the last bars thereof which are adjacent the respective upper and lower frame members 14 and 16. The arrangement is such that the last bar of the series of electrode bars 74 is adjacent to the bottom frame member 16, and the last bar of the series of electrode bars 76 is adjacent to the top frame member 14. As shown most clearly in Fig. 5, the ends of all the electrode bars terminate in spaced relation to the side frame members 40 and 42.

As is customary in electric screens of this character, the two sets of electrode bars are connected to a suitable source of current, usually high tension current of low amperage from a suitable transformer.

In the use of this improved electric screen insert, the bolts 66 on each of the side frames 40 and 42 are loosened, and the side frames adjusted within the door opening so that the outer surfaces of the triangular head portions of the side frames abut snugly against the edge of the door openings, as shown in Fig. 5, at which time the bolts 66 are tightened. The top and bottom frame extension angle portions 34 are then adjusted outwardly in the same manner and their respective bolts 38 tightened. Holes are then drilled at suitable points along the side edges of the frames, these holes being passed through the wooden frame of the door and in a position to receive the mounting bolts 12 so that the heads and nuts thereof will overlap the opposite edges of the side frames, as shown most clearly in Figs. 1 and 5.

At the time the screen is assembled in the factory it is connected to a source of high tension current and adjustment made of the two sets of electrode bars with respect to the upper and lower frame members 14 and 16 so that the static charge induced in the frame is substantially neutralized, thereby eliminating all danger and difficulty of a person receiving a shock by touching any part of the surrounding metallic framework. By having the side frames made of electric conducting material, such as sheet metal, or the like, the upper and lower frames 14 and 16 are electrically connected in such a manner that adjustment of the electrode bars with respect to the upper and lower frame members can be made to neutralize the induced static charge.

When the screen insert is thus mounted in a door opening, the outwardly extending flanges 30 and 32 overlie the marginal edge of the door opening, as shown in Fig. 7, and, if desired, these flanges may also be bolted or otherwise secured to the door frame 10.

Electrical connection is made to the two sets of electrode or grid bars by conductors 96 and 98.

Although but one embodiment of this invention has been herein shown and described, it will be understood that numerous details of the construction shown may be altered or omitted without departing from the spirit of this invention, as defined by the following claims.

What is claimed is:

1. In an electric screen, surrounding frame members, two sets of electrode bars supported by said frame members, one of said frame members

being of channel shaped cross-section with the web thereof in a plane substantially parallel to the plane of said screen, the flange at one edge of said channel being interrupted to provide an opening, and an electrode insulator secured within said opening, said insulator being embraced between the cut away ends of the flange and thereby held against sidewise movement.

2. In an electric screen, surrounding frame members, two sets of electrode bars supported by said frame members, one of said frame members being of channel shaped cross-section with the web thereof in a plane substantially parallel to the plane of said screen, the flange at one edge of said channel being interrupted to provide an opening, and an electrode insulator secured within said opening and being embraced at opposite sides by the end edges of said interrupted flange and thereby held against sidewise movement.

3. In a high tension electric screen, a pair of spaced metallic frame members, a series of conductor bars supported between said frame members, said bars comprising two sets arranged in alternate relation with the end bar of one set positioned adjacent one of said frame members and the end bar of the other set positioned adjacent the other of said frame members, an electrical conductor joining said frame members, and means for adjusting said bars relative to their respective adjacent frame members whereby the induced charge in said metallic frame members may be neutralized.

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