

[54] **ELECTRICALLY HEATED PRINTING SCREEN CONSTRUCTION**

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[58] Field of Search **101/127, 127.1, 128, 128.1; 219/545, 549; 160/371, 378; 174/153 R; 209/403, 405, 408**

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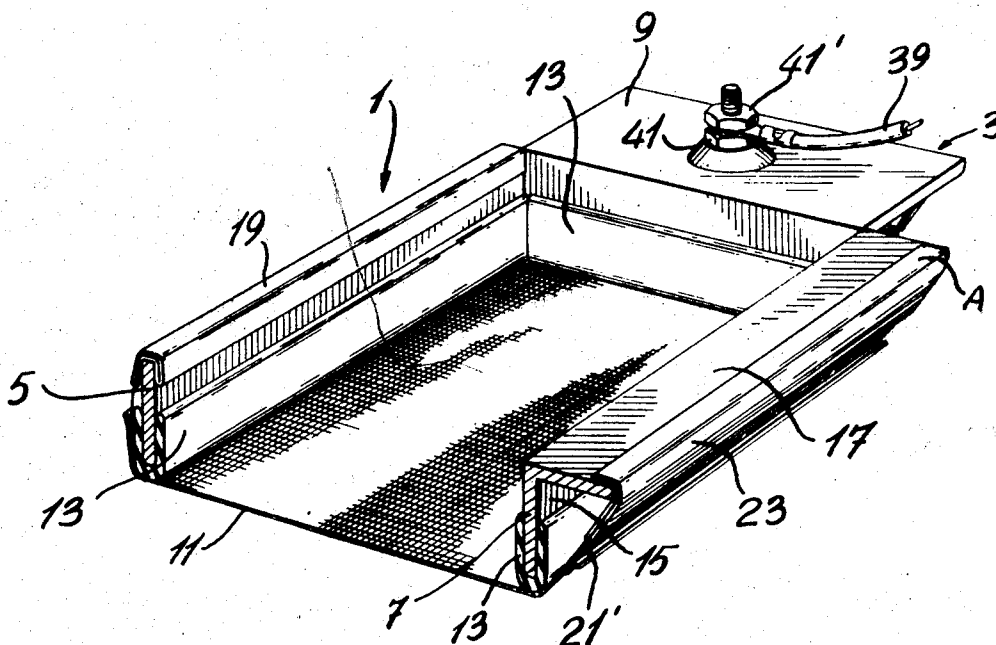
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[57] **ABSTRACT**

A printing screen construction to be electrically heated and formed of a metallic frame defined by two opposed side members and two opposed end members, the construction including a metallic printing screen extending across the frame over the lower edges of the members with electrical insulating material interposed between the screen and the frame. One side member of the frame is an angular element having a vertical flange and a horizontal flange, the latter projecting horizontally outwardly away from the top edge of the vertical flange. A strip fastener is electrically insulatingly connected to one side edge of the screen, the fastener having a generally U-shaped cross-section and being applied over the outer edge of the horizontal flange with one leg lying flat over the top surface of the horizontal flange and with the other leg being inclined with respect to the top surface and extending toward the said one side edge of the screen. The other edges of the screen are electrically insulatingly secured to the frame and the screen is connected to an electrical circuit.

5 Claims, 4 Drawing Figures



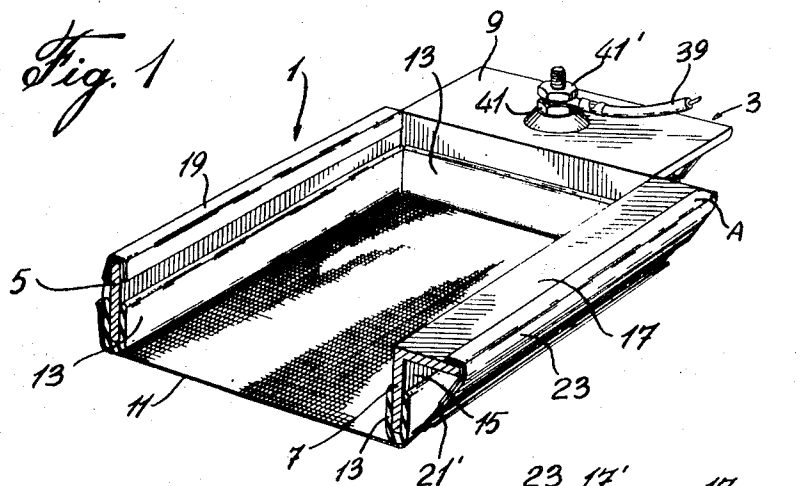


Fig. 4

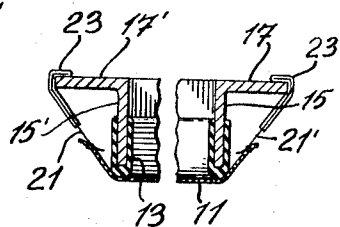


Fig. 2

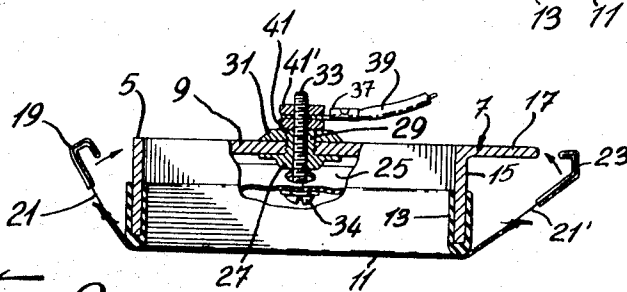
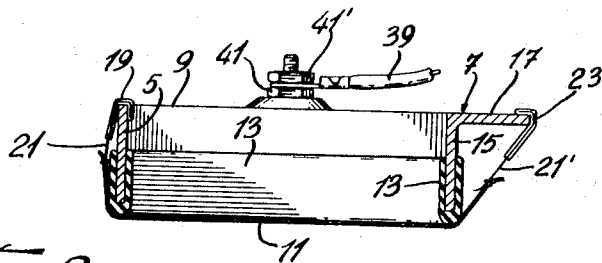


Fig. 3



ELECTRICALLY HEATED PRINTING SCREEN CONSTRUCTION

The present invention relates to an electrically heated printing screen for use, mainly, in applying a design to a glass bottle. It is an improvement over the printing screen construction disclosed and claimed in my previous Canadian Pat. No. 634,954, issued on 1st January 1962.

Heated screens of this type are adapted for use either by hand operation or in a machine wherein the screen is caused to move relatively to and in tangential contact with the bottle surface while at the same time a paint composition is forced through the screen by the spreading action of a squeegee.

In the printing screen construction of my Canadian Pat. No. 634,954, the metal screen is provided along one edge with a U-shaped strip fastener straddling the upper edge of one side member of the frame, the member being in the form of a flat bar. The other side edge of the screen is fixed to the other frame side member, in the form of an angle iron, by means of screws extending through holes in a strip fastener fixed to the said other side edge, the screws being screwed into threaded holes of the horizontal flange of the angle iron. In the smallest frame use, five such screws are required in order properly to hold the screen in taut condition on the frame. It will thus be appreciated that positioning and tightening such screws represent a substantial part of the labor time required for mounting a screen on its frame. Consequently, the use of a U-shaped fastener straddling the upper edge of one side member of the frame, in the form of a flat bar, although being a substantial improvement over previous similar devices, truly solved only part of the problem. It was often thought that the solution may lie in the use of a like U-shaped strip fastener, on the other side edge of the screen, to straddle the second side member of the frame which would then also be a straight vertical bar rather than an angle iron. However, this solution was readily discarded as it was always thought that the mounting of the second U-shaped fastener, in straddling position over the upper edge of the second straight bar, would require stretching of the screen to a point where the central useful portion thereof would sag after being positioned which would obviously render the screen almost useless. Furthermore, putting the second fastener on and removing it would have likely required the use of tools such as screwdrivers that would have deformed it.

I have however found that the problem can be solved and a second U-shaped fastener used if the latter is applied against the outer edge of the horizontal flange of the angle iron. In this manner, probably because the fastener and the corresponding edge of the screen lie inclined with respect to the horizontal flange, the screen when put on stretches to a lesser extent such that it does not detrimentally sag at the center when assembled on the frame. Furthermore, I have found that this second fastener can readily and quickly be placed in position on the flange by starting at one end of the flange and working up toward the other end.

Another time saving improvement obtainable with my improved construction lies in the type of securing means used for holding the end edges of the screen to the end members of the frame. In my previous device, the fact that the securing screws used were threaded,

from above, through nuts beneath the end screen strip fasteners, was found awkward and inefficient. I have found that it is much easier to slip the screws from beneath through the strip fasteners and screw them into threaded holes in dowels permanently fixed to the end members of the frame or otherwise fastened them to the permanent dowels from beneath.

It is believed that the invention will be better understood by the description that follows of a preferred embodiment having reference to the appended drawings wherein:

FIG. 1 is a perspective view of a half portion of a printing screen construction incorporating the improvement represented by the instant invention;

FIG. 2 is a transverse cross-section illustrating the screen about to be mounted on the frame;

FIG. 3 is a view similar to that of FIG. 2 but showing the screen in position on the frame;

FIG. 4 is a cross-sectional view of a modified construction.

Referring now to FIGS. 1, 2 and 3, there is illustrated a hot printing screen construction 1 comprising a metallic frame 3 defined by two opposed side members 5, 7 and by two opposed end members, only one end member 9 being shown. A metallic printing screen 11 extends across the frame 3 over the lower edges of the members 5, 7. A doubled-over band 13 made of electrically insulating material, preferably resilient such as rubber, is interposed between the screen and the metal frame 3. Band 13 extends fully around the lower edges of the frame. As shown, the side member 5 is a vertical flat bar while the side member 7 is an angular element or angle iron having a vertical flange 15 and a horizontal flange 17 projecting outwardly away from the top edge of the flange 15. The side edge of the screen 11 that corresponds to the flat bar 5 is held to the latter solely by means of an elongated member in the form of a U-shaped strip fastener 19 straddling the upper edge of the bar 5 and electrically insulatingly connected to the corresponding side edge of the screen 11. Preferably, the strip 19 is made of metal and is connected to the screen 11 through the intermediary of a strip or band 21 made of fabric which acts as an insulator stitched to the screen 11, on the one hand, and, on the other end, clamped between the inner faces of a folded sheet of metal bent to define the U-shaped fastener 19. Alternatively, the strip 19 may be insulatingly connected to the screen 11 by simply being made of an insulating material, although I prefer the former method which offers greater flexibility, and hence life, between the hook-type fastener 19 and the screen.

The above description also applies to the frame and screen construction described in my prior Canadian patent.

The improvement of my present invention lies in the provision of a second strip fastener 23 electrically insulatingly connected to the side edge of the screen 11 corresponding to the frame side member 7. The latter electrically insulating connection may be of the same type as that with the first fastener 19: either the strip 21' is made of fabric or a fastener 23 made of electrically insulating material is used.

With particular reference to FIG. 3, it will be noted that the strip fastener 23 is U-shaped (or hook-shaped) in cross-section and is applied over the outer edge of the horizontal flange 17 with one leg thereof lying flat over the top surface of the flange 17 and with the other

leg inclined with respect to the top surface and extending in alignment with the adjacent side edge of the screen 11.

Means electrically insulatingly connect the end edges 25 (FIG. 2) of the screen 11 to the end members 9 of the frame 3. These end edges 25 are strengthened by stiffeners made of longitudinally bent metal strips clamping the edges 25 between their inner faces much in the same manner as the fasteners 19 and 23 in respect to the fabric strips 21, 21'.

As will be gathered from FIG. 1, the end members 9 of the frame are angle iron. The end edges 25 of the screen 11 are secured to the frame by the following means.

The latter comprises dowels made of electrically insulating material, such as nylon, permanently fixed to and extending across the horizontal flanges of the members 9. Each dowel is formed of a lower washer 27, having an upward spigot 29 extending through a threaded hole in the horizontal flange of member 9, and an upper washer 31. The spigot is outwardly threaded and screws both into the threaded hole and into the upper washer 31 thus permanently fastening the insulating dowel to the corresponding member 9. Obviously, the hole may be unthreaded and the spigot 29 may be made to screw only into the upper washer 31. Finally, the spigot 29 is provided with a threaded through bore into which is screwed, from below the end edge 25 of the screen 11, a bolt 33 of which the head 34 holds the screen 11, through the edge 25, in firm taut condition. Again, the bore of the spigot could be without threads in which case the bolt 33 would thread into a nut 41.

In the embodiment shown, the screen 11 is held taut at one end by only one such dowel arrangement but it will of course be realized that two or more arrangements may be necessary, depending on the width of the frame and the screen.

From the above description, it will also be understood that the screen is completely electrically insulated from the frame.

For heating of the screen, the latter is joined in an electrical circuit (not shown) in any convenient manner but preferably through the means illustrated in FIG. 2 and comprising a pair of nuts 41, 41' screwed on the protruding end of the bolt 33 and clamping therebetween an eye connector 37 provided at the end of an electrical lead 39 which is part of the said electrical circuit. It will be noted that while the mounting of the screen end edges 25 on the end members 9 of the frame 3 is appreciably improved as compared to the like connection of the device in my prior patent, the electrical connection is by the same token facilitated since it is independent of the mounting of the screen edges 25.

Finally, FIG. 4 illustrates a modification of the above embodiment wherein both edge fasteners are of the same type, that is they are like fastener 23 of FIGS. 1, 2 and 3 which has the advantage of further simplifying the frame by reducing the number of parts of different shapes.

As mentioned previously, the fastener 23 may easily be mounted or placed on the outer edge of flange 17, after fastener 19 has been slipped into position, by first entering one end of the fastener, such as end A in FIG. 1, and then working up toward the other end.

I claim:

1. An electrically heated printing screen construction comprising:

- a. a metallic frame defined by two opposed side members and two opposed end members each having upper and lower edges;
- b. a metallic printing screen having end and side edges extending across the frame over the lower edges of said members;
- c. electrical insulating material interposed between said screen and said frame;
- d. wherein at least one side member of said frame is an angular element having a vertical flange and a horizontal flange, the latter projecting horizontally outwardly away from the upper edge of said vertical flange;
- e. a strip fastener electrically insulatingly connected to one of said side edges of said screen corresponding to said one side member, said fastener having a generally U-shaped cross-section and being applied over the outer edge of said horizontal flange with one leg thereof lying flat over the top surface of said horizontal flange and the other leg being inclined downwardly and inwardly toward the lower edge of said one side member and extending colinearly with the said side edge of said screen;
- f. means electrically insulatingly securing the other edges of said screen to said frame; and
- g. means to connect said screen to an electrical circuit electrically insulatingly from said frame whereby only said screen is heated.

2. A construction as claimed in claim 1, wherein the other side member of said frame is likewise an angular member having a vertical flange and a horizontal flange, the latter projecting horizontally outwardly away from the top edge of said vertical flange and wherein said securing means in f) includes a second strip fastener electrically insulatingly connected to the other side edge of said screen, said fastener having a generally U-shaped cross-section and being applied over the outer edge of said horizontal flange with one leg thereof lying flat over the top surface of said horizontal flange and the other leg being inclined with respect to said top surface and extending in alignment with the said side edge of said screen.

3. A construction as claimed in claim 1, wherein the other side member of said frame is a flat vertical bar and wherein said securing means in f) includes a second U-shaped strip fastener electrically insulatingly connected to the side edge of said screen corresponding to said flat bar, said second strip fastener straddling the upper edge of said bar.

4. A construction as claimed in claim 2, wherein said end members are angular elements each having a vertical flange and an outwardly projecting horizontal flange extending from the top edge of said vertical flange and wherein said securing means in f) of claim 1 further comprises: dowels made of electrically insulating material fastened to and extending across said horizontal flanges, each dowel having a central through aperture and there being at least one dowel per horizontal flange, and screws extending through holes in the end edges of said screen, with the heads of said screws applied against said end edges, to hold said screen tight across said frame, said screws being fixed to said dowels.

5. A construction claimed in claim 4, wherein said dowel apertures are threaded and said screws are fixed thereto by being threaded into said apertures.

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