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2,925,774

FRAME FOR A SCREEN

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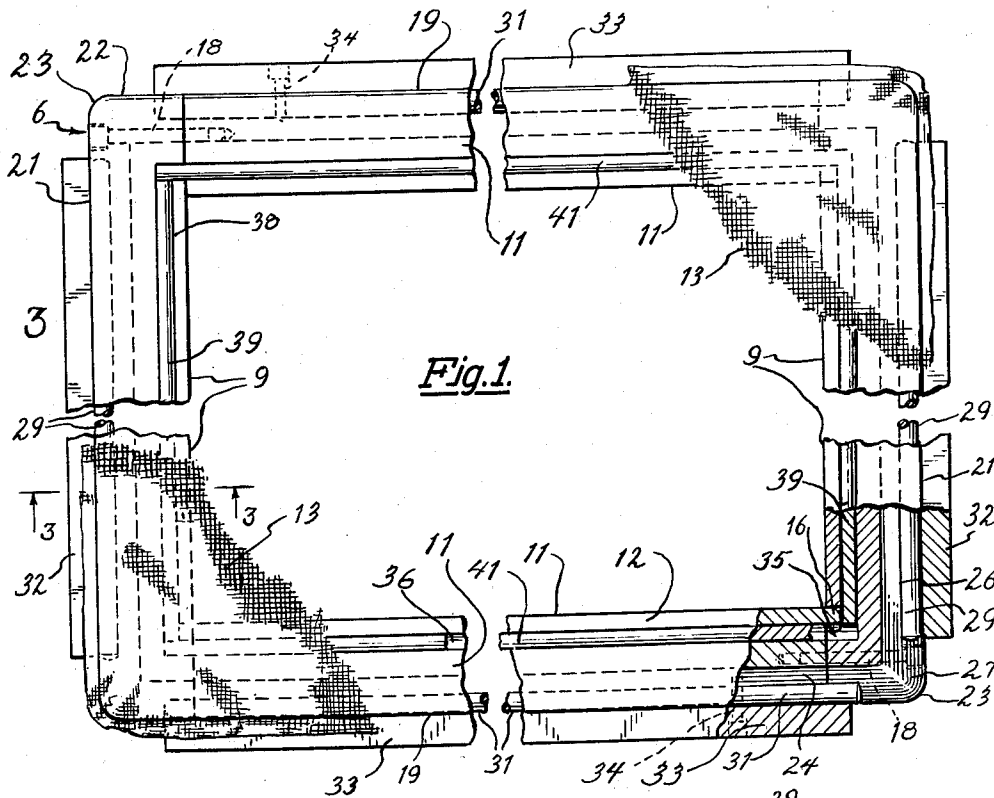


Fig. 1.

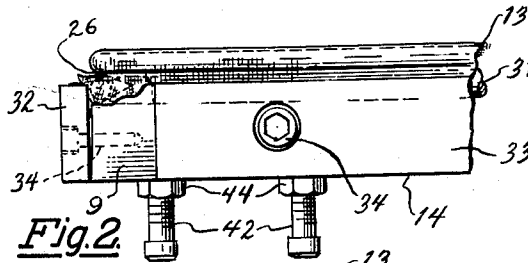


Fig. 2.

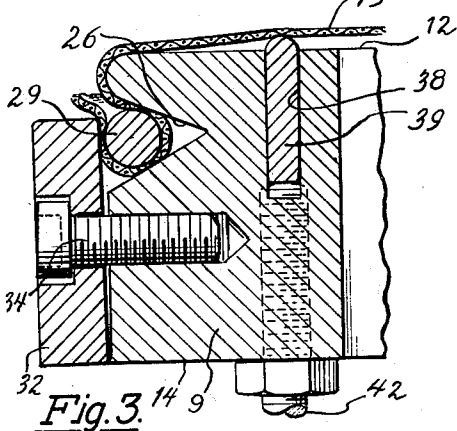


Fig. 3.

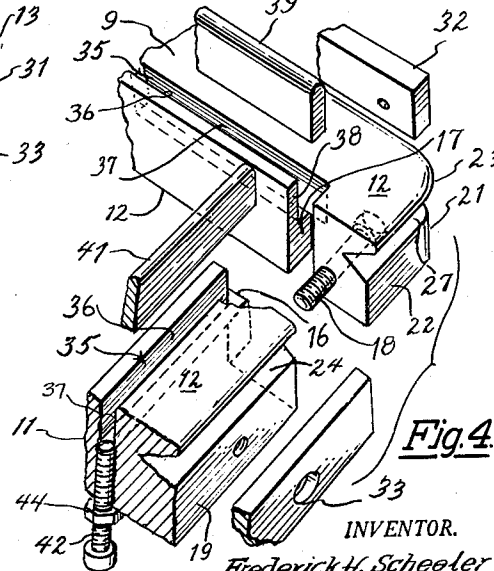


Fig. 4.

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FRAME FOR A SCREEN

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1 Claim. (Cl. 101—127.1)

This invention relates to a support for a screen and in particular to a frame for supporting a screen of the type used in that class of printing commonly referred to as "silk screen printing."

Although printing operations involving silk screens are not new to the printing art whereby electrical elements are produced on plates of dielectric material and referred to in the art as printed circuits, the screens employed consisted of sheets of silk fabric fixed to one of the sides of a rectangular wooden frame usually by staples or tacks. The latter operation was performed after the silk was treated with water or a detergent to remove loose particles from its threads. In applying the silk to the wooden frames, the threads of the screen were drawn taut. As the screen dried on the frame it underwent further tightening due to shrinkage. And this was sometimes accompanied by rupture of the screen, making it useless. Furthermore, the life of such a screen in printing was limited.

Resort was then made to metal screen material, the life of which was found to be much longer than the life of a silk screen. The present inventive concept is drawn to a novel frame devised to support the metal screen. The new frame affords means for more quickly anchoring the screen thereto and additional means for placing the screen under uniform tension; the latter means being adjustable to regulate the tension and easily control the uniformity of said screen tension.

An advantage of the present device over that of the prior art is that shrinkage and the hazard of breakage of a screen due to shrinkage has been eliminated. Also, although made of metal, the frame is lighter in weight, due to the inventive features incorporated therein.

The construction of and manner of operation of the apparatus, as well as certain advantages due to the construction, will become more apparent from the following description of an embodiment thereof, the description being illustrated by the accompanying drawings and forming a part of this specification.

In the drawings:

Fig. 1 is a fragmentary top plan view, partly in section, of a screen support in which the invention is incorporated, portions of the support being broken away to show other parts;

Fig. 2 is a fragmentary side elevational view of the support;

Fig. 3 is a vertical section, drawn to an enlarged scale, on line 3—3 of Fig. 1; and

Fig. 4 is a fragmentary exploded view of elements of the frame at one of the corners thereof.

The reference character 6 is used to denote a screen support or frame, in its entirety. Although a rectangular frame is illustrated it may be of any desired configuration, and may be provided with a pair of rails or end members 9 which are uniformly spaced apart in a fixed relationship, at their ends, with the ends of a pair of spacer members or rails 11, also in parallelism. The

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support 6 is therefore an endless structure having a planar obverse or screen side 12 with which a screen 13 may be associated, by means later to be described, and a bottom or reverse side 14. The rails are of metal or light weight, such as aluminum or an aluminum alloy. Throughout their length the rails 9 and 11 are of uniform cross-section with the exception that the rails 11 are formed with tongues 16 on each of their ends while the rails 9 are formed with grooves 17, laterally and transversely of their ends, to receive the tongues. The tongues are retained in the grooves by screws 18 one of which is at each of the corners of the frame. The screws 18 pass freely through the rails 9 and are threaded into the rails 11. The rails 11 have outermost edges 19 while the rails 9 have outermost edges 21 and ends 22 registering with the edges 19. If desired, the corners of the frame may be rounded as at 23. Adjacent the screen side 12, the edges 19 are formed with grooves 24, the edges 21 with grooves 26 and the ends 22 with grooves 27. Each of the grooves 24, 26 and 27 is of identical V-shaped cross-section and their ends are in registration with the ends of adjacent grooves to provide a continuous channel about the periphery of the frame. The grooves 24, 26 and 27 provide seats for cylindrical rods 29 and 31 confined in the grooves by pressure plates or clamp plates 32 and 33 through which screws 34 pass freely and into threaded engagement with the rails 9 and 11.

The screen 13 is composed of closely woven fine wires of some suitable corrosion resistant material such as Phosphor bronze or stainless steel. Both Phosphor bronze screening of 180 and 200 mesh and stainless steel of 165 mesh were found satisfactory and comparable to silk screen of the highest quality for printing of printed circuit blanks.

For anchoring it to the frame 6, the screen 13 is spread over the screen side 12 and marginal portions of said screen are bent downward over the outer edges 19 and 21 where they are then passed into the grooves 24, 26 and 27. The rods 29 and 31 are then placed in the grooves 24, 26 and 27, and said marginal portions of said screen are wrapped around said rods. The pressure plates 32 and 33 are placed against the edges 21, 22 and 19 respectively, and the screws 34 are then tightened to releasably secure the screen to said frame. The screen is therefore pinched throughout the length of the rods at three linear regions, namely, at the two regions of greatest proximity of the rods to the respective walls of the grooves 24, 26 and 27 and where the plates 32 and 33 press against the rods 29 and 31.

Tensioning means are provided to adjustably regulate the degree of tension of the screen 13 after it has been anchored to the frame, as indicated. For this the upper side 12 of the frame is formed with an endless slot 35 of uniform cross-section, having spaced-apart parallel walls 36 and 37. The slot 35, in each rail 9 extends toward the ends thereof to register with slot 35 in each rail 11. Pairs of bars 39 and 41 also having parallel side walls for intimate slidable association with the side walls 36 and 37 of the slots are placed within said slots 35, and are adjustable vertically of the slots by set screws 42 extending from the reverse side 14 of the frame into communication with the bars 39 and 41. By turning the screws 42 their consequent axial movement is communicated to the bars forcing them against the screen to tension it or relieve the pressure thereon as the case may be. Lock nuts 44, in association with said screws 42, provide means to maintain the position of said screws, once they have been moved.

While I have shown my invention in an embodiment thereof, I am aware that extensive other departures may be made therefrom without departing from the spirit or scope of the invention.

I claim:

A frame and screen unit comprising a rectangular open frame having interconnected sides, each side of the frame having a longitudinal V-shaped groove which is open at the outer edge of that side and which is formed by obliquely disposed walls intersecting one another inward from said outer edge, a corresponding plurality of round rods received individually in said grooves, a screen extending across the frame between the sides thereof and extending around the outside of each side of the frame into the respective groove at the inner side of the rod therein and out of said groove and back across the outer side of said rod, a plurality of elongated clamping plates each presenting an inner face in confronting relation to the outer edge of the corresponding side of the frame, said inner face of each clamping plate extending at said outer edge across the open side of said groove and bearing against the screen thereat throughout substantially the entire length of the corresponding rod to clamp the screen against the outer side of the rod and forcing the rod into said groove to clamp the screen against each of said obliquely disposed walls of the groove at locations spaced from one another, screws threadedly received at their inner ends in each side of

the frame in spaced relation to the screen and having enlarged heads at their outer ends which bear inward against the corresponding clamping plate, each of said sides of the frame having an elongated open slot across which the screen extends, bars slidably received in said slots, screws threadedly received in the sides of the frame and engaging the inner ends of said bars to force the outer ends of said bars out through the open ends of the slots to engage the screen thereat and tension the screen, and lock nuts threaded on said last-mentioned screws and engaging the respective sides of the frame to lock said last-mentioned screws in place.

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