

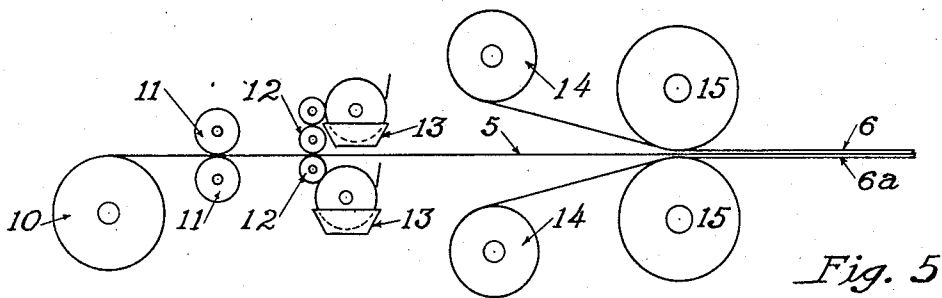
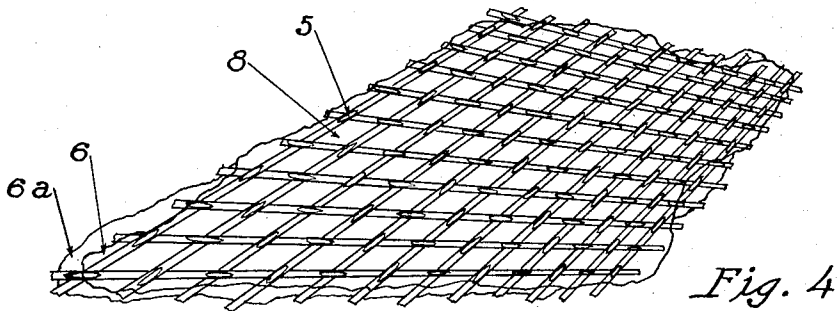
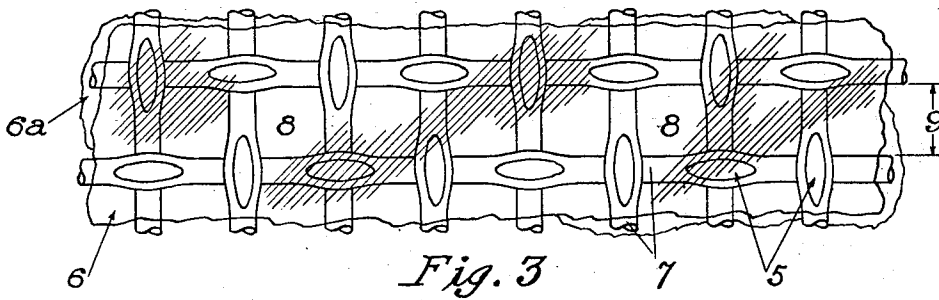
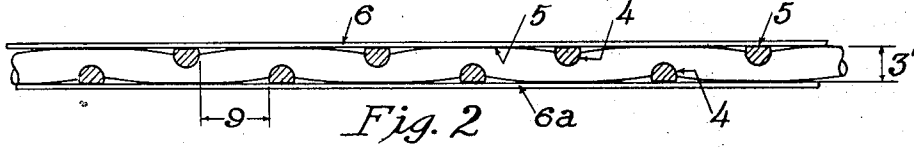
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REENFORCED LIGHT TRANSMITTING SHEET

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REENFORCED LIGHT-TRANSMITTING
SHEET

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4 Claims. (Cl. 154—53)

My invention relates to improvements in flexible, reenforced, light-transmitting sheet materials. It pertains more particularly to improvements in the structure of such sheets.

5 The objects of my improvements are, to provide a sheet material that shall possess certain advantages in use over pre-existing sheets of this character, namely, greater durability; lower cost of manufacture; greater flexibility, so they
10 can be more easily packed in rolls or formed into the many kinds of useful articles for which such sheets are adapted; possessing a maximum of clear visibility through the material, that is, with a minimum of diffusion, refraction and distortion of the light which passes through each of the
15 meshes or elemental windows of the screen-like sheet, and a minimum of glare.

These desirable qualities of low cost, greater durability, flexibility and improved visibility, I attain by means of a novel departure from the usual woven wire mesh structure that has heretofore constituted the reenforcing element of the sheet, and by a novel mode of application of the transparent material to such improved mesh,
20 whereby the individual window-elements that span the individual meshes are made flat, and disposed in the same plane, as distinguished from pre-existing sheets wherein the individual window-element was not flat, but presented a skewed
25 or warped surface, with consequent blurred visibility of objects when viewed through the sheet, and also an undesirable degree of glare caused by refraction through a great number of the warped window-elements.

35 The essential elements of my invention are more particularly pointed out in the claims defining it, it being understood, however, that the claims are not intended to be limited to the form of the parts illustrated and described further than a limitation to the described form is necessary to distinguish them from the prior art.

Like reference characters indicate like parts in all the figures of the drawing.

45 Fig. 1 is a diagrammatic view partly in cross section, greatly enlarged, showing a typical round wire woven mesh screen, with two transparent sheets applied.

Fig. 2 shows a screen such as that of Fig. 1 after it has been rolled flat and the sheets have been applied thereto according to a claimed embodiment of my invention.

Fig. 3 is a plan view of the parts shown in Fig. 2.

Fig. 4 is a general perspective view of a sheet embodying the parts shown in Fig. 3.

Fig. 5 is a diagrammatic view of a preferred form of mechanism for carrying on my method of manufacture.

Wire cloth or screen material usually consists of individual wires 1, that are bent up-and-down 5 and in regular order cross over and under the other wires 2. Each of these sinuously bent wires defines a plane which is perpendicular to the plane of the screen. At each crossing point the screen is of course two wires thick, as is indicated
10 at 3 in Fig. 1, and all of its high spots, H, lie in one plane, all low spots, L, in another parallel plane.

According to one mode of carrying on my invention, the spots, H and L, only, are first coated
15 with a suitable adhesive such as lacquer, cement or the equivalent. Then a flat smooth sheet, S, of suitable sheeted regenerated cellulose material such as "Cellophane" or other transparent flexible material is applied to each side of the
20 screen. It adheres to the said spots, H and L, and remains almost as smooth and clear as a sheet of glass.

The sheets S enclose an air space between them and the structure possesses the desirable properties of an insulating window pane that serves to retard the transmission of heat through it.

As is shown in Figs. 2, 3, 4, I have produced a modified form of the structure just described.

When such a standard woven wire screen such
30 as that shown in Fig. 1 is squeezed between suitably spaced pressure rolls, or is pressed flatwise between a pair of platens, the length and width of the screen are slightly increased because all of the curved wires become straight and, therefore,
35 elongated. The whole screen becomes thinner. Instead of having the original thickness of two wires it becomes one wire thick, as at 3', Fig. 2, or only slightly in excess of that. The wires become embedded in each other at their points
40 of crossing, thus interlocking, as at 4, Fig. 2, and the high and low points, H and L, become flattened so as to present at each side of the screen a series of small flat oblong areas 5, lying in a
45 common plane. When both sides of the thus deformed and flattened screen have been cemented at their areas 5 and covered with transparent sheets 6, 6a, a multiplicity of cellular air spaces is provided, one at each mesh 8. If the mesh is
50 flattened sufficiently, as indicated in Fig. 2, the sheets 6 and 6a will also adhere along the outermost faces of the straight portions 7 of the wire, the result being that the cellular air spaces 8 will be nearly or quite sealed from communication 55

with each other, giving the sheet certain advantages in practical use.

There is a minimum of optical distortion or waviness in the finished surface because the flat surface of every cellular mesh or window remains parallel with the flat surface of every other one. There is practically no glitter.

In earlier attempts to produce a transparent material of this character two sheets have sometimes been applied to a screen structure by pressing them onto the screen by means of a soft pad in such a way that each wire was partly wrapped around by the sheets. But since the wires had been bent sinuously up and down when weaving the screen, it resulted that the surface of each little window-like mesh was skewed or warped and was angularly disposed with respect to the surfaces of the adjacent meshes, giving to the completed sheet an undesirable bright glitter, and impairing the clearness of vision through it. By causing the sheets to be cemented only to the high spots, H and L, as in Fig. 1, or to the flat areas, 5, in Figs. 2 and 3, the above-mentioned difficulty has been overcome.

In another respect my present invention improves on former practice wherein each wire was first embedded in a strip of cement material, and this strip was employed for cementing the transparent sheets together. That arrangement caused the relatively opaque strip-covered area to project beyond the sides of the wires into the meshes where it obstructed a considerable part of the desired clear vision field of each mesh.

It will be noted that according to my invention the cementing material does not extend beyond the sides of the individual wires nor does it spread or squeeze out into the desired clear vision field, 9, of the individual cellular meshes, 8, when the sheets are applied.

The process of manufacture is simple and can be accomplished by one continuous operation of an automatic machine in the manner indicated diagrammatically in Fig. 5, where 10 is a supply of standard mesh screen, 11, 11 are a pair of power-actuated rollers for flattening the mesh in the manner above described. The screen may be flattened and welded simultaneously at the wire crossings by passing the crossed wire assembly through a roller-type welder. 12, 12 are rollers that are kept supplied with fluid cementing material from the receptacle 13 by means of intermediate rolls according to the practice commonly employed in the inking of printing rolls. 14, 14 are rolls of transparent material, such as regenerated cellulose, and 15, 15 are presser rolls that press the sheets onto the cemented flat areas of the screen.

My method of construction, by reason of its producing the interembedding wire crossings and the external flattened areas 5, makes it possible to use relatively inexpensive iron wire for the screen material. It need not be enamelled or galvanized, because the transparent sheets are

so well cemented to the wire areas that they tend to protect the wires against rusting.

In practice, when a wire screen is used of rather coarse mesh, say, one-quarter inch square, made of comparatively small wire and flattened in the manner described and covered with transparent sheets, there is no appreciable amount of light diffusion. Objects can be seen through the sheet almost as well as through clear glass, because the only obstructions to clear vision are the wires themselves. There are no opaque areas of cemented joints or of cemented strips adjacent the wires, as in earlier structures above referred to.

Various color effects can be obtained by using colored regenerated cellulose or other transparent material, or by coloring the wires, or by filling the cells 8 with colored gases.

The finished sheets are sufficiently flexible to permit them to be easily rolled for shipping.

The surfaces of my finished material, being flat and smooth, are well adapted to take printing or other ornamental decoration that can be applied by type, imprinting blocks or printing rollers.

In the foregoing description it will be understood that the term "wire mesh" is employed to designate not only metal wire, but any other suitable material, such as strands of Cellophane, waxed cords, or the like.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. Sheet material comprising a woven mesh screen and a sheet of transparent flexible material secured flatwise to each side of said woven screen, being cemented thereto at the high spots only of the wire elements that define the meshes of the screen.

2. A sheet of material comprising a woven mesh screen having a sheet of flexible transparent material secured to each side thereof, wherein the wires of said woven screen are formed with flat areas at the outer faces of their points of crossing and at their inner crossing faces are mutually interembedded, the said transparent sheets being adhesively fixed to said flattened areas only.

3. A structure as set forth in claim 2 wherein the portions of wires that connect successive points of crossing of said wires are substantially straight, and their upper and lower peripheral surfaces disposed substantially in the planes of said flattened areas, and the transparent sheets are affixed to said peripheral surfaces and also to said flat areas, whereby the meshes present cells whose parallel flat faces are spaced from each other by a distance substantially equal to the diameter of said wire.

4. Sheet material comprising a screen presenting raised portions and a sheet of transparent flexible material secured flatwise to each side of said screen, being cemented thereto in planes that include the surfaces which define the greatest thickness of the screen structure.

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