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LAMINATED PLASTIC MATERIAL

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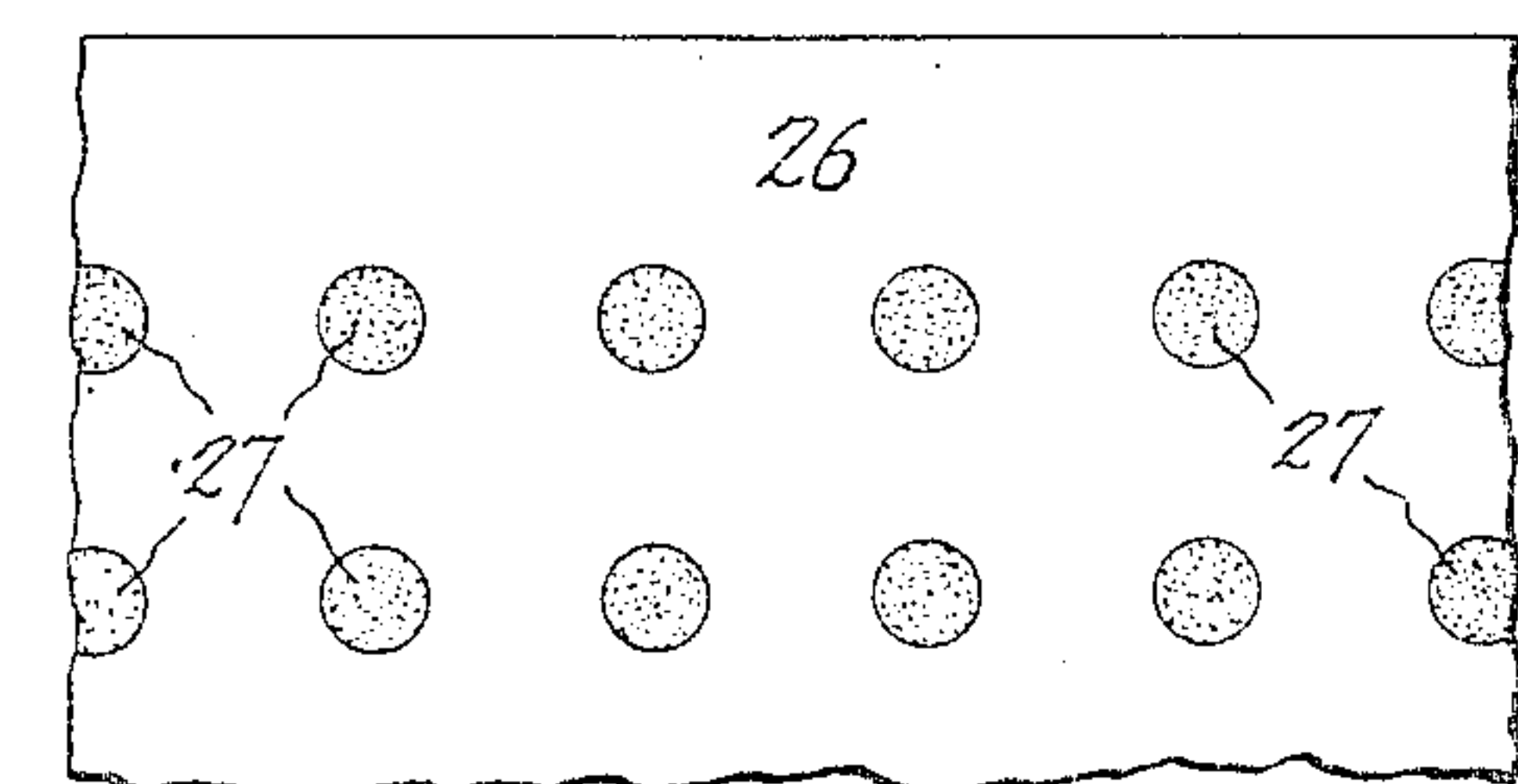
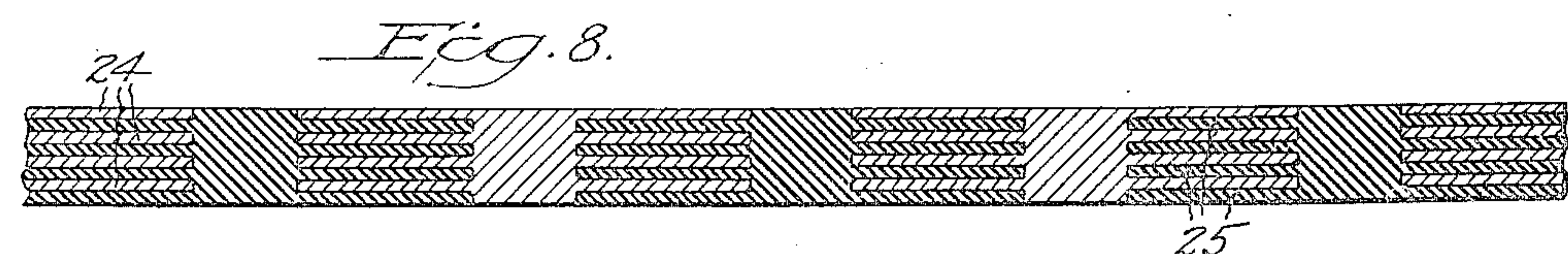
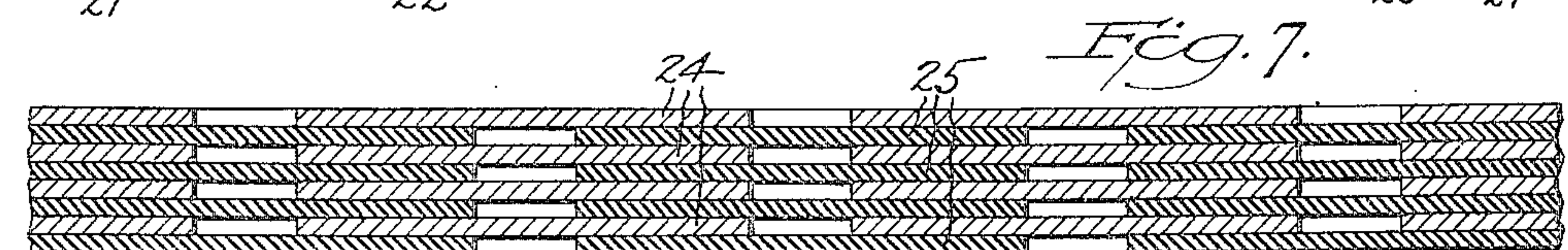
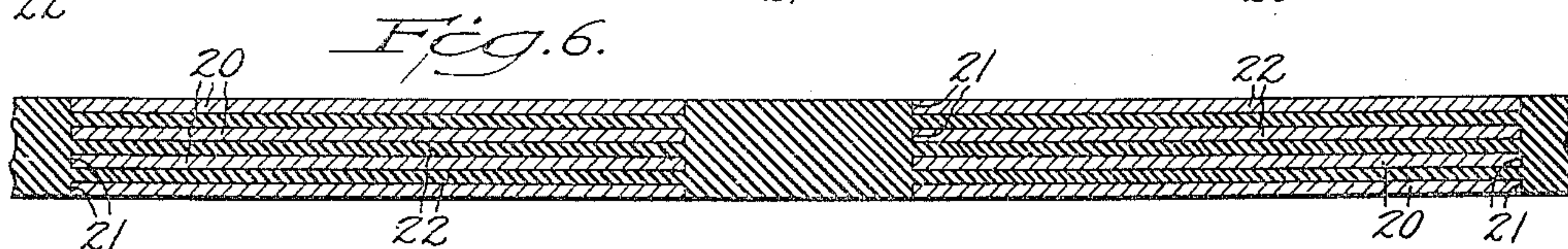
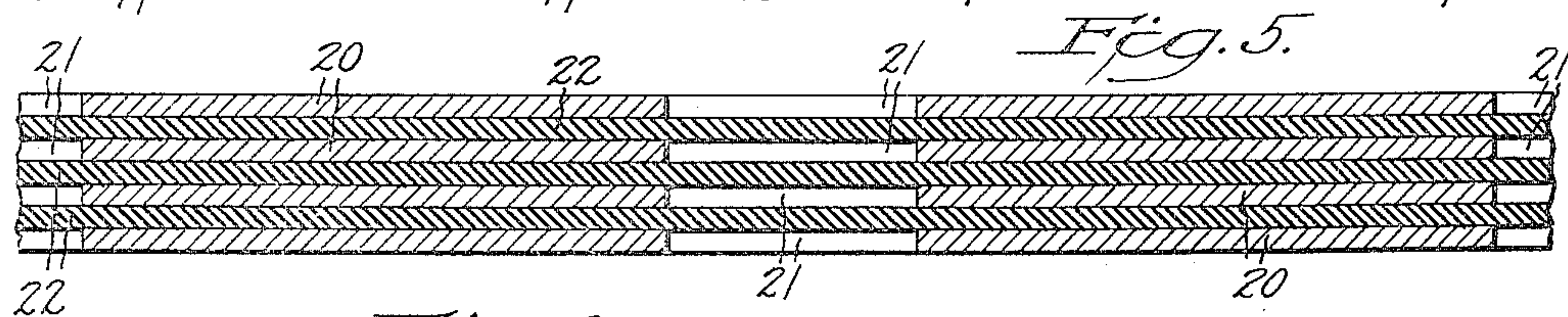
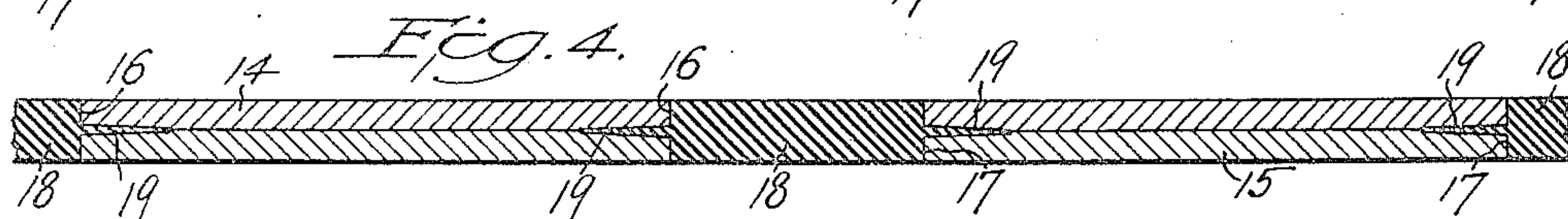
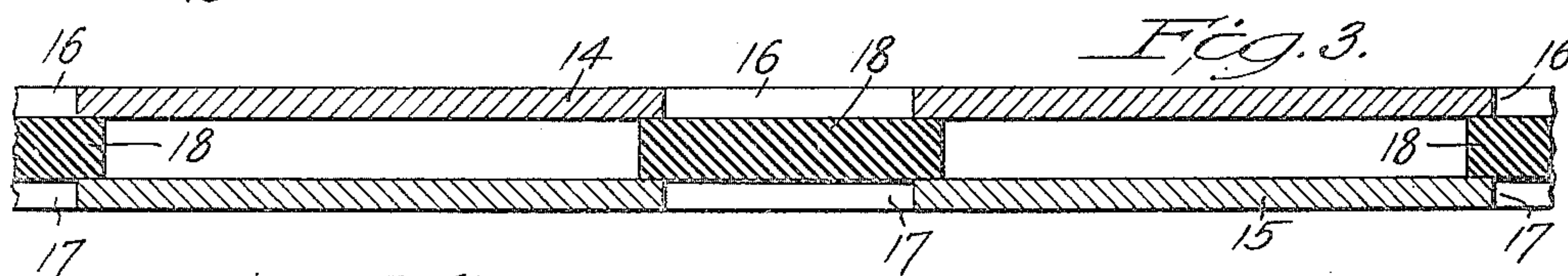
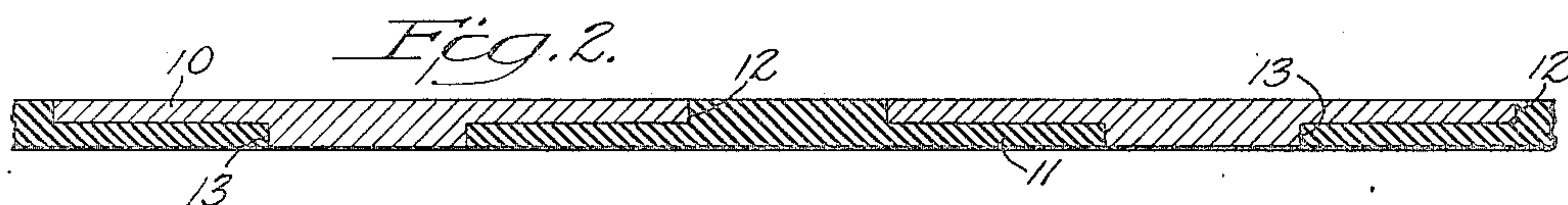
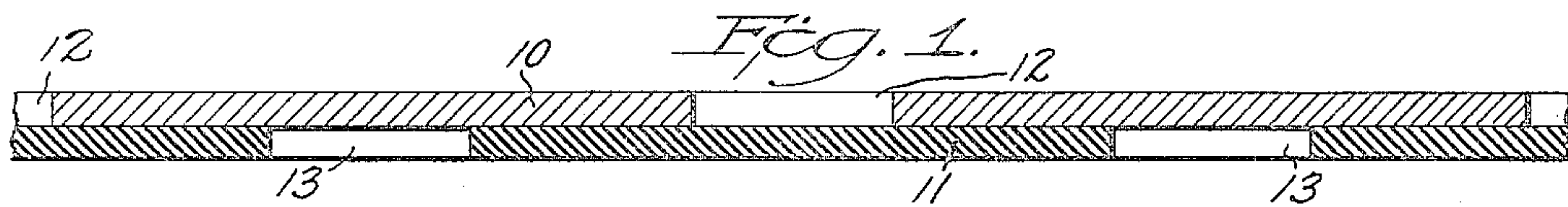


Fig. 9.

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LAMINATED PLASTIC MATERIAL

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This invention relates to plastic compositions such as are suitable in floor coverings, rugs, mats, and other uses where a water-proof covering or surface is desired.

5 An important object of the invention is to produce a material or article of the character above-mentioned in a color design. Another important object of the invention is to produce an article of superposed layers or plies of sheeted material in which the adhesion between the several layers or plies is so firm as to give the effect of an integral structure. In the attainment of these and other objects, I provide at the same time a waterproof, "non-slip" material which, when used as a floor mat or rug, will not tend to slide or slip when walked upon.

The principles of the invention are applicable to many different chemical compositions, but in any case the composition will include fibrous material mixed with a vulcanizable material. In the use of this material, it is contemplated that separate quantities will be differently colored, and after being separately rolled out into sheets, will be united in such a manner that the material of one color will pass through perforations of the material of another color at selected portions, so as to provide a color design at the exposed surface. This result may be accomplished in many ways, a simple example being the use of perforated sheets of different colors, superposed on each other with the perforations of one sheet covered by the unperforated portions of an adjacent sheet or sheets and then pressing the superposed sheets together to force the material of one through the perforated portions of another and firmly unite them together. This operation is performed while the material is plastic and more or less adhesive, and after being thus assembled the built-up laminated structure is subjected to vulcanization by which the union of the successive sheets is rendered firm and permanent. The accompanying drawing illustrates several examples of uniting sheeted material in the manner above described.

In said drawing,

50 Figures 1 and 2 are cross-sections of two

superposed perforated sheets before and after being pressed together.

Figures 3 and 4 are similar views of two perforated sheets assembled with strips covering their perforations, and pressed into these perforations.

Figures 5 and 6 are similar views of a number of perforated sheets superposed on each other and pressed together in the manner described, the arrangement in these figures being intended to give the same design on both sides.

Figures 7 and 8 are views similar to Figures 5 and 6 with the arrangement being such as to give a different design on the two faces of the finished article, and

Figure 9 is a face view of a finished laminated structure such as may be produced in accordance with the principles of the invention.

Referring to said drawing in detail, it should first be briefly noted that the sheeted material is a fibrous, vulcanizable composition, which will be more fully described hereinafter, of such a nature that superposed sheets of the material may be caused to adhere by pressure when, for example, moist or heated, and of such plasticity that it will flow under pressure. In Figure 1 the sheets 10 and 11 are of different colors and are perforated in any desired design, geometrical or otherwise, as illustrated at 12 and 13. These sheets being superposed are pressed together, as for example by being passed through even speed rollers, to force the material of sheet 10 into the perforations 13, and to force the material of sheet 11 into the perforations 12. The result is shown in Figure 2 where it will be noted that the exposed surface will contain materials of the two colors in the pattern selected by the location of the perforations 12 and 13.

In Figures 3 and 4, sheets 14 and 15, perforated at 16 and 17, are of one color and are assembled with intervening strips 18, of a different color, disposed across the perforations 16 and 17. When subjected to pressing, as above described, the material of strips 18 will be forced into the perforations 16 and 17, as indicated in Figure 4, and will at the same

time spread into interlocked flanges 19 between the layers 14 and 15. The design in this case will be the same on both sides, whereas it will be noted that in Figures 1 and 2 the designs produced are different on the two exposed surfaces.

In Figures 5 and 6 a number of sheets 20, perforated at 21, are superposed alternately with a number of sheets 22, the sheets 20 and 22 being of different colors respectively, and the perforations 21 being covered by unperforated portions of the intervening sheets. Upon the pressing of the layers together the material of sheets 22 will be forced into the perforations of sheets 20. Since these sheets are of different colors, the effect will be to produce a surface design, as indicated in Figure 6, the design being the same on the two surfaces.

Figures 7 and 8 illustrate a principle of building up the laminated structure, similar to that employed in Figures 5 and 6, with the exception that the design is different on the two exposed surfaces of the resulting product, due to the use of an even number of plies 24 and 25 of differently colored material, each having perforations into which the material of the adjacent sheets is forced in the pressing operation.

In Figure 9 the exposed surface is shown as being made up of the perforated material 26, having its perforations filled with material 27 of a different color.

In all of the examples shown above, it is to be particularly noted that the filling material in the perforations extends transversely over a greater or less extent of the face of each layer into which it has been forced, thus providing a firm anchorage or bonding to assist in preventing subsequent displacement of the filling material from its proper place in the perforated portions of the other sheets. In Figures 1, 2, 5, 6, 7 and 8, I have illustrated the filling material in each case as extending continuously along the face of the perforated sheets into which it is forced, whereas in Figures 3 and 4 the filling material extends to a limited extent along the surface of the perforated layers into which it has been forced.

Having assembled and pressed together the superposed layers in the manner described, the assembled body is subjected to vulcanization to complete the union of the component portions and to give to the finished article the desired degree of hardness. After the vulcanization step, one or both of the exposed surfaces may be subjected to the action of a wire brush or similar treatment to effect the removal of the surface film of rubber or the like, and to expose the colored fibers, thus giving a warmer and more pleasing surface.

While the description above given will enable those familiar with the compounding and preparation of plastic, vulcanizable com-

positions to practice the invention with a great many of the known compositions, there are certain practical details which should be observed to obtain the best results. The choice of suitable dyes is of importance, as not all dyes will stand the vulcanizing temperature without suffering a loss or degradation of color. Also the physical character of the finished product may depend to a considerable extent upon the ingredients of the composition other than rubber, sulphur and fiber. I shall, therefore, describe a specific example of a composition which is particularly suitable for use in connection with the invention.

As a dye, I may employ any of the sulphur dyes or developed dyes of the desired color. Thio indigo red, Hydron scarlet, and the indanthrene red known as "Ponsol red" give good red colors that withstand the vulcanizing operation.

As the fiber ingredient, I may employ cotton or other cellulosic fiber, and particularly the waste or discarded material of the rubber industry such as old tires and other articles containing fibrous material and vulcanized rubber. Such material should be disintegrated or shredded to admit of thorough mixture with the other ingredients of the composition which is to be produced.

In addition to the fiber and dye, with or without a portion of shredded vulcanized rubber, the composition will include a portion of raw or crude rubber with a vulcanizing agent, and preferably an accelerator, with certain amounts of filler and oils of vegetable or mineral nature, a mordant or fixing ingredient by which the rubber suspension which penetrates the cellulosic fiber is coagulated; and if desired, any compatible special ingredients such as, for example, Gilsonite or asphalt when the material is to be embedded in concrete, cement or tile floors or walls.

With this explanation of the nature of the materials which may be employed, the following specific example of the composition will be readily understood.

100 pound batch: 40% vulcanized rubber, 40% cotton fiber, 10% crude rubber, 3% sulphur, 2% coloring matter, 5% zinc oxide.

I claim:—

1. An article of manufacture comprising in combination a plurality of superposed plies of differently colored fiber and rubber composition, the material of each ply extending through perforations of another, said plies being bonded together and vulcanized in place.

2. The method of forming sheet material in designs, which comprises superposing a plurality of layers of plastic vulcanizable rubber and fiber composition of different colors, pressing said layers together to intrude portions of each into an adjoining layer to produce designs at the oppositely

exposed surfaces, and vulcanizing the superposed layers together.

5 3. The method of producing sheet material in color designs, which comprises superposing a sheet of colored fiber and vulcanizable rubber composition between two other differently colored sheets of similar composition, compressing the sheets to press the material of the interposed sheet through the materials of the other sheets at selected places
10 to produce designs at the exposed surfaces, vulcanizing the sheets thus assembled, and brushing the exposed surfaces to expose the fiber.

15 4. The method of producing sheet material in color designs, which comprises assembling a plurality of differently colored plies of fibrous vulcanizable composition, each ply having a perforation covered by an unperforated portion of its adjacent ply or plies,
20 pressing the superposed plies together to force material from each through the perforation of another, and vulcanizing the united plies.

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