May 5, 1942. G. R. CUNNINGTON 2,282,169

DECORATED FABRIC

Filed Aug. 1, 1938

FIG.4.

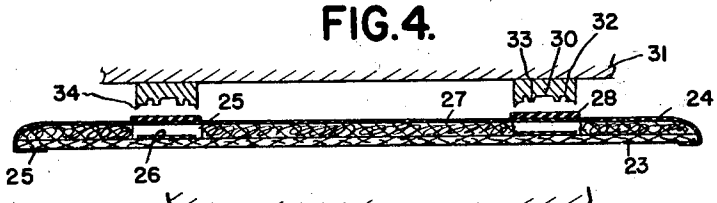


FIG.5.

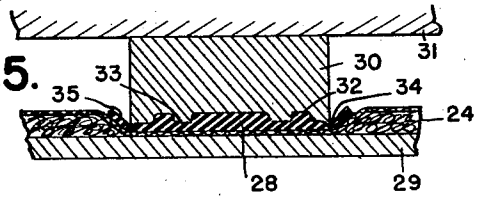


FIG.3.

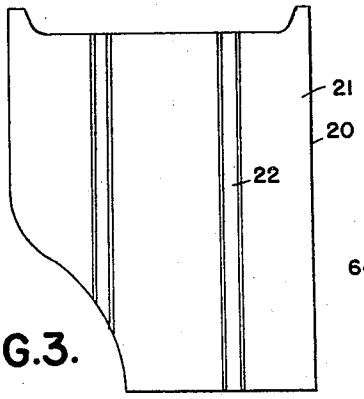


FIG.6.

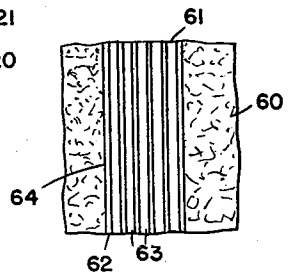


FIG.7.

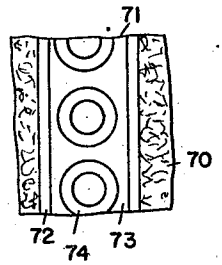


FIG.8.

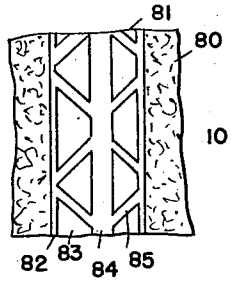


FIG.9.

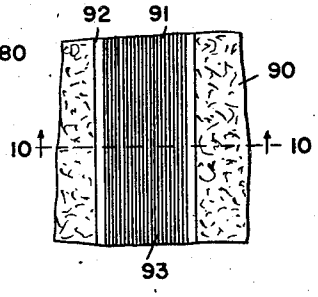


FIG.1.

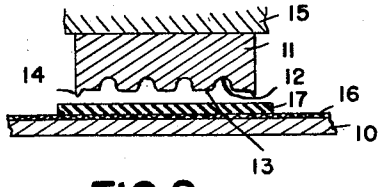


FIG.11.



FIG.10.

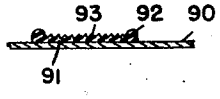


FIG.2.

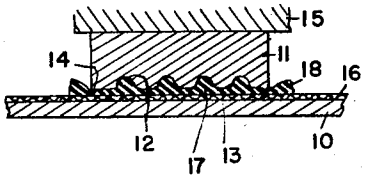


FIG.12.



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UNITED STATES PATENT OFFICE

2,282,169

DECORATED FABRIC

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Application August 1, 1938, Serial No. 222,552

2 Claims. (Cl. 154—2)

The present invention relates to a decorated fabric and more particularly to one which comprises a ply of flexible sheet material and a ply of rubberous material permanently bonded thereto.

It is an object of the present invention to provide a decorated material comprising a sheet of flexible material, such for example as a suitable fabric having a strip or area of predetermined outline of rubberous material attached to the dress face of said flexible material.

It is a further object of the present invention to decorate a fabric, or other flexible material, by attaching thereto a thin strip of rubberous material of contrasting or harmonizing color.

It is a further object of the present invention to decorate the exposed face of a fabric or the like by vulcanizing thereto an area of rubberous material and simultaneously imparting a decorative effect to the exposed face of the rubberous material.

It is a further object of the present invention to provide decorated trim panels in which thin strips or areas of rubberous material are permanently bonded to the exposed face of the trim fabric.

It is a further object of the present invention to form decorated material by the novel steps disclosed herein.

Other objects of the invention will be apparent as the description proceeds and when taken in conjunction with the accompanying drawing, and wherein

Fig. 1 is a view showing the initial or preliminary arrangement of parts employed in decorating an area of fabric;

Fig. 2 is a view corresponding to Fig. 1 in which the die member has been moved into engagement with the material;

Fig. 3 is an elevation of the trim panel manufactured according to the present invention;

Fig. 4 is a section indicating the initial or preliminary relationship of parts in the manufacture of trim panels according to the present invention;

Fig. 5 is an enlarged detail section illustrating the operation of the die member in trim panel decoration;

Figs. 6 to 9, inclusive, are detailed elevations illustrating various decorative effects to be obtained by the present invention;

Fig. 10 is a section on the line 10—10, Fig. 9;

Fig. 11 is a fragmentary section illustrating elements employed in a slightly different embodiment of my invention; and

Fig. 12 is a view of the elements shown in Fig. 11 after embossing and vulcanizing.

In my copending application Serial No. 210,034, filed May 25, 1938, I have disclosed a decorated fabric in which a decorative effect is imparted to the exposed face of the fabric by applying a strip or area of rubberous material to the rear of said fabric and deforming both said fabric and at least the face of said rubberous material in contact with said fabric into a decorative design.

The present invention marks a radical departure from the method and material previously claimed in the application above identified, although it employs the same materials; namely, a strip or area of rubberous material in combination with the fabric or other flexible material to be decorated.

I have illustrated the present invention both as applied to decorating sheet material, as for example a fabric, and as applied to decorating the upholstery fabric of an automotive trim panel. It will be apparent that in its broadest aspects this invention has a wide field of application, and in fact the field is limited only by the field of usefulness of the various fabrics or other materials which may be thus decorated. I have illustrated a decorated fabric in combination with a trim panel only as an illustration of one of the many applications of the present invention.

Referring now to Figs. 1 and 2, I provide a flat table 10 which may be of any suitable material and may, for example, be formed of metal. In juxtaposition to the table 10, I provide a die member 11 provided with a plurality of recesses 12 formed in its generally flat forward face 13 and provided at its edges or around its periphery with short knife edges 14. I have illustrated the die member 11 as attached to a suitable support 15 which may take any convenient form.

The die member 11 is provided with suitable means for heating the same. These means may take any well known form, for example, electric resistance elements or, for example, the die 11 may be provided with a central conduit for the passage of steam or other heating fluid. The particular means for heating the die element form a part of the present invention, and in order to simplify the disclosure and because such heating means are familiar to those skilled in the art, none are illustrated.

In the manufacture of my improved decorated material, I place a sheet of material 16 on the table 10. This sheet of material may be either a pile fabric or a fabric of any other desired

characteristics, or it may be artificial leather, or various compositions. Perhaps the widest field of application of the present invention is to use a flexible sheet material, but it will be understood that decorations of the nature disclosed herein may be imparted to various other materials, such, for example, as substantially rigid sheet material or, under proper circumstances, to solid objects.

For purposes of illustration, however, I have indicated the material 16 as a fabric. In upholstery fabric ordinarily the fabric has a dress face which is intended to be exposed in the upholstered article, and a reverse face. According to the teachings of the present invention, the dress face of the fabric, if the fabric is such that it has a dress face, or in any event the face of the material which is to be exposed, is placed upwardly. Over this exposed or dress face of the fabric 16, I place a piece of rubberous material 17 of sufficient area and shape to cover the design to be vulcanized and preferably to extend slightly therebeyond. This strip may be very thin, as, for example, on the order of .030 inch. However, as will be readily understood, the thickness of the ply of rubberous material 17 may be varied between wide limits. The limiting factors normally as will further appear as the description proceeds are: The material must be of sufficient thickness to permit complete filling of the recesses 12 in the die member; and the material should not be of excessive thickness due to cost restrictions.

It may be stated at this time that the rubberous material 17 may be selected from a large number of rubber stocks of various grades and colors, the requirements being that it be of a good grade of material, and preferably should be a quick curing composition.

With the parts assembled in the relationship illustrated in Fig. 1, the rubberous material and the die member 11 are brought into engagement as by elevating the table 10 or depressing the support 15, or both. The die 11 is heated to a temperature sufficient to cure the rubberous material 17 in a relatively brief interval and at the same time to insure vulcanization between the material 17 and the fabric 16. As illustrated in Fig. 2, the knife edges 14 substantially sever the projecting portions of the strip or area of rubberous material. The application of heat and pressure causes the ruberous material 17 between the knife edges to mold and flow, as indicated, so as to completely fill the recesses 12 of the die member. The pressure is sufficiently great and the heat is chosen so that the contact between the face of the die member 11 and the rubberous material 17 imparts a glossy finish to the exposed face of the rubberous material. The application of heat and pressure, as above stated, is contained for sufficient time to insure substantial vulcanization between the rubberous material and the fabric between the knife edges 14.

The portions 18 of the rubberous material which are substantially severed by the knife edges 14 are not vulcanized to the fabric since there is no substantial application of heat or pressure to the material. As a result of this, when the die is removed from the rubberous material the strips 18 may be drawn away from the decorative design and due to the action of the knife edges 14 this will leave the decorative design with a clear-cut ruled boundary.

In the event that the fabric 16 to which the rubberous material 17 is applied is a pile fabric, it will be evident that the action of the die member will force the rubberous material down into the pile, the pile will be forced into the rubberous material, or forced down. In either case the pile adjacent to the rubberous material is not affected and the result of this, as will be apparent without illustration, will be that the pile will extend upwardly above the plane of the rubberous material. This imparts a richness to the decorated fabric and creates the illusion of padding back of the fabric.

In Fig. 3 I have illustrated an automotive trim panel 20 of conventional design which is covered with an upholstery fabric 21, the fabric being decorated by vertical strips 22 of rubberous material.

The trim panel 20 illustrated in Fig. 3 is produced by a method very similar to that illustrated in Figs. 1 and 2. However, the method is further illustrated in detail in Figs. 4 and 5. In these figures, a panel board 23 which may be of any suitable composition is precut to the form shown in Fig. 3. The face of this panel board which is to be exposed in use may be covered if desired with padding material 24 which may take the form of cotton, blue wadding or any suitable resilient and preferably fibrous padding material. The padding material is removed from areas of the panel board corresponding to the areas of the upholstery fabric which are to be decorated. In the illustrated embodiment this involves removing the padding material in long strips, as indicated by the numeral 25 in Fig. 4, which corresponds to the strips 22 to be applied to the padding material. This padding material may be removed by any convenient method, or in the event the padding material is of a self-sustaining form, such for example as blue wadding, the padding material may be precut to cover the separated areas shown in Fig. 3.

I apply material 26 directly to the panel board at the areas from which the padding material has been removed. The material 26 may be of a suitable adhesive or it may be, if desired, a rubberous composition so that in the completed upholstered panel the design will be permanently vulcanized to the panel board.

The next step in the method of manufacturing the decorated upholstery trim panel is to place upholstery fabric 27, which is preferably precut to a form corresponding to the form of the panel board, over the padding material 24 and reflecting the edges 25' about the edges of the panel board. The edges 25' are then permanently secured to the back of the panel board as by a suitable adhesive, by tacking or the like.

Following this, strips or areas of rubberous material 28 are placed on the exposed face of the upholstery material 27 in conformity with the areas to be decorated and hence in conformity with the areas from which padding material has been removed. For convenience in handling, if desired, this rubberous material may be temporarily attached to the fabric as by separated spots of adhesive, or the like. This step may, of course, be omitted if desired. The panel board and assembled elements are placed on a flat table 29 indicated in Fig. 5, which is in juxtaposition to a heated die element 30 corresponding in all respects to the die member 11 shown in Fig. 1. As previously described, the die member 30 may be heated by any convenient means. The table 29 and support 31 for the die member 30 are caused to approach with the result that the die 30 is forced against the rubberous ma-

terial 28. The die 30 is provided with grooves or slots 32 and intermediate projecting ribs 33. It is also provided with suitable knife edges 34.

The application of heat and pressure to the rubberous material 28 causes the rubberous material to mold and to flow, as shown in Fig. 5, so that it completely fills the slots or grooves 32 and is in contact over its entire face with the heated die 30. The knife edges 34 substantially sever edges 35 of rubberous material which project therebeyond.

The application of heat and pressure is continued for a sufficient time to cure the rubberous material 28 and to cause vulcanization between the rubberous material and the fabric 27. Due to the fact that the rubberous material 28 is in surface contact with the die over its entire face, the surface of the strip 28 will be glazed so as to have, when completed, an attractive glossy appearance.

As in the embodiment illustrated in Figs. 1 and 2, the projecting substantially severed edge portions 35 are not vulcanized to the fabric and may be removed with the result that a very accurately ruled edge is formed along the decorative rubberous material.

If the material 26, previously referred to, is also a rubberous composition, the application of heat and pressure will be continued long enough to insure vulcanization between the fabric and the material 26. If a suitable adhesive is used, the application of heat and pressure by the die member 30 need not be so long continued.

In both of the embodiments just described it will be understood that the rubberous material may take any desired shape or form. For simplicity, I have illustrated merely straight parallel strips of material. However, it will be appreciated that the die members may be formed into any predetermined design so that the finished article may present various geometrical forms, pictures or indicia. It is desired to emphasize at this time the extreme flexibility of the method disclosed. In the past, decorative designs have been imparted to fabric by sewing or the like. The cost of sewing fabric to decorative designs is prohibitive unless the sewing is limited to straight line jobs. According to the teachings of the present invention the design imparted to the fabric may be of any size and shape, either regular or irregular, and the expense in time consumed in its manufacture will not thus be increased.

I have found that very attractive results are obtained when a rubberous material which is attached to the exposed face of the fabric is of a color either harmonizing with or strongly contrasting to the color of the fabric. It is possible to obtain rubberous material for this purpose in practically every color, and it is also possible to obtain various combinations of colors, such for example as a mottled rubber.

Due to the fact that according to the teachings of the present invention the rubberous material is forced firmly into recesses in the die member, it will be apparent that the decoration will be characterized by extremely sharp delineations.

In Figs. 11 and 12 I have illustrated a somewhat different embodiment of my invention which offers important advantages in economy. Since in the present invention the rubberous material is exposed to view and itself forms primarily a decorative element, it is necessary that this rubberous material be of a good grade. If desired to obtain relatively large ridges in the completed design it would, according to the embodiments of the invention shown in Figs. 1 and 4, be necessary to employ a relatively thick ply of rubberous material. I have found that equivalent results may be obtained by the following method: A relatively thick ply 40 of rubberous material may be positioned against the rear surface of a fabric or the like 41, and a relatively thin ply 42 of high grade rubberous material may be placed against the exposed or dress face of the fabric 41. The rubberous materials 40 and 42 will be preformed into areas corresponding to the decorative design desired and will be placed in registering relation relative to the fabric 40.

In order to increase the economy of the embodiment now being described, the rubberous material 40 may, if desired, contain a substantial quantity of filler. This filler may be of any suitable material, and simply by way of example I call attention to the fact that certain fibrous materials may advantageously be employed.

The parts assembled as shown in Fig. 11 may then be placed between a table and die exactly as shown in Fig. 1. The table and die will then be moved together to cause deformation of the exposed rubberous face in the predetermined design. This will result in a deformation of the parts, as best indicated in Fig. 12, where it will be observed that a substantial portion of the molding of the rubber takes place in the backing element 40 with the result that the exposed area of rubberous material 42 may be extremely thin. In this last embodiment, it may be desirable to apply heat to the material being acted upon simultaneously from the die and from the table member.

By way of example, I have found that entirely satisfactory results may be obtained by employing a facing area of rubberous material of a thickness of .010 inch in combination with a back ply of rubberous material having a thickness of .030 inch. Where a relatively expensive rubberous material is employed for the facing areas, the economy resulting from this arrangement is obvious.

In Figs. 6 to 10 I have illustrated a number of different designs merely for the purpose of emphasizing the flexibility of my improved method. In Fig. 6 I have shown a fragment of fabric 60 to which is vulcanized a strip 61 of rubberous material having a plurality of ridges or elevations 62 spaced by corresponding grooves or elevations 63. This figure illustrates the decorative appearance of the straight ruled edges 63 of the rubberous strip resulting from the present process.

In Fig. 7 I have illustrated a fragment of fabric 70 which has a strip of rubberous material 71 vulcanized thereto. The strip 71 is bounded at its edges by ridges or ribs 72 separated by a generally flat area 73. The decorative effect is further enhanced by a plurality of circular ridges or risers 74 formed to project above the flat surface 73.

In Fig. 8 I have illustrated a fragment of fabric 80 to which a strip of rubberous material 81 is vulcanized. The strip 81 has at its edges upstanding ribs 82, a generally flat circular area 83 and circular upstanding rib 84, the circular rib 84 being connected to the edge ribs 82 by diagonal ribs 85.

In Fig. 9 I have illustrated a portion of fabric 90 having a strip of rubberous material 91 vulcanized thereto. The strip of rubberous mate-

rial 91 has at its edges upstanding ribs 92 and intermediate its edges a multiplicity of sharp small projections as indicated at 93.

In the designs illustrated in Figs. 6 to 9, the exposed face of the rubberous material is in all instances smooth and glossy.

I have found that decorative materials formed according to the teachings of the present invention exhibits attractive decorative effects, and in addition, is characterized by the fact that the rubberous material is not easily soiled and, when soiled, may be readily cleaned.

The present disclosed method of decorating material, due to its flexibility, lends itself to schemes of decoration which have hitherto been impractical. In the case of the decorated fabrics made according to the process illustrated in Figs. 1 and 2, the fabrics may be employed for substantially any purpose. Among the many possible applications of this fabric are upholstery fabric for automobile cushions, covers for cushions, covering fabric for luggage, draperies, and many others which will suggest themselves to those skilled in the art.

The foregoing detailed description has been given for clearness and understanding only, and no unnecessary limitation should be understood therefrom, but the appended claims should be construed as broadly as permissible in view of the prior art.

What I claim as my invention is:

1. The method of imparting a decorative effect to a limited area of a fabric which comprises: applying a relatively thick ply of uncured rubber to the rear surface of said fabric opposite to the limited area to be decorated, applying a relatively thin ply of uncured rubber to the front surface of said fabric over the limited area to be decorated and in registry with said relatively thick ply of uncured rubber, subjecting said rubber to vulcanizing temperatures while applying pressure at a plurality of closely spaced zones to the front face of said relatively thin ply of rubber sufficient to displace the rubber of said relatively thick ply into raised risers intermediate the zones of pressure application, thereby forming the fabric and thin ply of rubber into a relief design, and maintaining said pressure until vulcanization of said rubber is substantially effected.

2. The method of imparting a decorative effect to a limited area of a fabric which comprises: applying a relatively thick ply of uncured rubber to the rear surface of said fabric opposite to the limited area to be decorated, applying a relatively thin ply of uncured rubber to the front surface of said fabric over the limited area to be decorated and in registry with said relatively thick ply of uncured rubber, subjecting said rubber to vulcanizing temperatures while molding the composite assembly with a die having a plurality of adjacent, closely spaced, shallow recesses from the front face thereof to mold the rubber of said relatively thick ply into risers, the said risers and their cover of fabric and thin rubber filling the shallow recesses of said die, thereby forming the fabric and thin ply of rubber into a relief design, and maintaining said pressure until vulcanization of said rubber is substantially effected.

GEORGE R. CUNNINGTON.