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**METHOD OF AND MEANS FOR
MENDING FABRIC****Charles K. Hirsch, 195 Claremont Ave.,
New York, N.Y.****Filed Oct. 25, 1960, Ser. No. 64,917****4 Claims. (Cl. 156—94)**

My present invention relates to the mending of fabrics and has as its general object the provision of an improved method of and means for patching textile materials and the like.

While so-called "iron-on" tapes have long been used to patch holes in fabrics, they have many disadvantages. Such tapes generally comprise a fabric patch coated on one side with a thermally effective plastic adhesive which is applied to the inner surface of the fabric to be mended. The plastic adhesive is then fused to the fabric by the application of heat and moderate pressure (e.g. from a common household iron). When such tapes are used, however, the glossy undersurface of the factory-applied plastic adhesive shows through the hole in the mended fabric. The great diversity in the types of fabric which may require patching from time to time necessitates the stocking of a large variety of mending tapes and, although a particular type may have been of the proper color for a certain mending purpose, it was always difficult to match the weaves or designs of the fabric to be patched with the mending material. Furthermore, the impermeability of the adhesives used in iron-on tapes between the patch and the fabric renders the patched area thereof impenetrable by fluids (e.g. dyestuffs, cleaning solvents) and prevents its satisfactory treatment by fluids; this also has the undesirable effect of impeding the evaporation of body perspiration when the fabric is part of a garment and the patch covers a large area.

It is, therefore, a more specific object of my invention to provide a method of patching fabrics whereby the patched region retains a permeability to fluids approaching that of the unpatched regions of the original fabric.

Another specific object of the invention is to provide a thermally activatable patching material adapted to match the fabric to be patched which is suitable for large-scale mending as well as for household patching applications and which can be applied equally well to either the "wrong" or the "right" side of such fabric.

According to a feature of the invention, I provide a heat-responsive (preferably thermoplastic) adhesive backed by a substrate which may be stripped therefrom. The adhesive may be applied to a patching fabric by the application of heat, whereupon the substrate may be removed and the adhesive-coated patch applied to the inner surface of a fabric to be mended. Advantageously, a thermosensitive release agent is interposed between the adhesive and the substrate (e.g. as a surface coating on the latter) to facilitate the removal of the latter after application of the adhesive to the patch. The adhesive carried on the substrate is, according to a more particular feature of the invention, provided with a multiplicity of perforations adapted to assure the permeability of the patch after the latter is applied to the fabric. The perforations, which may, for example, be punched or drilled into the adhesive-coated substrate, are sufficiently numerous to provide a penetrability to fluids comparable to that of the unpatched areas of the fabric.

According to another more specific feature of the invention, the adhesive-coated substrate is provided with a hole substantially matching in size and configuration the hole in the fabric to be mended. The adhesive is then thermally fused to a patch of the same or similar fabric whereupon the substrate is removed. The patch is then

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applied over the hole in the fabric, the design and weave of the patch being aligned with that of the fabric surrounding the hole therein. The weave and design of the patch, revealed through the aligned holes in the fabric and the adhesive, will then blend with that of the fabric while the adhesive, fusing the patch to the fabric about the perimeter of the patched hole, prevents the unraveling of the threads along this perimeter. It should also be noted that the adhesive-coated substrate can be provided with a preformed hole, the adhesive film being suitable for patching holes and rents smaller than the preformed hole.

The thermally activatable adhesive, which may be a polymeric heat-softening adhesive, may be cast, sprayed or otherwise deposited on the substrate. The latter may be a paper treated with a heat-responsive release agent such as wax, a silicone or the like. In addition to mechanical techniques (drilling and punching) for perforating the adhesive film on the substrate, bombardment by particles from a radioactive source, electric-spark techniques and chemical treatment may also be used to render porous the polymeric film.

The above and other objects, features and advantages of my present invention will become more readily apparent from the following description, reference being made to the accompanying drawing in which:

FIG. 1 is a plan view of a fabric mended in accordance with my invention;

FIG. 2 is a cross-sectional view taken along line II—II of FIG. 1;

FIG. 3 is a view similar to FIG. 1 of the bonding film used in forming the patch;

FIG. 4 is a cross-sectional view of a patch according to the invention along the line IV—IV of FIG. 3, illustrating one stage in the patch-forming process;

FIG. 5 is a view similar to FIG. 4 of a patch according to another embodiment of my invention; and

FIG. 6 is a view similar to FIG. 1 of the bonding film according to still another embodiment of my invention.

In FIGS. 1 and 2 I show a fabric 10 having a hole 11 which is to be patched. Loose threads in the vicinity of this hole are removed and a patch 13 of the same material as fabric 10 is cut. The patch 13 is dimensioned to overlie the hole 11 with a substantial marginal portion surrounding this hole. A piece of bonding material 12, of the same size as the patch 13, is provided with a centrally disposed hole 14 of the same size and configuration as the hole 11. The bonding material 12 comprises a thermally softenable polymeric adhesive film 17 cast onto a flat substrate 16 which is preferably a sheet or strip of paper treated at least on its surface with a thermosensitive release material such as wax or a silicone. To render the bonding foil 12 permeable to fluids, I perforate the substrate-backed adhesive so as to obtain a network of pores 15. The latter are made of sufficiently large diameter to obviate the closing of the pores during the application of heat and/or pressure.

To form the patch, I prefer to rest the compound bonding foil 12, with its adhesive film 17 facing upwardly, on a flat surface. The patching material 13 is then placed over the adhesive film 17 and subjected to heat and a moderate amount of pressure by an iron to form a composite by bonding the patch 13 to the foil. Next, the releasing agent interposed between the film 17 and the substrate 16 is sufficiently softened or decomposed by the heat to permit the backing element or substrate 16 to be peeled from the adhesive film 17, as shown in FIG. 4. After the substrate is stripped from the film 17, the latter is placed face down on the inner surface of the fabric 10 so that the hole 14 in the adhesive is aligned with the opening 11 in the fabric 10 whereby none of the adhesive

film may be seen through the opening. A hot iron is then used to bind the patch to the fabric 10 vis the thermal adhesive 17. The weaves of the patch 13 and the fabric 10 are, of course, matched before the patch is affixed to the fabric.

In FIG. 5 I show the patch 13 having a bonding foil 12' applied to it by the process described above. The foil 12' comprises a removable substrate 16', treated with a thermally activatable release agent, on which the adhesive film 17' has been cast. The adhesive 17' is chemically removed at selected portions 15' (which may include an area co-extensive with the hole 11 in the textile 10 to be repaired, cf. FIG. 2) prior to applying the foil 12'.

FIG. 6 illustrates an annular foil 12'', of the type previously described, wherein a central hole 14'' is formed during manufacture of this ring. The latter, adapted to be used for patching holes of maximum diameters not larger than that of the adhesive-free area 14''; if the hole to be mended is smaller than that area, it may be cut to size by the operator before mending, if not, the peripheral portions of the fabric will subsequently fray until the outline of the hole exactly matches that of area 14''. The perforations 15'' should be numerous enough to permit a satisfactory penetration of the patch by fluids. Thus, the permeability of the patch may equal or exceed that of the surrounding fabric.

It will be understood that a patch, according to my invention, may also be used to join adjacent strips of fabric. The large openings 14 and 14'' may thus be dispensed with. The patching foil is, however, rendered permeable to fluids as described above so that the joining seam has essentially the same permeability as the adjacent portions of the fabric.

The invention as illustrated and described is believed to admit of many variations and modifications deemed to come within its spirit and scope as defined in the appended claims.

I claim:

1. A method of mending a hole in a fabric, comprising the steps of forming a compound foil by coating a backing element with a layer of thermally activatable adhesive with interposition of a heat-responsive releasing agent therebetween, removing at least said adhesive layer over an area substantially co-extensive with said hole, thermally bonding to said layer a patch of material matching said fabric with said patch overlying said area, exposing said layer by stripping said backing element from the composite thus obtained, applying said patch to said fabric with said layer contacting the latter and with said area in registry with said hole whereby the material of said patch substantially blends with said fabric in the region of said hole, and bonding said fabric onto said patch by heat and pressure.

2. A method of mending a hole in a fabric, comprising the steps of forming a compound foil by coating a back-

ing element with a layer of thermally activatable adhesive with interposition of a heat-responsive releasing agent therebetween, removing at least said adhesive layer over an area substantially co-extensive with said hole, perforating at least said layer at a multiplicity of locations surrounding said area, thermally bonding to said layer a patch of a material matching said fabric with said patch overlying said area and said locations, exposing said layer by stripping said backing element from the composite thus obtained, applying said patch to said fabric with said layer contacting the latter and with said area in registry with said hole whereby the material of said patch substantially blends with said fabric in the region of said hole, and bonding said fabric onto said patch by heat and pressure.

3. A method of mending a hole in a fabric, comprising the steps of removably securing a patch of a material matching said fabric to a backing element with interposition of a layer of thermally activatable adhesive, removing said layer from an area substantially co-extensive with said hole and covered by said patch, exposing said layer by stripping said backing element from the composite thus obtained, applying said patch to said fabric with said layer contacting the latter and with said area in registry with said hole whereby the material of said patch substantially blends with said fabric in the region of said hole, and bonding said fabric onto said patch by heat and pressure.

4. A method of mending a hole in a fabric, comprising the steps of coating a backing element with a layer of thermally activatable adhesive with interposition of a heat-responsive releasing agent therebetween, perforating the backing element so coated over an area substantially co-extensive with said hole and at a multiplicity of locations surrounding said area, thermally bonding to said layer a patch of a material matching said fabric with said patch overlying said area and said locations, exposing said layer by stripping said backing element from the composite thus obtained, applying said patch to said fabric with said layer contacting the latter and with said area in registry with said hole whereby the material of said patch substantially blends with said fabric in the region of said hole, and bonding said fabric onto said patch by heat and pressure.

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