BONDING FASTENING MEMBERS TO A SUBSTRATE

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ABSTRACT

A fastening member and a method for applying a fastening member to a substrate is described. The method comprises coating the surface of a substrate with an adhesive, activating the adhesive on a fastening tape member and then bringing the adhesive coated surfaces into face-to-face relationship with sufficient pressure to firmly affix the tape member to the substrate.

7 Claims, No Drawings
BONDING FASTENING MEMBERS TO A SUBSTRATE

BACKGROUND OF THE DISCLOSURE

1. Field of the Invention
This invention relates to a fastening member, and more particularly to a fastening member for use in a separable fastening device and to its method of manufacture.

II. Disclosure of the Prior Art
Separable fasteners such as the hook and loop fasteners described in U.S. Pat. Nos. 2,717,437 and 3,009,235 are widely used for the purpose of attaching one object to another. In general, fasteners of this type include separable members, each member having a pile-like surface containing a multiplicity of hooking elements. Upon being pressed together in face-to-face relationship, the hooking elements of the separable members releasably interengage one another to hold the members together. In the above-mentioned U.S. patents, each separable member comprises a sheet of woven synthetic material having raised loop threads wherein the loops of one member are cut at their outer extremities to form hook-type hooking elements while the loop threads of the other member remain uncut to form loop-type hooking elements. It is also contemplated that a given member may comprise both hooks and loops. When these two members are pressed together in face-to-face relationship, there is substantial engagement of the hook-type hooking elements with the loop-type hooking elements. A considerable effort must be applied to separate the members unless they are peeled apart in which case the members are separated quite easily.

The number of applications in which separable fasteners of the type described above can be advantageously utilized is legion. One problem which characterizes the use of separable fasteners concerns the attachment of the individual fastening members themselves to adjacent structures, such as fabrics. For attachment to fabrics, tape fastening members are usually held in place by stitching the members onto the fabric. This is usually done by a conventional sewing machine. Conventional mechanical fasteners such as clips and staples, have also been used. However, these methods for attaching fastening members to fabrics present numerous disadvantages.

First of all, if the members are sewn onto the fabric it is generally necessary that the person performing the sewing have some skill regarding the operation of a sewing machine. Secondly, if the fastening members are either sewn onto the fabric or held thereto by a conventional mechanical fastener, the overall lifetime of the attachment means is usually much shorter than that of the fabric. For example, after several washings or dry-cleaning processes it has generally been discovered that the threads or mechanical fasteners become loose, and thus the fastening members become detached from the fabric. The use of adhesives for attaching fastening members to an adjacent structure is also known. However, to date, an effective method for permanently attaching a fastening member to a fabric by using an adhesive has not been found.

It is therefore, the principal object of the present invention to overcome the disadvantages stated hereinabove. With the present invention, it is now possible to attach a fastening member to a fabric by using an adhesive in a very simple and efficient manner such that the procedure can be performed in the home without using a sewing machine or other mechanical fastening means by even a child.

SUMMARY OF THE INVENTION
The method for securing a fastening member to a substrate, the member having projecting from one surface thereof a multiplicity of hooking elements and having coated on the opposite surface an adhesive film, in accordance with the present invention comprises first applying a synthetic resin based adhesive film on the substrate. Thereafter the adhesive film on the fastening member is activated. The two adhesive coated surfaces are then brought together in face-to-face relationship with sufficient pressure to firmly affix the fastening member to the substrate.

A fastening member for use in a separable fastening device according to the present invention comprises a substrate and a film of a synthetic resin-based adhesive on the substrate. A base member having projecting from one surface thereof a multiplicity of hooking elements contains a synthetic resin-based adhesive on the opposite surface of the member and is affixed to the substrate by contact of each of the adhesive layers in face-to-face relationship.

DESCRIPTION OF THE PREFERRED EMBODIMENTS
In accordance with the present invention fastening tape members are adhesively bonded to a substrate following a very unique procedure.

A fastening tape member which may be used in accordance with the present invention has a base member having one surface defined by a plurality of hooking elements which may be hook-type hooking elements, loop-type hooking elements or a combination of both hook-type and loop-type hooking elements. The tape member and projecting hooking elements may be constructed of any of numerous synthetic materials such as, for example, nylon. In order to securely bond an adhesive to the tape member it is preferred that the opposite surface of the tape member have a suitable base coat which would provide for a secure bond between the tape member and the adhesive. In the case of a tape member of woven nylon or woven polyester, a suitable base coat may be Bostik 7064 catalyzed with Boscodur No.30, both of which are sold by the USM Chemical Company. In the case of a molded plastic tape member, the base coat is preferably a primed tape member and Bostik 4045 which is also sold by the USM Chemical Company. Fastening members used in accordance with the present invention having adhesive coated surfaces may be as described in commonly assigned and pending U.S. Pat. Application Ser. No. 71,920, filed Sept. 14, 1970, now U.S. Pat. No. 3,726,752.

Many types of adhesives are suitable for use as the adhesive lamina of the invention. Suitable adhesives for this purpose are synthetic resin based adhesives, preferably the thermoplastic adhesives such as, for example, Thermogrip 1101 sold by the USM Chemical Company, on a release backing, such as a release paper backing or any other suitable release medium. It is also preferred in order to obtain an excellent bond, that an adhesive film having a thickness of at least approximately 4 to 6 mils be used.
In practicing the method in accordance with the present invention, the adhesive is first applied to a substrate. Preferably, the adhesive film on a release backing is first placed on the substrate to which it is desired to bond the fastening members can be bonded to numerous types of substrates, such as fabrics substrates, as, for example, cottons, woolens, synthetics, fiberglass and various blends of these materials whether they are formed of loose or tight weaves.

With the adhesive film facing the substrate, a heat source is applied to the release backing. Sufficient heat and pressure is applied to assure that the adhesive will melt and transfer to the substrate a film of adhesive which will coat a specified area of the substrate. A household iron has been found to be most eminently suitable for this purpose. However, the adhesive can be heated with hot air or with an infrared heating source. Using a temperature ranging from approximately 300° to 350° F for about 5 to 25 seconds when heating the adhesive, is eminently suitable.

After the heat source is removed, the adhesive is allowed to cool for about 10 to 20 seconds. After cooling, the release backing may then be peeled away leaving a coating of adhesive on the substrate.

The adhesive coated surface of a fastening tape member such as described in commonly assigned and co-pending U.S. Pat. Application Ser. No. 71,920 filed Sept. 14, 1970 is then activated. This is accomplished by heating the adhesive. Preferably, the same release backing as described above is placed over the adhesive coated surface of the tape member and a heat source is applied to the backing in the same manner as described above. Thereafter the adhesive coated surface of the tape member is positioned over the adhesive coated surface of the substrate and the two surfaces are brought together with sufficient pressure to securely bond the tape member to the substrate.

One of the unique features of this procedure is that the bonds do not have to be assembled while the adhesive is in a molten condition. The procedure and the adhesive used, allow for what is known as a long open time. Therefore, both bonding surfaces can be heat activated and assembled after a good deal of open time without any great loss in bond strength. In other words, after the adhesive coating is applied to the substrate and after the adhesive coating on the tape member is activated these components may be completely cooled and left standing prior to bonding them together.

The fastening tape members with associated up-standing hook-type hooking elements or loop-type hooking elements which are adhesively bonded to a substrate and which form fastening members in accordance with the present invention may consist of the woven hook pile or loop pile material described in U.S. Pat. Nos. 2,717,437 and 3,009,235 or of the knitted loop pile or hook pile material described in commonly assigned and co-pending U.S. Pat. Application Ser. No. 659,669, filed Aug. 10, 1967, now U.S. Pat. No. 3,530,687. Alternatively, these hook and loop type elements may consist of the molded plastic hook pile or loop pile material described in commonly assigned co-pending U.S. Pat. Application Ser. No. 824,597, filed May 14, 1969, now abandoned.

The invention will be described in detail with reference to the following example for illustrative purposes.

EXAMPLE

Using a household iron as a heat source, a woven fastening tape member having a multiplicity of up-standing hooking elements projecting from one surface thereof was attached to a fabric in the following manner.

A film of a synthetic resin based adhesive, Thermogrip 1101 manufactured by the USM Chemical Corporation having a thickness of approximately 6 mils and secured onto Daubert No. 1-50CSCK-2 release paper was used. The adhesive containing release paper was positioned on the fabric with the paper side up. A household iron set at approximately 325° F was placed on the paper and pressed firmly for twenty seconds. The iron was removed and the paper was allowed to cool for fifteen seconds. After cooling, the release paper was peeled from the adhesive film, which at this time was securely bonded to the fabric. The same piece of release paper was then placed on the back side of an adhesive coated fastening member. A household iron set at approximately 325° F was then placed on the paper and pressed firmly for five seconds. The iron was then removed and the paper was allowed to cool for fifteen seconds. The release paper was then peeled from the tape member leaving an activated adhesive coating on the member. The adhesive coated surface of the tape member was then placed over the adhesive coated surface of the fabric and the two surfaces were then pressed firmly together by hand. This resulted in a firm bond between the tape member and the fabric producing a fastening member in accordance with the present invention.

The following performance data resulted from sample bonds produced in the manner described above.

Tape members bonded to fabric in the manner described above were subjected to four hours of hot soapy water laundering in a commercial type of washing machine. Also, several samples were subjected to twenty hours of soaking in perchloroethylene to simulate a dry-cleaning process. In both cases there was no substantial loss of bond strength between the tape member and the fabric. Excellent bonds were achieved on substrates of cottons, woolens, synthetics, fiberglass, and blends of these materials which had either loose or tight weaves.

I claim:

1. A method for securing a fastening member to a substrate, said member having projecting from one surface thereof a multiplicity of hooking elements and having coated on the opposite surface thereof an adhesive film, comprising the steps of:
   a. applying a synthetic resin-based adhesive film on a surface portion of the substrate;
   b. heating the adhesive and applying sufficient pressure to coat the surface portion of the substrate with the adhesive;
   c. placing a release backing over the adhesive on the fastening member;
   d. heating the adhesive on the fastening member;
   e. removing the release backing from the fastening member; and
   f. bringing the adhesive coated surface of the fastening member into face-to-face contact with the adhesive coated surface of the substrate with sufficient pressure to firmly affix the fastening member to the substrate.
2. The method according to claim 1 wherein the film of thermoplastic adhesive applied to the substrate is initially coated on a release backing which is removed after heating the thermoplastic adhesive.

3. The method according to claim 2 wherein the adhesive coating on the substrate is heated to at least 300° F.

4. The method according to claim 3 wherein the adhesive film coating on the fastener member is heated to at least 300° F.

5. A method according to claim 1 wherein the substrate is a fabric.

6. A method according to claim 1 wherein the release backing is paper.

7. A method for securing a fastening member to a fabric substrate said member having projecting from one surface thereof a multiplicity of hooking elements and having coated on the opposite thereof an adhesive film, comprising the steps of:

a. contacting the fabric substrate with a film of a thermoplastic adhesive coated on a release backing;
b. heating the adhesive to a temperature of about 300° F to about 350° F and applying a sufficient pressure to coat the substrate with the adhesive;
c. removing the release backing from the adhesive coated substrate;
d. placing the release backing over the adhesive on the fastening member;
e. heating the adhesive on the fastening member to a temperature of about 300° F to about 350° F;
f. removing the release backing from the fastening member;

and

g. bringing the adhesive coated surface of the substrate and the adhesive coated surface of the fastening member into face-to-face relationship with sufficient pressure to firmly affix the fastening member to the fabric substrate.