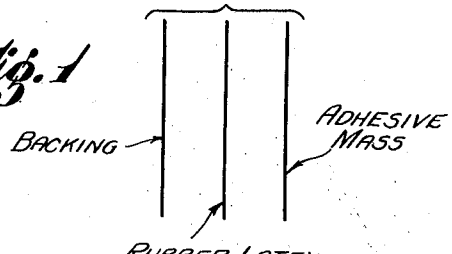
June 27, 1944. E. P. WENZELBERGER ET AL 2,352,463

ADHESIVE COATED FABRIC AND BARRIER COATING COMPOSITION THEREFOR

Filed June 15, 1940 2 Sheets-Sheet 1

Fig. 1



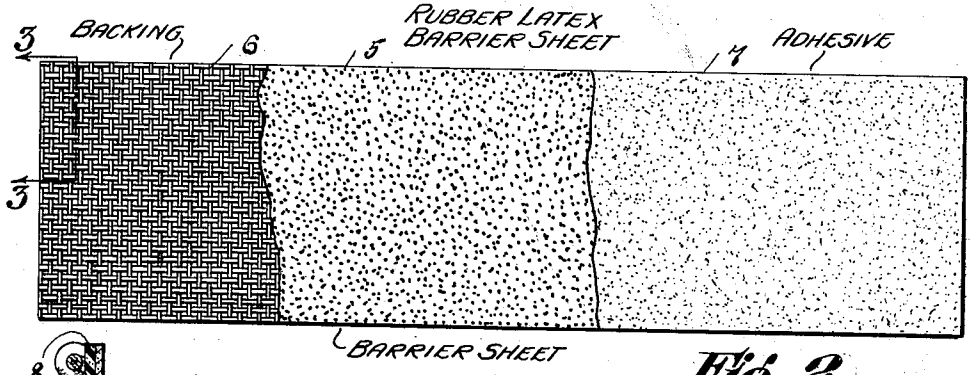


Fig. 2



Fig. 3

BACKING
BARRIER SHEET
ADHESIVE

Fig. 4

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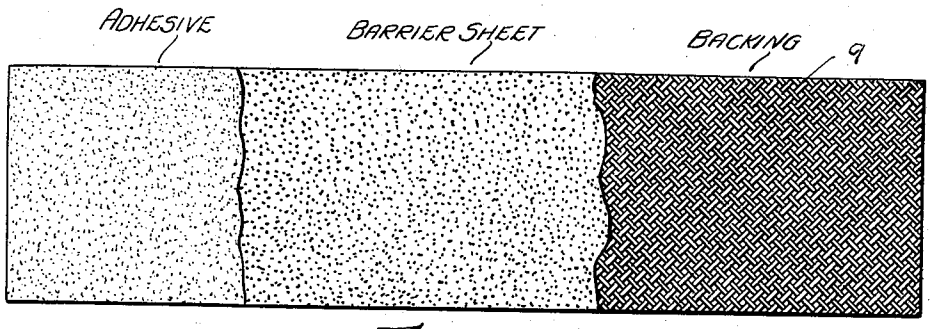


Fig. 5

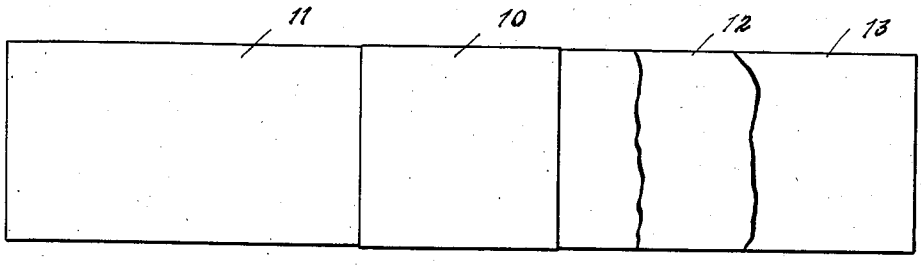


Fig. 6

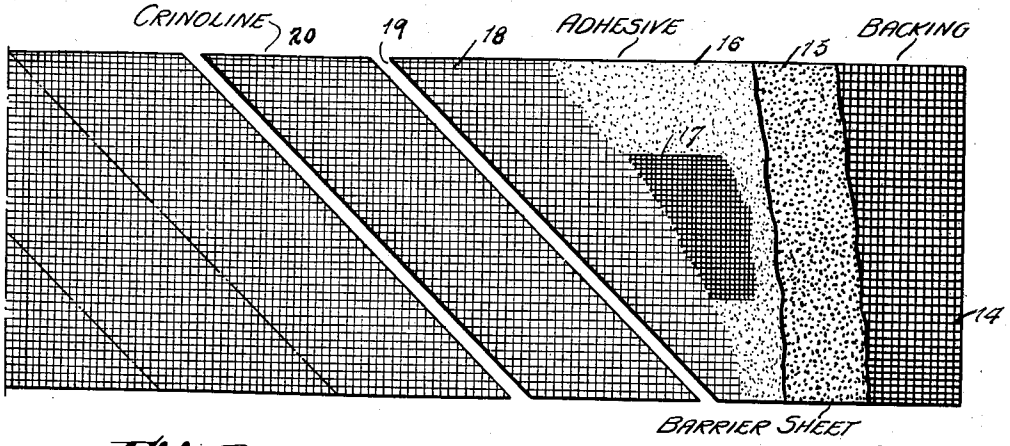


Fig. 7

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Patented June 27, 1944

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UNITED STATES PATENT OFFICE

2,352,463

ADHESIVE COATED FABRIC AND BARRIER COATING COMPOSITION THEREFOR

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Application June 15, 1940, Serial No. 340,842

2 Claims. (Cl. 117—80)

The invention relates to flexible coated fabrics coated on one side with a normally tacky or pressure-sensitive adhesive and intended for use as surgical dressings, insulating wrappings, decorative and other wall coverings, and for many other purposes, and it comprises the improvements hereinafter described and claimed.

Whether the fabric be of the close woven type, as is generally the practice in the manufacture of tape and plaster backings in the surgical field and with certain classes of industrial tape, or whether it be of relatively open or coarse construction, as is the case with burlap and kindred fabrics, or whether it be manifested as a relatively thick fabric with a pitted or irregular surface, such as, for example, asbestos cloth and the like, or whether it be a web of unspun fibers or unwoven fibers, such as paper, felt, bonded cotton, etc., all of which things are mentioned by way of illustration, and not of limitation, of conventional or any suitable backing fabrics to which our improvements are directed, there are definite problems either from the standpoint of production or from the standpoint of the varying conditions in the service for which it is intended.

The conventional cloth or fabric-backed tape is is a porous material with voids of varying size depending upon the choice of backing. Thermoplastic and water soluble adhesives are normally heat-sensitive and, when pressure is applied to a finished tape, flowing takes place and the adhesive is pushed through the backing of the fabric and is exposed on the other side so that, for example, in the binding of the ankle it frequently happens that the outside of the dressing sticks to the stocking. Flowing of the adhesive also ensues when the conventional tape or plaster is subjected to elevated temperatures for sterilizing purposes.

The conventional fabric-backed pressure-sensitive adhesive cannot withstand wetting. When wetted the adhesion between the fabric and the adhesive mass is weakened to a point which is less than the adhesion between the adhesive mass and the object to which it is applied. Moreover, under the conventional practice the adhesive mass is permitted more or less to enter and fill the voids of the fabric backing and this, in effect caulking, makes for sheer waste of relatively expensive adhesive mass.

Another defect and disadvantage of the conventional fabric is its tendency to ravel, a condition frowned upon in surgery and which in certain mechanical uses is highly objectionable because frayed edges militate against cleancut or symmetrical line finish as in painting with a spray gun.

For some purposes it is desirable that the coated cloth or fabric be elastic in the sense that it be capable of distension under applied effort and of returning to the original dimension when the effort is released. The conventional fabric does not possess these properties.

The principal object is to obviate the defects and disadvantages of the old practice and to provide a product, and method of making it, which will satisfactorily meet all of the requirements in an advantageous way.

While the nature and characteristic features of the invention will be set forth with more particularity in connection with the description of the drawings forming a part hereof, it may here be remarked that in one aspect the invention comprises interposing a flexible barrier sheet or baffle between the fabric and the adhesive to prevent the latter from substantially striking through the fabric as well from the standpoint of saving of adhesive mass and the avoidance of messy conditions as also to promote the elasticity of the fabric without substantially increasing its weight; in another aspect the invention comprehends a flexible barrier sheet of a type and composition that is compatible with the adhesive mass and which readily lends itself to application as in any suitable way which will provide a continuous gossamer-like film that clings tenaciously to the surface nap or fibers of the backing without any appreciable tendency to migrate and penetrate into either the adhesive mass and affect its characteristics or into the fabric and stiffen the body structure as a whole or the lattice elements thereof whereby the fabric, if naturally of distensible character, may be readily distended and upon release of distensible effort caused to return to its previous dimensions under the aggressive rebound action of the barrier sheet; in another aspect the invention comprises a continuous film or sheet of rubber latex along with a backing of any desired fabric so related to the sheet or film of rubber latex that the composite article is free from raveling and may be divided at any point or trimmed along the margins without the hazard of leaving frayed edges; in another aspect the invention comprises such composite article having on the rubber latex side an applied flexible surface coating of normally tacky or pressure-sensitive adhesive; in another aspect the invention comprises such composite article having on the rubber latex side

an applied flexible surface coating of pressure-sensitive adhesive embodying the composition hereinafter more particularly described.

Referring to the annexed drawings:

Figure 1 is a diagrammatic layout showing the general arrangement of the barrier sheet, the adhesive mass, and the backing.

Fig. 2 is a top view of a fabric section broken away to show a woven backing, the barrier sheet, and the adhesive.

Fig. 3 is an enlarged sectional view of the complete fabric structure, Fig. 2, as viewed in the direction of the arrows 3—3.

Fig. 4 is a perspective view showing how the composite structure readily lends itself to knife cutting or trimming without the hazard of frayed or raveled edges.

Fig. 5 is a face view broken away showing a composite structure employing a bias fabric.

Fig. 6 is a plan view of a first-aid or emergency dressing which incorporates the composite article of our invention.

Fig. 7 is a view, more or less diagrammatic, indicating how bulk strip material according to our invention is cut on the bias to provide stretchable first-aid units.

In the practice of our invention we provide a continuous sheet or film of compounded rubber, preferably rubber latex or artificial dispersions of rubber, so treated as to be stable and compatible and to manifest pliability or stretch and rebound properties when backed, as is contemplated, with a textile or equivalent porous or mesh fabric, and then surface coated with a normally tacky or pressure-sensitive adhesive mass. This provision is made, as indicated at the outset, to serve as a barrier or baffle between the adhesive mass and the backing fabric in order to prevent unnecessary loading of the backing fabric by the adhesive and breakdown of the adhesive due to its migration or to the migration of one or more of the constituents of the barrier.

The elastic or pliable barrier sheet or film, generally designated at 5, may be backed with any suitable fabric 6. The filming to produce the barrier sheets may be done by knife spreading, roll coating or by any other suitable well-known practice. The backing fabric may be a relatively close woven material, a coarse woven material or any conventional flexible material according to the service for which the article is intended.

In certain early experiments having for their ultimate purpose the provision of a barrier or baffle between the cloth or backing fabric and the rubber adhesive mass to prevent absorption of the latter, or some of its components, by the backing, we employed uncured rubber and various mineral fillers, such as zinc oxide, clay, superfloss, etc. etc. The compound was calendered onto the cloth in a thickness equivalent to about 1 oz. to the sq. yd. and then coated with the adhesive mass in the usual way. In every instance there was a definite drying action accompanied by loss of tackiness presumed to be due to an intermingling or selective action between the two compositions i. e. between the mass and the barrier. Subsequently, vulcanizing agents were added to the uncured and filler compound and filmed in the described manner. However, we still found an intermingling but at a slower rate. Our next trial was made with rubber latex compounded with vulcanizing agents and fillers. The rate of intermingling was retarded and the extent of intermingling was reduced to a point where it was negligible. It appears that rubber latex compounds which are aqueous dispersions have the ability to withhold these addition agents within the rubber globule as a tightly bound system. We found this property particularly peculiar to rubber latex. Crude rubbers such as pale crepes, smoked sheet, etc., possess this property only to a slight extent. Artificial rubber dispersions appeared to possess similar properties and benefits to rubber latex in this respect.

A typical rubber latex mixture according to our invention comprises

60% latex	334 parts—200 parts rubber
Karaya gum (2.5% sol.)	160 parts
McNamee clay	100 parts

A typical vulcanizing compound according to our invention comprises

Zinc oxide	1
Sulfur	1
Butyl zimate	1
Darvan	0.12
Casein	0.12
Caustic soda	0.10
Water	2.66

The latter mixture in a colloidally ground and dispersed state is added, in the proportion of 12 parts to 100 parts of rubber existing as 60% rubber latex mixture. We may vary this proportion or the ingredients depending upon the conditions or requirements at hand. The compound as heretofore remarked is spread onto the backing in liquid form in any conventional way as, for example, by means of a knife, roll coater, etc.

A typical spread after drying and vulcanizing with heat for about 30 minutes, at 200° F., amounts to one-half to 1 oz. per sq. yd. dry coating. A surface application of pressure-sensitive adhesive mass is then made in the conventional way. A typical application would be about 2 to 3 oz. per sq. yd. Accelerated ageing tests were conducted on strips of this material using Geer oven and air bomb for various periods of time. The ageing tests represented, over all, a period of about two years natural ageing. Upon observing the samples after these tests they were still in excellent condition whereas the conventional adhesive tape controls had deteriorated due mainly to the mass soaking into the cloth and drying up.

Our invention is especially meritorious when embodied in tape intended for surgical uses and required to be sterilized by exposure to sterilizing heat.

Fig. 2 graphically shows the composite structure comprising the barrier sheet 5, the backing 6 and the adhesive 7 applied as a facing to the barrier sheet. The backing fabric may be any porous sheet material and preferably a woven material.

Fig. 3 shows the distinct planar construction, that is to say, how the barrier sheet is interlocked in a substantially continuous plane with the surface loops of the backing fabric or, in other words, how it is substantially confined to the surface thereof and how it constitutes a complete barrier or baffle to prevent flow of the adhesive mass into the backing.

Fig. 4 illustrates that by reason of the complete bond or interlocking relation between the barrier sheet and the backing there is no tendency towards fraying or raveling when the article is divided at any point or trimmed along its margins. In other words, the margins are edge sealed as indicated at 8.

Fig. 5 shows an embodiment of the invention in which the inherent stretch and rebound characteristics of the barrier sheet are aided and abetted by a bias construction backing fabric 9.

Fig. 6 shows the application of the invention to surgical bandage dressings of the emergency or first-aid type. In this more or less conventional showing the numeral 10 designates a soft pad or dressing, 11 a facing of pressure-sensitive adhesive, 12 the barrier sheet, and 13 the backing fabric which, for example, may be the bias arrangement indicated in Fig. 5 or any other appropriate fabric.

In a continuation of the inventive thought of providing for increased extensible or elongation capacity in the backing fabric so that it will coordinate in the stretch and rebound action of the barrier sheet, we may proceed as shown in Fig. 7. According to this practice a strip of surgical bandage material comprising a suitable backing fabric 14, a barrier sheet 15, pressure-sensitive adhesive mass 16, pad material 17 and a protective facing, such as crinoline 18, is bias cut, as at 19, to provide complete first-aid units 20.

Having described our invention, we claim:

1. A pressure sensitive adhesive tape comprising in combination a flexible backing; a normally tacky pressure sensitive adhesive mass overlying one face of said backing; and a continuous, impervious, rubber barrier coat formed from an aqueous dispersion of a latex rubber coextensive with and interposed between said adhesive mass and said backing and substantially confined to the surface of said backing for preventing penetration of said mass into said backing, said latex rubber coat having the property of preventing migration or intermingling of the component parts of said mass and said barrier coat into each other whereby the effective life of the adhesive mass is prolonged.

2. A pressure sensitive adhesive tape comprising in combination a flexible backing; a normally tacky pressure sensitive adhesive mass overlying one face of said backing; and a continuous, impervious, rubber barrier coat formed from an aqueous dispersion of a latex rubber, Karaya gum, and vulcanizing agent, said barrier coat being coextensive with and interposed between said adhesive mass and said backing and substantially confined to the surface of said backing for preventing penetration of said mass into said backing, said latex rubber coat having the property of preventing migration or intermingling of the component parts of said mass and said barrier coat into each other whereby the effective life of the adhesive mass is prolonged.

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