Jan. 26, 1937. P. ADAMSON 2,069,083

SHOE WITH ELASTIC PORTION

Filed Oct. 26, 1932

Fig. 1.

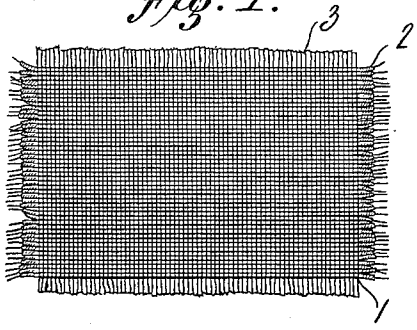


Fig. 2.

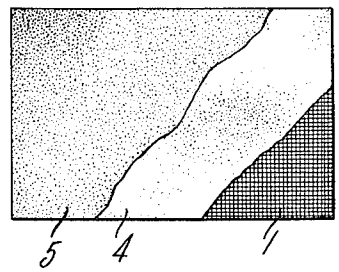


Fig. 3.

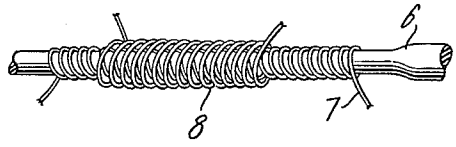


Fig. 4.

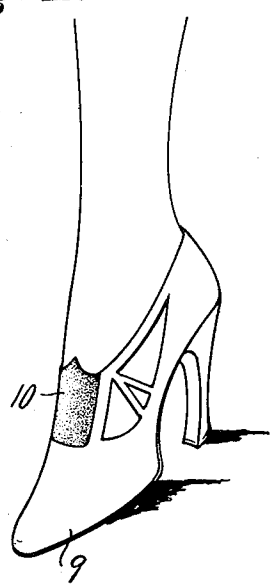
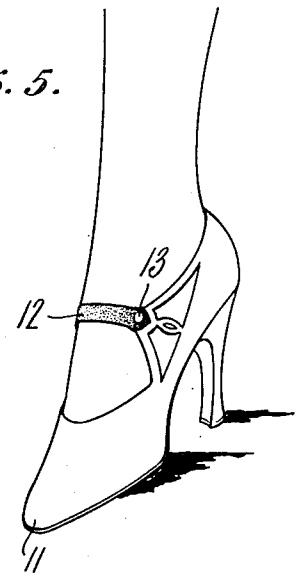


Fig. 5.



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2,069,083

SHOE WITH ELASTIC PORTION

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2 Claims. (Cl. 36—51)

This invention relates to elastic fabrics, and more particularly to elastic fabrics coated with flock material, and to articles of footwear made therefrom.

Suede-like fabric materials are commonly made from woven fabrics by coating one or both surfaces of the fabric with finely comminuted fibres such as flock, by means of a binder material deposited from an adhesive such as rubber cement by drying. These suede materials find various uses and are especially adapted to the manufacture of outer wear clothing and shoe uppers by virtue of the excellent wearing qualities of the flock surface. Articles such as rubber shoes have been provided with a flock lining by bonding flock on to the inside rubber surface by means of rubber cement or other adhesive material. In the manufacture of shoes, elastic fabrics have been used as inserts in the sides of a shoe in order to provide an article of footwear which may be easily put on and removed from the foot without the necessity for lacing or buttoning the shoe. In relatively high cut ladies' slippers, as in the case of the so-called "step-in operas", elastic gorings have been inserted across the vamp portion of the instep in order to provide a pump effect in the relatively high cut shoe, but in such cases a fabric or leather tongue or a buckle has been used to cover up the goring since the elastic insert itself has more or less of the appearance of ordinary garter material and if left uncovered detracts from the appearance of the finished article.

The present invention relates to elastic fabrics in which are incorporated elastic threads covered with textile material and more particularly to elastic fabrics having a flock surface. The flock surface of the material successfully covers the weave or meshes of the fabric base and provides an elastic fabric which is no different in appearance from ordinary inelastic suede material. Such a fabric may be utilized in the manufacture of various articles and is especially adapted for the manufacture of footwear for those parts of shoes and slippers where it is desired to have a fabric with a suede-like finish capable of stretching and which will after stretching relax and retract to its original condition without any permanent stretching or distortion.

Several embodiments of the invention are illustrated in the accompanying drawing in which:

Fig. 1 shows an elastic fabric base material;

Fig. 2 shows the finished fabric having a flock coating parts being cut away to show the base fabric and binder material on the same;

Fig. 3 is a detailed view of a preferred type of elastic thread used in the manufacture of the base fabric material;

Fig. 4 illustrates an article of footwear having the elastic suede material of Fig. 2 inserted in the vamp portion of the instep, and

Fig. 5 illustrates another article of footwear having a strap portion made of the elastic suede material shown in Fig. 2.

According to the present invention an elastic fabric base material is first coated with an adhesive binder and then flock material is applied to the thus treated surface. The surface of the fabric is coated preferably with a rubber adhesive such as rubber cement or latex adhesive, and comminuted fibre such as flock is distributed over the adhesive coated surface by means of a rotating or vibrating screen or the like. The surface is dried and preferably vulcanized and loose fibres that may not have been firmly enough embedded in the adhesive and bonded to the surface may be brushed off. One or both sides of the elastic base material may be thus coated with flock, and if desired several coatings of the flock may be applied to the surface in order to produce a greater density of suede surface.

Referring more particularly to the drawing, Fig. 1 illustrates a base material 1 having a weft composed of elastic threads 2 having a rubber core covered with textile material and a warp composed of inelastic textile threads 3. As shown in Fig. 2 this base 1 is coated with an adhesive 4, preferably a compounded aqueous dispersion of rubber, such as a latex adhesive, and flock material 5. The flock is applied to the adhesive coated surface after which the adhesive is dried and the rubber vulcanized preferably in air at elevated temperature. The weft of the fabric base is shown composed entirely of elastic threads 2 and the warp entirely of inelastic threads 3 thus producing a fabric which is stretchable in the direction of the weft. If desired, the weft or warp, or both, may be made partly of elastic threads and partly of inelastic threads, or wholly of elastic threads, to produce a fabric stretchable in one or both directions. With a weft composed of elastic threads and a warp of inelastic threads as shown, a fabric is produced the elastic properties of which extend only in the direction of the weft, and such a fabric is somewhat easier to successfully coat with flock material in a continuous manner in commercial operations than a fabric stretchable in the direction of the warp, since in the coating operation the material is fed along the warp length under a constant tension

which is more easily maintained with a continuously fed length of material not capable of stretching in the direction of feed.

The elastic thread used in the construction of the base fabric is shown in detail in Fig. 3 and is preferably made as described in my prior Patent 1,822,847 dated Sept. 8, 1931. The round core 6 may be made directly from an aqueous dispersion of rubber and may be deposited directly from rubber latex for example by extruding the latex through a nozzle into a bath of coagulant, removing the thus formed filamentary coagulum from the coagulating bath, drying and vulcanizing in a manner well known in the art, as described in the patent to Hopkinson and Gibbons 1,545,257, dated July 7, 1925. The rubber core 6 is covered while under tension with right and left windings of textile threads 7 and 8. This preferred type of elastic thread may have a rubber core made directly from an aqueous dispersion of rubber by other processes than the extrusion process above described or may have a core cut from calendered sheet rubber or made by other well known processes from various elastic materials and of any cross sectional shape desired, such elastic thread being covered with desired textile material and constructed with the desired number of helical windings or braided or otherwise covered with textile material, if desired.

Woven elastic fabric formed of elastic warps or elastic wefts constructed as shown in Fig. 3 hereof and as more fully descriibed in my Patent No. 1,822,847, may have its stretch limited by the covering of the elastic threads, since the stretch of the elastic thread is limited by the covering yarns 7 and 8. Furthermore, since this elastic thread is very much smaller than the elastic threads available prior to the development of my patented thread, the elastic fabric produced from this fine elastic thread can be woven with a much smoother surface than that produced by the coarse, elastic thread previously available. Therefore, the elastic fabric of Figs. 1 and 2, because of its limited stretch and smooth surface may be readily coated with a thin coating of latex to which the flock material can be applied. As a result, a relatively thin but strong elastic fabric may be produced to which the coating of flock can be secured by a thin layer of latex which will not interfere with the contraction or expansion of the fabric.

Fig. 4 illustrates an article of footwear having an upper portion 9 with insert 10 in the vamp portion of the instep of the elastic suede material of the present invention. The remainder of the upper may be made of a non-elastic suede material similar in appearance to the insert material thus making apparently an all inelastic suede shoe without openings in the shoe or providing for lacings or buttons and of a higher cut than is possible with an ordinary all inelastic shoe. The remainder of the upper other than the elastic suede insert may, of course, be made of leather or any desired fabric material.

In Fig. 5 is shown a strap pump with an upper of non-elastic suede material or other fabric, or leather, and a strap 12 across the vamp portion of the instep buttoned to the upper portion at 13. If desired the strap may be permanently attached to the upper portion and the elasticity of the strap itself will permit the entry or exit of the foot from the shoe. The strap 12 made of the suede material of the present invention will not permanently stretch out of shape as does the ordinary leather strap and will also prevent any bulging of the sides of the upper of the slipper.

The covering material for the elastic threads, and the inelastic threads, may be of various textile materials such as cotton, silk, wool, artificial fibre, rayon, or the like, and various comminuted fibres such as cotton, wool, rayon, silk, mohair, etc. of various lengths from $1/64$ of an inch or less to over $\frac{1}{8}$ of an inch may be used for producing the flock surface. As may be readily seen, various combinations of textile materials and fibres may be used in the flock surface and for the inelastic threads and covering material for the elastic threads in the production of the desired suede-like fabric. Various other portions of the shoe upper may be made of the elastic suede fabric of the present invention, or if desired the entire upper portion may be so constructed.

Various other changes and modifications may be made without departing from the principles underlying the invention, and it is not desired to limit the invention otherwise than as set forth in the appended claims.

Having thus described my invention, what I claim and desire to protect by Letters Patent is:

1. In an article of footwear, an upper composed at least in part of a relatively thin woven elastic fabric formed of inelastic threads of textile material and elastic threads of a diameter not greater than .025 of an inch, the elastic threads being formed of an elastic core covered with textile yarn, said fabric having at least one face thereof coated with an elastic binder that will allow the full stretch of the fabric and being provided with flock material secured to the fabric by said binder.

2. In an article of footwear, an upper composed at least in part of a woven elastic fabric having a controlled stretch and formed of inelastic threads of textile material and elastic threads of a diameter not greater than .025 of an inch, the elastic threads being formed of an elastic core of vulcanized grainless rubber having a textile cover thereupon, said fabric having at least one face thereof coated with an elastic binder that will allow the full stretch of the fabric and being provided with flock material secured to the fabric by said binder.

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