

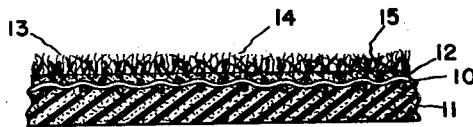
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H. P. FARIS

2,317,595

CARPET

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INVENTOR.

HAROLD P. FARIS

BY *Whittemore, Hulbert*  
*+ Belknap* ATTORNEYS

# UNITED STATES PATENT OFFICE

2,317,595

CARPET

Harold P. Faris, Philadelphia, Pa., assignor to National Automotive Fibres, Inc., Detroit, Mich., a corporation of Delaware

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The present invention relates to carpet, and more particularly to a cemented pile carpet of the flock type, distinguished particularly by the character and arrangement of the pile fibers.

In cemented pile carpet of the flock type, such as disclosed in Faris et al. Patent 2,187,140, granted January 16, 1940, the pile surface of the carpet is composed of a multiplicity of individual upstanding fibers of a length sufficient to simulate ordinary woven pile in appearance and to have substantial wearing properties.

In the patent referred to, a disclosure was made of the use of relatively stiff fibers, such as goat hair, with the statement that such fibers were found better suited to the product than fibers of spun yarn, wool, rayon, cotton or the like. In the patent the statement was made that if desired mixtures of these soft fibers could be employed with relatively stiff fibers, such as goat hair.

I have now found that greatly improved results are obtained when the pile surface of the carpet is composed of a mixture of relatively long, relatively soft fibers, such for example as wool, and relatively short, relatively stiff fibers, such for example as goat hair. Preferably the fibers of these two different characteristics are applied separately, and the relatively soft, relatively long fibers are first applied.

With the foregoing general remarks in mind, it is an object of the present invention to provide a new cemented pile carpet of the flock type, characterized by an upper tread surface composed of relatively soft fibers and a lower supporting area comprising a mixture of relatively stiff and relatively soft fibers.

It is a further object of the invention to provide a cemented pile carpet of the flock type, characterized by the use of a mixture of relatively long, relatively soft fibers, such as wool, and relatively short, relatively stiff fibers, such as goat hair.

It is a further object of the invention to provide a new method of manufacturing a carpet of the type referred to, characterized by the steps of first applying the relatively long, relatively soft fibers to a cement coated surface and thereafter applying the relatively short, relatively stiff fibers thereto.

Other objects of the invention will be apparent as the description proceeds, and when taken in conjunction with the accompanying drawing, wherein the figure is a fragmentary section through the carpet embodying the present invention.

In the foregoing, I have shown a carpet as

comprising an open woven, reinforcing fabric 10 which may be burlap. Beneath this fabric is a ply of resilient material 11 which may be sponge rubber, either cemented to or initially calendered to and vulcanized to the fabric 10. Overlying the fabric 10 is a thin ply of a suitable cement 12. For this cement, rubber cements, mixtures of rubber and resin, or resinous cements have been found satisfactory.

Overlying the fabric 10 and permanently bonded thereto by the cement 12 is the pile surface indicated generally at 13, which comprises a multiplicity of relatively long, relatively soft fibers as indicated at 14, and a multiplicity of relatively short, relatively stiff fibers as indicated at 15.

As previously stated, the carpet which forms the subject matter of the present invention is of the flock type, which means that the fibers are attached thereto as separate elements and are caused to assume a generally upstanding position as a result of the method of application. This method of application may consist of vibrating a cement coated fabric 10 while the separated pile fibers are sifted downwardly thereon. Due to the vibration, the fibers become embedded at one end, and in many cases penetrate to a substantial depth in the soft cement. It is not to be understood that the fibers are all strictly perpendicular to the surface of the carpet, and in fact such a relationship would be undesirable. As a matter of fact, the fibers when examined closely are found to extend at random, occupying angles with respect to the plane of the carpet, ranging from about 10° to 90°.

This random, inclined arrangement of the majority of the fibers is desirable since a substantial proportion of relatively stiff fibers such as goat hair are employed. If a carpet of this type were produced in which relatively stiff fibers such as goat hair were all arranged in parallelism and perpendicular to the surface of the carpet, an undesirable result would be obtained. These stiff fibers, being vertically arranged on the carpet, would resist bending until a substantial force had been applied, so that when the carpet was walked on it would give the user a sense of breaking down, as the fibers yielded to the weight. Since the fibers are all arranged at random and at different angles, this result is avoided, and the carpet has a feel comparable with the feel of woven carpets.

While a carpet employing nothing but fibers of goat hair, or a mixture of goat hair and other material of equal length is useful for certain pur-

poses, it does not exhibit the surface softness and appearance which is desirable for home use. At the same time, it has been found impossible as a practical matter to form a pile of fibers of soft material, such for example as wool, without an admixture of relatively stiff fibers.

According to the present invention the flocking operation is carried out with a mixture of fibers, some of which are relatively long, relatively soft fibers, such for example as obtained from wool, whereas the balance of the fibers are relatively short, relatively stiff, such as obtained from goat hair. By way of example, I have obtained substantially improved results by employing a 50-50 mixture of wool fibers cut to a uniform length of about  $\frac{1}{8}$  of an inch, and goat hair or similar stiff fibers cut to a uniform length of about  $\frac{1}{4}$  of an inch.

When the carpet is flocked with the above described mixture of fibers, it is found that the relatively short, relatively stiff fibers penetrate rather deeply into the soft cement and form a lateral support for the relatively long, relatively soft fibers. At the same time the relatively long, relatively soft fibers become embedded firmly in the soft cement and extend above the upper surface defined by the ends of the relatively short fibers. Therefore the upper surface of the carpet has an appearance and feel which is substantially improved over prior practices.

I have referred to a suitable method of flocking as comprising vibrating the cement coated fabric while sifting the fibers downwardly thereon. Any other suitable method of flocking may be employed and, if desired, the position of the fibers as a result of an electric field set up between spaced electrodes may be employed. This latter method is now well known and no claim to it per se is made herein.

While I have stated above that if desired the 50-50 mixture of relatively long, relatively soft and relatively short, relatively stiff fibers may be applied at once, I prefer to apply these fibers separately. I have found that by separate application of the two different classes of fibers in a particular manner results in a better fill, so that the completed carpet has improved appearance and better wearing qualities.

According to my preferred method of applying the fibers, the relatively long, relatively soft fibers are first applied in as great a quantity as the carpet will take. Following this and while the cement is still soft, I apply the relatively short, relatively stiff fibers. Due to the greater density and strength of the relatively short, relatively stiff fibers, these penetrate through the pile formed by the relatively long, relatively soft fibers and serve two important functions. In the first place, they still further increase the fill obtained. In the second place, due to the stiffness and great strength of the fibers, they provide substantial lateral reinforcement for the relatively long, relatively soft fibers, and hold them up, so as to increase the simulation of the pile of a woven carpet.

It is pointed out that the order of application of the fibers cannot successfully be reversed since the relatively long, relatively soft fibers will not to any substantial degree penetrate through a moderately filled covering of relatively short, relatively stiff fibers.

It will be understood that the figure is intended to be more or less diagrammatic, and that the fill or density of the fibers is substantially greater than illustrated in the figure. It is further to

be understood that as a practical matter it is impossible to insure that all of the relatively short, relatively stiff fibers shall be beneath the surface formed by the relatively long, relatively soft fibers. However, by employing a mixture of two fibers of specifically different lengths, a carpet is produced which has a high percentage of the soft fibers forming the uppermost surface thereof, and the great majority of the relatively short, relatively stiff fibers are beneath the upper surface thus formed.

It is important to obtain the fibers in substantially uniform lengths before application, and for this purpose the fibers are preferably carded and cut to predetermined length while arranged in substantially parallelism. I have found that improved results are obtained when, after cutting, the two classes of fibers are graded or sorted, and satisfactory devices for carrying out this classification of the fibers according to lengths are available on the market.

While I have specifically referred to wool fibers and fibers of goat hair by way of example, it will be understood that these have been given merely by way of example, and that the essence of the invention is in the use of fibers of different lengths and different characteristics, as set forth. For example, synthetic fibers of various materials may be manufactured in different diameters and cut to different lengths to satisfy the present invention. This is mentioned merely to show that it is not necessary that the fibers of different stiffness and different lengths have a different origin.

While I have illustrated and specifically described a preferred form of carpet and have described a preferred method of manufacturing the same, it will be understood that this has been done solely to enable those skilled in the art to practice the invention, the scope of which is indicated by the appended claims.

What I claim as my invention is:

1. A floor covering having a relatively soft base of sponge rubber, a layer of burlap bonded in surface to surface relation to the upper surface of said base, a relatively thin layer of cement bonded in surface to surface relation to said layer of burlap, and a mixture of individual wool fibers and goat hairs imbedded endwise in and extending upwardly from the layer of cement, the goat hairs being relatively short and relatively coarse and stiff, the upper ends of said goat hairs defining a relatively stiff surface, the wool fibers being relatively soft and longer than the goat hairs, said wool fibers extending upwardly through and above the surface defined by the upper ends of the goat hairs and provided above said stiff surface with a relatively soft tread surface, the goat hairs below said tread surface constituting lateral supports for the wool fibers.

2. A floor covering having a base of relatively soft rubber, an open mesh fabric bonded in surface to surface relation to the upper surface of said base, a relatively thin layer of cement bonded in surface to surface relation to said open mesh fabric, and a mixture of individual wool fibers and goat hairs imbedded endwise in and extending upwardly from the layer of cement, the wool fibers being relatively long and relatively soft, the upper end portions of said wool fibers providing a relatively soft tread surface, the goat hairs being shorter than the wool fibers and terminating below said tread surface, said goat hairs being relatively coarse and stiff

and forming below the tread surface lateral supports for the wool fibers.

3. A floor covering having a base of relatively soft rubber, an open mesh fabric bonded in surface to surface relation to the upper surface of said base, a relatively thin layer of cement bonded in surface to surface relation to said open mesh fabric, and a mixture of individual fibers imbedded endwise in and extending upwardly from the layer of cement, approximately 50% of said fibers being relatively long and relatively soft, and approximately 50% of said fibers being relatively short and relatively stiff, the upper ends of the short and stiff fibers providing a relatively stiff surface above and substantially parallel to the layer of adhesive, the long and soft fibers extending upwardly through and above the surface provided by the upper ends of the short and stiff fibers and providing above and substantially parallel to said stiff surface a relatively soft tread surface, the short and stiff fibers below said tread surface forming lateral supports for the long and soft fibers.

4. The method of making a cemented pile carpet which comprises the steps of adhering in surface to surface relation a layer of sponge rubber to one side of a layer of burlap, adhering in surface to surface relation to the other side of said layer of burlap a layer of relatively soft cement, vibrating the assembly in a vertical direction, sifting a multitude of relatively long relatively soft fibers onto the cement while the assembly is being vibrated so that a substantial portion of said fibers will imbed themselves endwise at random in said cement to provide a relatively soft tread surface, and thereafter sifting a multitude of relatively short and relatively stiff fibers onto the cement while the assembly is being vibrated so that a substantial portion of said stiff fibers will penetrate through the pile formed by the soft fibers and will imbed themselves at random in said cement so as to provide beneath said soft tread surface lateral supports for said long and soft fibers.

5. The method of making a cemented pile car-

pet which comprises the steps of adhering in surface to surface relation a layer of relatively soft rubber to one side of an open mesh fabric, adhering in surface to surface relation to the other side of said fabric a layer of relatively soft cement, vibrating the assembly in a vertical direction, sifting a multitude of relatively long wool fibers onto the cement while the assembly is being vibrated so that a substantial portion of said fibers will imbed themselves endwise in said cement to provide a relatively soft tread surface, and thereafter sifting a multitude of relatively short goat hairs onto the cement while the assembly is being vibrated so that a substantial portion of said goat hairs will penetrate through the pile formed by the wool fibers and will imbed themselves endwise in said cement to provide beneath said soft tread surface lateral supports for said wool fibers.

6. The method of making a cemented pile carpet which comprises the steps of adhering in surface to surface relation a layer of relatively soft rubber to one side of an open mesh fabric, adhering in surface to surface relation to the other side of said fabric a layer of relatively soft cement, vibrating the assembly in a vertical direction, cutting to a substantially uniform length of about  $\frac{1}{8}$  of an inch a multitude of wool fibers, sifting the cut fibers onto the cement while the assembly is being vibrated so that a substantial portion of said fibers will imbed themselves endwise in said cement at angles ranging from about 10 degrees to 90 degrees relative to the layer of cement to provide a relatively soft tread surface, cutting to a substantially uniform length of about  $\frac{3}{4}$  of an inch a multitude of goat hairs, and thereafter sifting the cut goat hairs onto the cement while the assembly is being vibrated so that a substantial portion of said goat hairs will penetrate through the pile formed by the wool fibers and will imbed themselves endwise in said cement to provide beneath said soft tread surface lateral supports for said wool fibers.

HAROLD P. FARIS.