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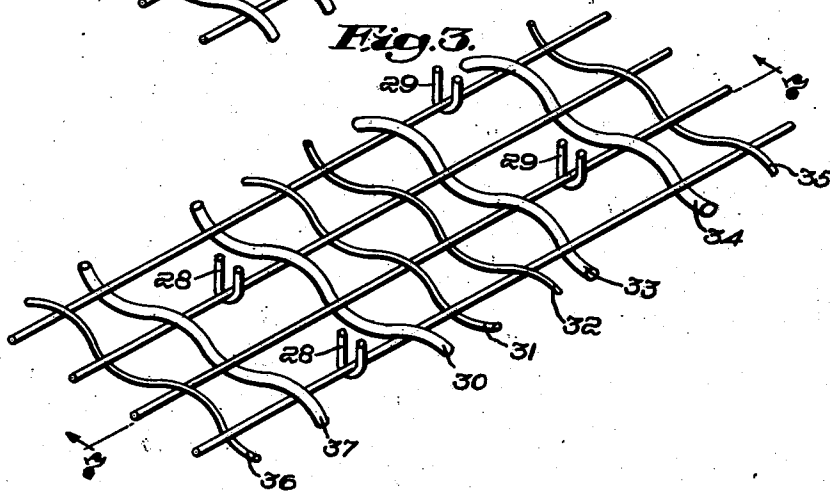
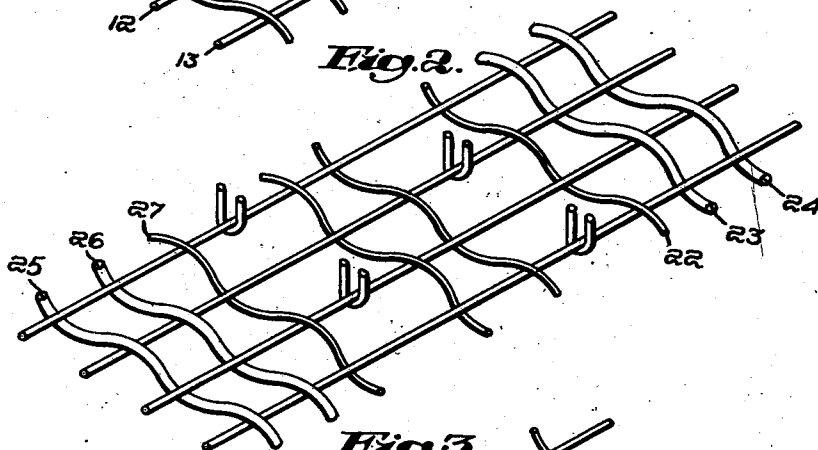
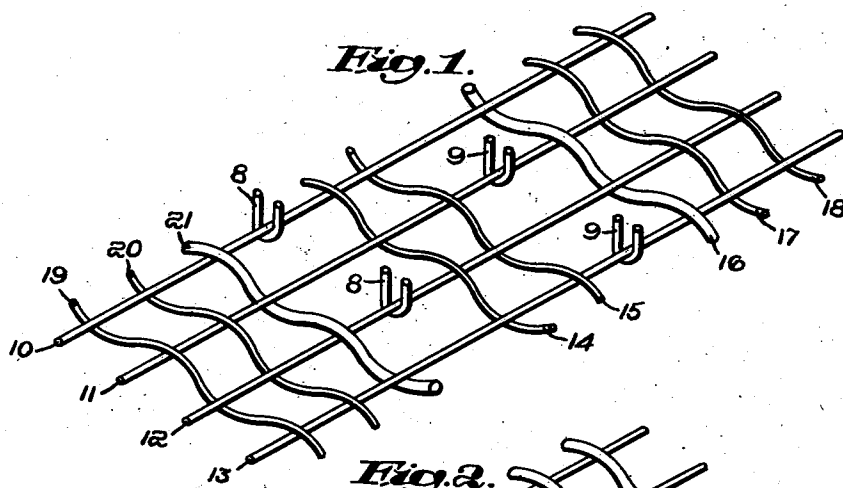
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2,362,299

WARP PILE FABRIC

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Fig. 4.

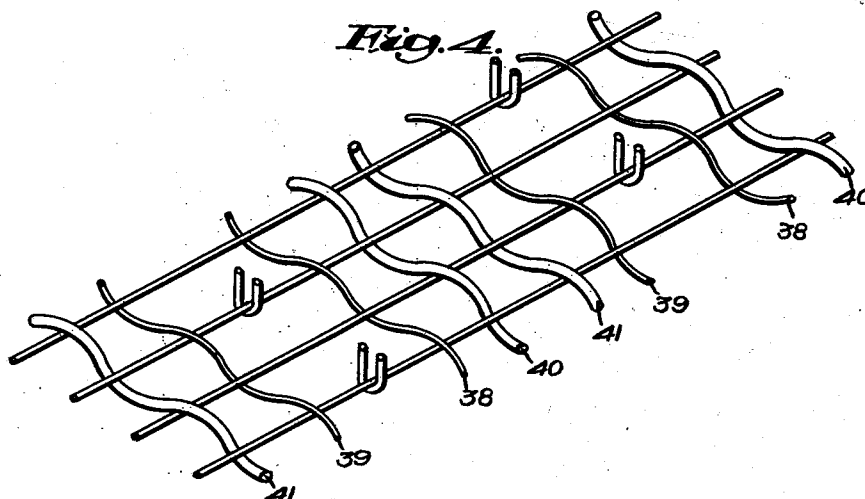


Fig. 5.

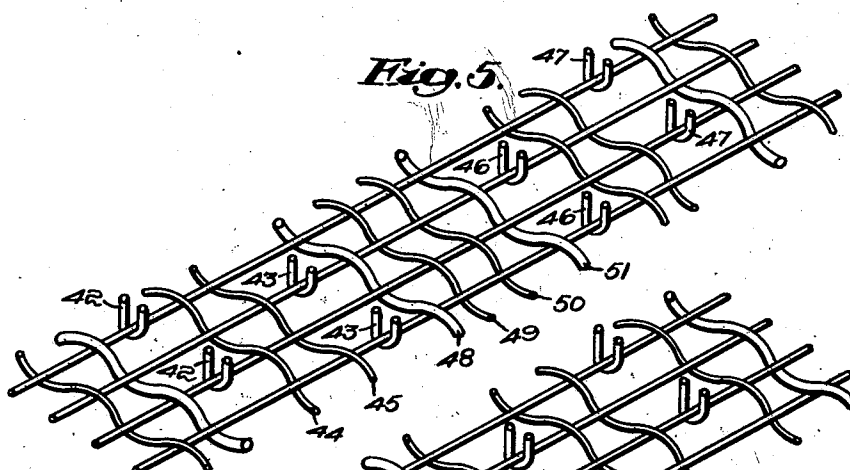


Fig. 6.

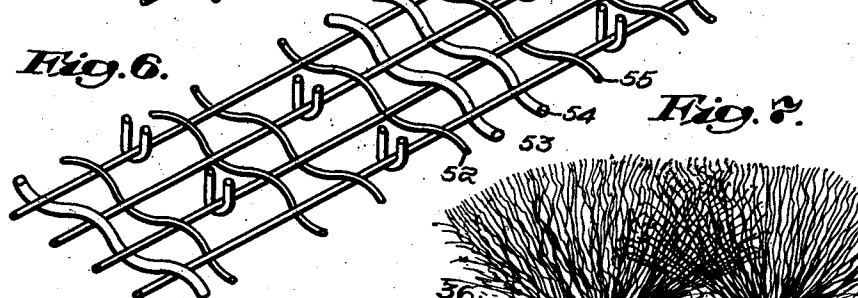
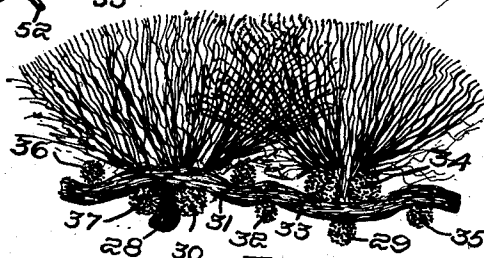


Fig. 7.



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2,362,299

WARP PILE FABRIC

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Application October 8, 1943, Serial No. 505,461

7 Claims. (Cl. 28—80)

This invention relates to pile fabric of that type generally used for upholstery in automobiles, railway cars, busses, furniture and the like and which has also found an extensive use for carpeting and rugs. This type of pile fabric is best made with the pile formed from the warps and with these pile warps composed wholly or in part of mohair. Mohair is highly advantageous for this purpose because of its great durability and resistance to wear. But mohair is relatively a very expensive fiber and its conservation is, therefore, important.

A chief object of the present invention is to present a mohair warp pile fabric of the type involved in which a minimum number of the pile tufts and consequently a minimum amount of the mohair fiber component is employed, while at the same time the required appearance of the fabric is secured, the optimum wearing quality of the fiber is brought out, and qualities hitherto found objectionable but considered inherent in this type of pile fabric are eliminated or obviated.

A further object of the invention is to present such a mohair warp pile fabric in which the pile component of the fabric is so arranged as to meet most efficiently the requirements for upholstery and similar purposes.

A further object of the invention is to present such a mohair or mohair containing pile fabric in which the pile component of the fabric is so arranged as to allow great flexibility of the pile tufts with consequent low friction resistance and high wearing quality of the pile.

In this type of mohair warp pile fabric to which the invention relates the ground or base portion is commonly composed of cotton warps and wefts, and the pile tufts formed from the pile warp are of V-shape and extend around under and project upward from the wefts of the ground. This type of fabric may be woven single with the pile warps formed into loops which may be left uncut but are usually cut to form the V-tufts. But usually this type of fabric is woven double with the pile warps running back and forth between the bases of the two fabrics with the pile warps cut midway the bases of the two fabrics as the weaving operation proceeds. After this type of fabric, whether woven single or double, has been taken from the loom, the V-tufts are insecurely held in the ground. Consequently it has been the practice to provide a thin coating of a suitable adhesive such as a natural or artificial rubber dispersion pre-vulcanized or subsequently vulcanized or a pyroxylin or other solution which is applied to the back of the ground in a suitable

manner so as to impregnate the ground and the portion of the pile tufts embedded in the ground. This coating acts firmly to secure the pile tufts in place and is so applied as not to form a continuous sheet but rather to leave open and unobstructed most of the spaces between the interlaced warps and wefts of the ground. This enables air to pass back and forth through the ground or, as it is termed in this art, permits "breathing" of the fabric back.

The methods and apparatus employed for thus weaving and coating such warp pile fabrics are now well known and familiar to those skilled in this art and therefore here need no detailed description or illustration.

It will be seen that the pile tufts in the fabric extend in longitudinal rows and a "row" of pile tufts in this invention may be either a single series of tufts formed from a single pile warp or as herein termed a "duplex row" composed of two parallel series of tufts formed from two pile warps with a pair of ground warps interposed.

In this invention the ground warps following each row or duplex row of the pile tufts in the widthwise repeat are of two sizes, one relatively large and one relatively small and where the row of pile tufts is of the duplex form the relatively small ground warps are preferably of the same size as the ground warps interposed in the duplex row. Most satisfactory results have been secured by employing for the relatively large ground warps a fifty per cent increase in size over the relatively small ground warps, and this is readily secured by employing for the relatively small ground warps a two-ply cotton yarn and for the relatively large a three-ply cotton yarn of the same count. The position of the relatively large and relatively small ground warps in the repeat may be varied somewhat as will be hereinafter indicated, but in all cases the arrangement is such that the relatively large ground warps function both to stabilize the fabric and to support the rows of pile tufts so that the fabric presents the required feel, body and uniform even appearance of the pile face while employing a minimum amount of pile yarn.

In the widthwise repeat the total number of ground warps, including the relatively large and relatively small ground warps following the row of pile tufts, must be at least three times and not more than four times the number of pile warps to obtain the desired result. Thus where the row is single there will naturally be four, and where the row is double either four or six, following the row of pile tufts. The stabilizing and supporting

functions may be secured either with the ground warps lying immediately adjacent the spaced rows of tufts of the large size and the two or four intervening of the small size or with the small size ground warps lying immediately adjacent the spaced rows of tufts and the two or four intervening of the large size; but the latter construction has been found the more satisfactory.

The drawings illustrate various forms which the invention may take and are chiefly of a diagrammatic character with the elements of the fabric widely separated to disclose the weave and with the proportions exaggerated. No attempt is made to illustrate the adhesive coating employed because its relation to the fabric is well known in the art and cannot be accurately shown.

In the drawings Figs. 1 to 4 inclusive illustrate preferred forms of the fabric in which the minimum amount of mohair pile yarn that will give the required appearance and quality is employed. Figs. 5 and 6 illustrate forms of fabric also embodying the invention but in which a somewhat larger amount of mohair pile—approximately one-third—is employed.

Fig. 1 illustrates a single widthwise repeat of a fabric in which a duplex row of the pile tufts is followed by six ground warps with the first and last of the relatively large size and the others of the relatively small size.

Fig. 2 illustrates a construction similar to that of Fig. 1 but with the first and last of the ground warps following the duplex row of pile tufts of the relatively small size and the others of the relatively large size.

Fig. 3 illustrates a single widthwise repeat of a fabric in which two staggered single rows of pile tufts are each followed by four ground warps with the first and last of the relatively large size and the others of the relatively small size.

Fig. 4 illustrates a construction similar to that of Fig. 3 but with the first and last of the ground warps of the relatively small size and the others of the relatively large size.

Fig. 5 illustrates a single widthwise repeat of a fabric in which two staggered duplex rows of pile tufts are each followed by four ground warps with the first and last of the relatively large size and the others of the relatively small size.

Fig. 6 illustrates a construction similar to that of Fig. 5 but with the first and last of the ground warps following the duplex row of pile tufts of the relatively small size and the others of the relatively large size.

Fig. 7 is a view based upon a microphotograph of a small section of pile fabric embodying the construction shown in Fig. 3 and taken in section along the line 7—7 of Fig. 3.

In the construction shown in Fig. 1 the "duplex row" of pile tufts is employed, the tufts 8 being staggered with respect to the tufts 9, that is, the tufts 8 extend around under the ground wefts 10 and 12 while the tufts 9 extend around under the ground wefts 11 and 13 with the interposed ground warps 14 and 15 in each case extending over the weft under which the adjacent tuft extends. Following this duplex row of pile tufts are the six ground warps 16, 17, 18, 19, 20, and 21 with the ground warps 16 and 21 immediately adjacent the duplex row of the relatively large size and the others 17, 18, 19, and 20 of the relatively small size. When the elements of this fabric are compacted in finished form the relatively large ground warps give the required stabilizing effect and coming immediately adjacent to the duplex

row of pile tufts give the requisite support so that a very firm and stable fabric is produced.

In Fig. 2 the construction is similar to that of Fig. 1 excepting that in this case the six ground warps 22, 23, 24, 25, 26, and 27 following the duplex row of tufts in the repeat have the relatively small size ground warps 22 and 27 immediately adjacent the duplex row of tufts and the other ground warps 23, 24, 25, and 26 of the relatively large size. But it is found that with only one of the relatively small ground warps lying between the row of tufts and the following relatively large size ground warps that the required stabilizing and supporting function is still practically secured.

In Fig. 3 a single row of pile tufts 28 and a staggered row of tufts 29 is illustrated and each row in the repeat is followed by four ground warps with those of relatively large size immediately adjacent the row of tufts and the others of relatively small size. Thus the row of tufts 28 is followed by the four ground warps 30, 31, 32, and 33 with the ground warps 30 and 33 of the large size and the others 31 and 32 of the small size. Following the row of tufts 29 is a similar set of ground warps 34, 35, 36 and 37.

In Fig. 4 the construction is similar to that of Fig. 3 but in this case the first and last ground warps 38 and 39 following a row of tufts and thus lying immediately adjacent to each of the spaced rows is of the relatively small size while the others 40 and 41 are of the relatively large size.

The constructions shown in Figs. 5 and 6 are generally similar to those shown in Figs. 3 and 4 respectively except that in this case duplex rows of pile tufts are employed instead of single rows thus increasing about a third the amount of pile in a given area of fabric but still maintaining a low quantity of mohair. In Fig. 5 the pile tufts 42 are staggered with respect to the pile tufts 43 and form with the interposed ground warps 44 and 45 one duplex row while the pile tufts 46 and 47 of the next duplex row are staggered respectively with respect to the pile tufts 42 and 43 of the first duplex row in the repeat. Here again each duplex row in the repeat is followed by four ground warps as for example 48, 49, 50, and 51 with the first and last 48 and 51 or those immediately adjacent the spaced rows of the relatively large size and the others 49 and 50 of the relatively small size. In Fig. 6 the construction is the same excepting that in the case of the four ground warps following each duplex row of tufts in the repeat, as for example 52, 53, 54, and 55, the first and last 52 and 55 or those immediately adjacent the spaced duplex row of tufts are of the relatively small size and the others 53 and 54 of the relatively large size.

In the construction of Figs. 1, 2, 5, and 6 the ground warps beginning with the second in the repeat are woven as flats in pairs in alternation over and under successive wefts but this is not essential and is varied as indicated in Figs. 3 and 4.

Fig. 7 is a close representation of a microphotograph of a warp pile fabric in which the pile warp contained a substantial amount of mohair fiber and in which the fabric is constructed in accordance with the present invention. There is here represented a fabric having the construction illustrated diagrammatically in Fig. 3. The pile fabric from which the microphotograph was taken was a low pile upholstery fabric, and the drawing represents an enlargement of approximately twenty-five times. It will be seen from

this figure that the pile component of the fabric composed of the pile tufts each containing mohair is so arranged or positioned that the pile tufts are highly flexible and have spread or fanned out to a high degree. The ground warps which follow the rows of tufts in the repeat afford space for the pile tufts thus to spread or fan out while the inclusion in this group of the large size warps gives the necessary stabilization to the fabric and support to the tufts. Were it not for the spaces thus provided the fibers of the pile tufts would stand up substantially erect from the ground or base as in this type as heretofore constructed. With the pile tufts thus erect the pressure of the body of a person is taken chiefly upon the ends of the fibers and wear is mainly on the fiber ends. Anyone who has sat upon an ordinary plush upholstered automobile seat recognizes the grip of the fabric on the clothing and the resistance afforded to lateral shifting of the body. With the construction of this invention wherein the tufts of pile spread or fan out as illustrated in Fig. 7 the pressure of the body is taken largely by the side surfaces of the pile fibers rather than by the pointed ends. This practically eliminates the undesirable grip of the pile on the clothing and enables lateral shifting of the body readily to take place. It will be seen that the pile tufts thus fanned or spread out are highly flexible and that due to this flexibility and the consequent position of the fibers there is less frictional resistance thus reducing wear and allowing for free movement of the body or whatever may be moved upon or against the pile when in use. In this connection the abrasive tests commonly employed on pile fabrics have been made and show that pile fabrics made in accordance with this invention withstand the abrasive action to a remarkable extent and far beyond anything hitherto obtainable with this type of fabric. Tests also made with respect to the angle of slope show that test objects placed upon the pile fabric of this invention start to move at an exceedingly low angle or slope thus indicating the low friction resistance of the pile face.

With the constructions of the invention whereby four ground warps follow the row of pile, as for example in Figs. 3, 4, and 7, the pile tufts spread or fan out sufficiently to present a substantially even and continuous body of pile and pile face while with the construction employing six such ground warps a slight ribbed effect appears in the face but with the same advantages due to the position of the pile fibers. This gives what may be termed a Bedford cord effect familiar in flat and corduroy fabrics but not before successfully employed in V-weave pile fabrics.

Furthermore in all cases the "breathing" quality of the fabric in this invention is enhanced and dust and dirt readily removed since it is not wedged into erect upstanding pile.

The term "upholstery" as used in the claims is to be understood as not restricting the claims to the particular use to which the fabric of the invention may be put and includes its use as for carpeting and rugs as pointed out in the beginning of this specification.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is:

1. An upholstery pile fabric of that type in which the bases of V-pile tufts composed of or containing a substantial proportion of mohair are adhesively secured to the ground with openings between the warps and wefts of the ground

permitting breathing, in which the repeat widthwise of the fabric consists of a row of the V-pile tufts followed by a sufficient number of ground warps of relatively large and relatively small size to present at least three and not more than four times as many ground warps as pile warps in the repeat with the ground warps immediately adjacent the spaced rows of tufts of the one size and the remainder of the ground warps between said spaced rows of the other size, the relatively large ground warps acting to stabilize the fabric and support the rows of tufts.

2. An upholstery pile fabric of that type in which the bases of V-pile tufts composed of or containing a substantial proportion of mohair are adhesively secured to the ground with openings between the warps and wefts of the ground permitting breathing, in which the repeat widthwise of the fabric consists of a single row of the V-pile tufts followed by four ground warps, two of relatively large size and two of relatively small size with the two immediately adjacent the spaced rows of tufts of the one size and the other two of the other size, the relatively large ground warps acting to stabilize the fabric and support the rows of tufts.

3. An upholstery pile fabric of that type in which the bases of V-pile tufts composed of or containing a substantial proportion of mohair are adhesively secured to the ground with openings between the warps and wefts of the ground permitting breathing, in which the repeat widthwise of the fabric consists of a single row of the V-pile tufts followed by four ground warps, two of relatively large size and two of relatively small size, with the two immediately adjacent the spaced rows of tufts of the small size and the other two of the large size, the relatively large ground warps acting to stabilize the fabric and support the rows of tufts.

4. An upholstery pile fabric of that type in which the bases of V-pile tufts composed of or containing a substantial proportion of mohair are adhesively secured to the ground with openings between the warps and wefts of the ground permitting breathing, in which the repeat widthwise of the fabric consists of a duplex row of the V-pile tufts and interposed pair of ground warps followed by six ground warps, of relatively large and relatively small size, with the first and last of said six ground warps immediately adjacent the spaced duplex rows of tufts of the one size and the other four of the other size, the relatively large ground warps acting to stabilize the fabric and support the rows of tufts.

5. An upholstery pile fabric of that type in which the bases of V-pile tufts composed of or containing a substantial proportion of mohair are adhesively secured to the ground with openings between the warps and wefts of the ground permitting breathing, in which the repeat widthwise of the fabric consists of a duplex row of the V-pile tufts and interposed pair of ground warps followed by six ground warps with the first and last of said six ground warps immediately adjacent the spaced duplex rows of tufts of relatively small size and the other four of relatively large size, the relatively large ground warps acting to stabilize the fabric and support the rows of tufts.

6. An upholstery pile fabric of that type in which the bases of V-pile tufts composed of or containing a substantial proportion of mohair are adhesively secured to the ground with openings

between the warps and wefts of the ground permitting breathing, in which the repeat widthwise of the fabric consists of a duplex row of the V-pile tufts and interposed pair of ground warps followed by four ground warps, two of relatively large size and two of relatively small size, with the two immediately adjacent the spaced duplex rows of tufts of the one size and the other two of the other size, the relatively large ground warps acting to stabilize the fabric and support the rows of tufts.

7. An upholstery pile fabric of that type in which the bases of V-pile tufts composed of or containing a substantial proportion of mohair

are adhesively secured to the ground with openings between the warps and wefts of the ground permitting breathing, in which the repeat widthwise of the fabric consists of a duplex row of the V-pile tufts and interposed pair of ground warps followed by four ground warps with the first and last of said four ground warps immediately adjacent the spaced duplex rows of tufts of relatively small size and the other two of relatively large size, the relatively large ground warps acting to stabilize the fabric and support the rows of tufts.

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