

Jan. 20, 1948.

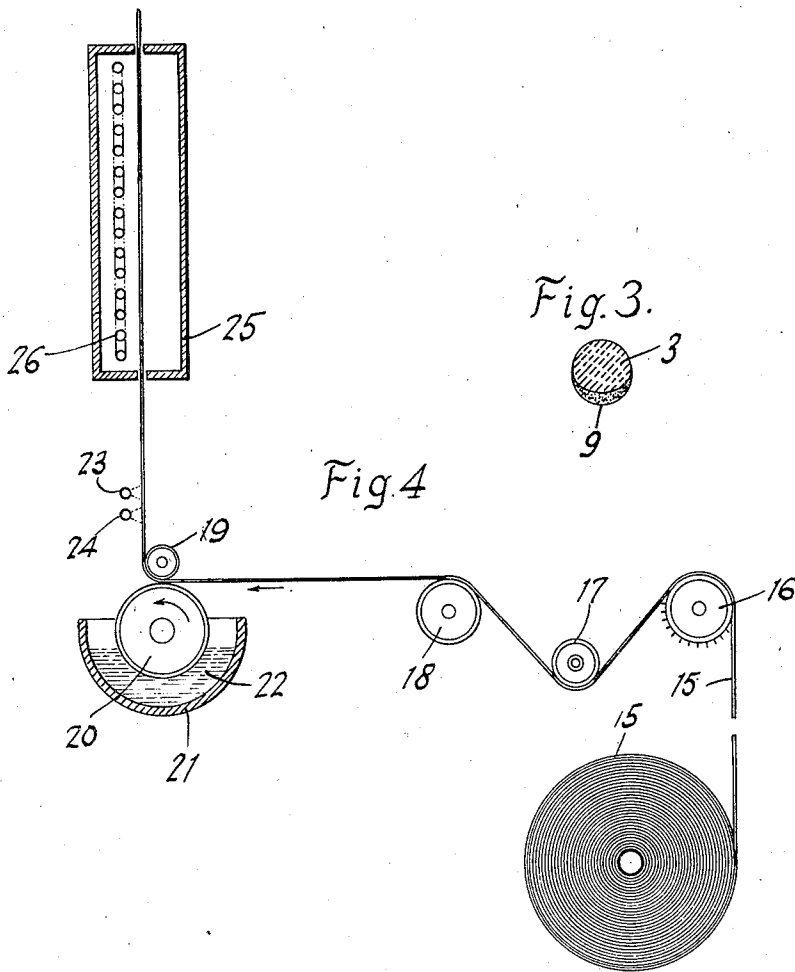
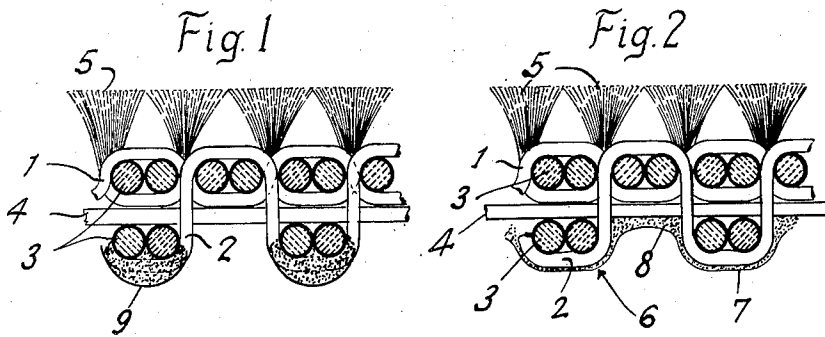
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2,434,709

NONSLIP TEXTILE ARTICLE

Filed April 29, 1944

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 5.

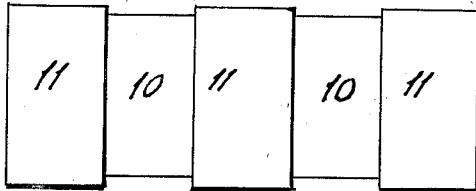


Fig. 7.

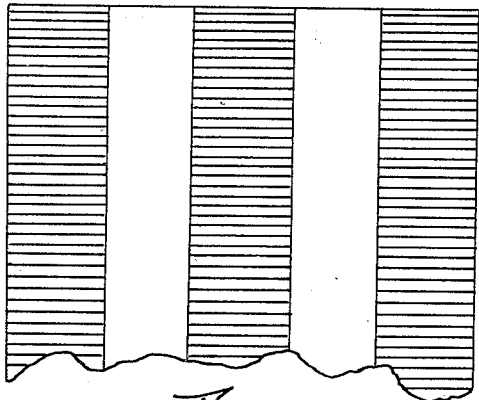
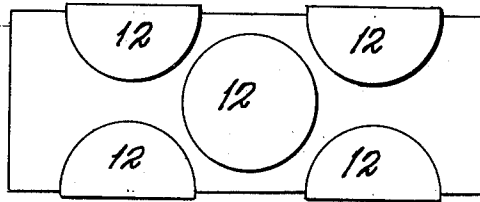


Fig. 6.

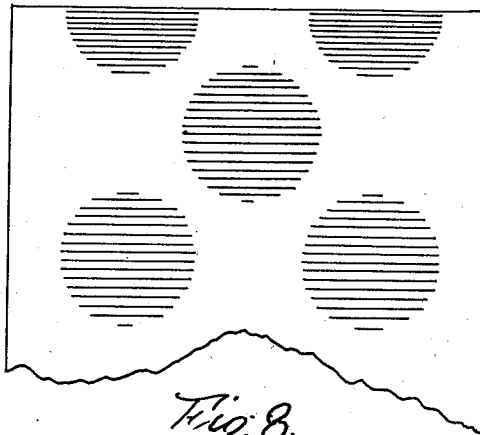


Fig. 8.

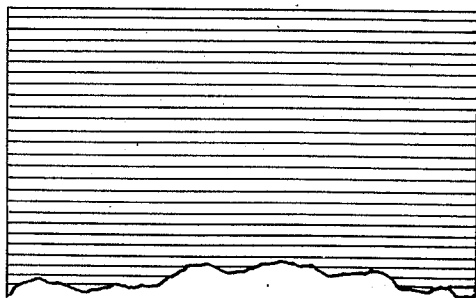


Fig. 9.

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UNITED STATES PATENT OFFICE

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NONSLIP TEXTILE ARTICLE

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Application April 29, 1944, Serial No. 533,272

1 Claim. (Cl. 28—80)

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This invention is a covering material which stays in place without slipping when used in contact with a smooth surface.

The present application is a continuation-in-part of my prior application, Serial No. 349,903, filed August 2, 1940. This prior application is now abandoned.

I am, of course, well aware that the prior art teaches the use of materials, and coatings, which have a high coefficient of friction in contact with smooth surfaces, and that corrugated and ribbed surfaces have been used to prevent slipping. However, I believe that I am the first to provide a partial coating of slip inhibiting material to spaced contacting portions of a covering which otherwise has such a low coefficient of friction that it is difficult to maintain the covering in position on a floor. I likewise believe I am the first to partially coat the ribs of a carpet ribbed by the character of the weave on the contact face, and apply the coating to the ribs in such a manner that the resultant article has its maximum application of friction increasing material only at that portion of each rib having bearing contact with the floor upon which the rug or carpet is placed.

My invention is also comprehensive of a woven textile floor covering in which the character of the weave produces spaced ribs on the contact side and which ribs are the only portions which are provided with a substantial coating of a material having a high coefficient of friction with respect to the character of surface with which floor coverings are commonly used.

As illustrative of a practical form of my invention, I shall describe it in connection with the lower grade of Axminster floor covering which statistics indicate constitutes approximately 80% of the production in machine made rugs or carpets. Low grade Axminster of this class is rather flexible, heavily starched, and its tendency to slip on smooth floors has become so well established as a causative factor in home accidents that the retail trade now demand non-slip backs to such an extent that wholesalers and retailers insist that all goods furnished them must have the non-slip feature, particularly in the mat sizes where it is unlikely that a piece of furniture will act as an anchor for the rug.

However, the water dispersion of rubber which is used for such non-slip coating is expensive, and its durability, life and effectiveness are decreased in proportion as adulterants are added, and while many manufacturers have resorted to the addition of substances tending to cheapen the rubber compound it is still the fact that the higher grade unadulterated rubber compound affords the most effective means of protecting against slip.

At the current cost to carpet manufacturers of water dispersion rubber coating material the ap-

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plication of a non-slip backing to a 27" x 36" low grade Axminster mat costs approximately .10¢ whereas with the present invention an equivalent non-slip effect is obtained for the non-slip backing on the same size unit at a cost of .023¢ and, in addition the non-slip backing of lower cost has many advantages in appearance and use over the more costly article.

It has been customary practice in producing a non-slip back to completely cover the back surface of a mat, rug or carpet with the non-slip material whereas just as effective non-slip result is obtained by the use of about 75% less of the material if it is properly located upon the piece treated; to this end the invention contemplates a carpet material in which the non-slip substance is applied only on the floor contact portion of the ribs.

The advantages of such an article as this invention provides are manifold, for instance the saving in non-slip substance used is sufficient to reduce the cost to about one-quarter with respect to usual practice and thus warrant the use of the best grade of non-slip compound on even the cheaper grade carpets. The hinge effect of the weave is not destroyed as is the case with a full coating. The spaces or intervals between the ribs of a carpet remain open or porous so that gritty material, which has an abrasive action at the base of a pile fabric, is not retained as in the case of the full coated type and the gritty material may either work its way out of the carpet or be withdrawn by a vacuum cleaner thus prolonging the life of the carpet.

In the full coated material the treatment or filling of the spaces between the ribs detracts from the appearance of the goods, such non-slip material as is in the spaces is wasted in that it does not contact the underlying surface and hence performs no non-slipping function. When pressure is used to apply the coating it pushes through the interstices of a loose weave and produces objectionable rubber fingers on the decorative surface. The full coating is almost impossible of even application and more material is in the spaces between the ribs than on the ribs, and, as a matter of fact the contact portions of the ribs where the non-slip coating or substance is most to be desired usually has the least substance.

In the drawings accompanying this specification and in which I have shown the invention:

Fig. 1 is a cross section of a three shot pile floor covering material having a ribbed contact surface treated to provide an article according to the present invention;

Fig. 2 is a view, similar to Fig. 1, of a three shot pile floor covering material treated according to the prior art;

Fig. 3 is a cross section of an Axminster weft

shot in the base of a carpet or rug and delineating one rib having a non-slip coating applied only to the contact portion of the rib;

Fig. 4 is a diagrammatic view of one manner in which the non-slip coating is applied to form the article of the present invention.

Fig. 5 is a plan view of another form of coating roll for the method apparatus of Fig. 4;

Fig. 6 is a plan view of the floor side of a rug having ribs treated by the roll shown in Fig. 5;

Fig. 7 is a plan view of still another form of coating roll for the method apparatus of Fig. 4;

Fig. 8 is a plan view of the floor side of a rug having ribs treated by the roll shown in Fig. 7, and

Fig. 9 is a plan view of the floor side of a rug having ribs treated by the roll shown in connection with the method apparatus of Fig. 4 where the roll surface is all at one level. In detail:

In each of Figs. 1 and 2 I have illustrated a three-shot Axminster weave simply because it represents a commonly used weave typical of the lower grade Axminster.

In each of the Figures 1 and 2 of the drawing reference characters 1 and 2 are chain warps between which sheds are opened for the filling 3, while 4 is the characteristic stuffer. The tuft insertions are shown at 5. This type of weave is rather loose, heavily starched to give it body and has considerable flexibility or hinge effect in the weave. It is one of the most common of the low grades of Axminster and the inability of this grade to stay anchored in place upon a floor unless anchored by a piece of furniture, or by other fastening means, is too well known to require further comment. As hereinbefore mentioned, the slipping of mats made with this weave is such a common cause of household accident that the wholesale and retail trade now demands non-slip treatment without exhibiting a willingness to pay the proportionate increase in cost occasioned thereby. The treatment has consisted in spraying or otherwise applying to the under surface a coating of a water dispersion of rubber which dries artificially or otherwise to form a coating such as is depicted at 6 in Fig. 2. However, with spraying on the coating the result has been either too heavy a deposit between the ribs formed by the lower face wefts 3 and the chain warps or a very thin and short wearing deposit on the floor contact portion of the ribs where the non-slip coating should be located in order to attain the maximum effect. My invention is depicted clearly in Fig. 1 while the prior art product is shown in Fig. 2.

In the prior art Fig. 2, 6 represents the non-slip coating material and 7 the thin portion over the ribs, while 8 indicates the heavy deposit between the ribs where it is obviously ineffective as a deterrent against slip as it does not even contact the floor; in Figs. 1 and 3 the heavy coating on the floor contact surface of the ribs is indicated at 9 in Figs. 1 and 3 with substantially no deposit between the ribs as shown in Fig. 1. In this invention, as distinguished from the prior art Fig. 2, substantially all of the coating material is utilized on the contact face of the rib and may even be of greater layer thickness thereof than that at 7 in the prior art construction of Fig. 2 without using as much of the costly coating material to obtain the same or a greater degree of non-slip effect.

The result in Fig. 1 is a better appearing article, one which has sufficient porosity to permit vacuum cleaner withdrawal of dirt and grit in

the rug, a construction in which the weave breathes and the hinge effect is preserved, and yet withal a longer wearing, better holding non-slip article at less cost than prior art practice affords.

One way in which the water dispersion of rubber is applied to produce the article of Fig. 1 is shown in Fig. 4 wherein 15 represents a roll of carpet ribbed on the floor side as in the case of woven carpet of Fig. 1. The length of carpet passes over a spiked roll 16 beneath a roll 17 over a roll 18 and between rolls 19 and 20 as shown. The adjustment between rolls 19 and 20 is such that substantially no pressure is applied to the carpet but its lower or ribbed face has the ribs kept in contact with the surface of roll 20; rolls 16 and 20 are interconnected by driving means (not shown) so that the peripheral speed of roll 20 is maintained at a different rate, preferably slower than the rate of travel of the carpet 15 so that there is a wiping action. The roll 20 is partially immersed in a trough 21 containing the water dispersion of rubber 22 in liquid form and which is of a consistency to be carried as a thin film on the roll 20; consequently, as the surfaces of roll 20 and the carpet 15 slip with respect to each other the ribs formed by the weft shots 3, wipe the coating off without depositing any between the ribs. Sometimes it will be found that a film or web of the coating may accidentally extend partially from one rib to another and in order to eliminate this air jets are played upon the ribbed surface throughout its width as shown at 23 and 24 and serve to rupture the film, parts of which are attracted to the ribs without leaving a deposit between. Thickness of the coating is regulated by viscosity and relative rates of travel. The treated carpet 15 passes through a dryer box 25 having a steam coil or other heating medium 26 which congeals or cures the rubber to the desired degree.

In Fig. 5 I have shown a coating roll which has depressed portions 10 so that the floor surface of the rug engages only the spaced portions 11 of the roll and coats the ribs in stripes as shown in Fig. 6, intermediate portions of the ribs being uncoated and here indicated in blank.

The same method as just described is utilized in connection with Figs. 7 and 8 in which the coating roll has raised circular portions 12 which transfer the non-slip coating material to the ribs on the floor surface of the rug in the pattern shown in Fig. 8, the uncoated portions of the ribs being left blank.

The carpet shown in Fig. 9 is the same as shown in Figs. 1, 6 and 8 and here the ribs are indicated as coated throughout the width of the piece of woven carpet material.

I claim:

In a woven floor covering fabric, upper and lower weft shots, stuffer warps between the upper and lower weft shots, pile held by the upper weft shots, warps passing over and under the upper and lower weft shots respectively, and a non-slip coating on the underside of the lower weft shots to form therewith ridges to prevent the fabric from slipping when in position on a floor, said coating having its greatest thickness at the line of contact of each coated ridge with the floor.

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