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CARPET TREATMENT

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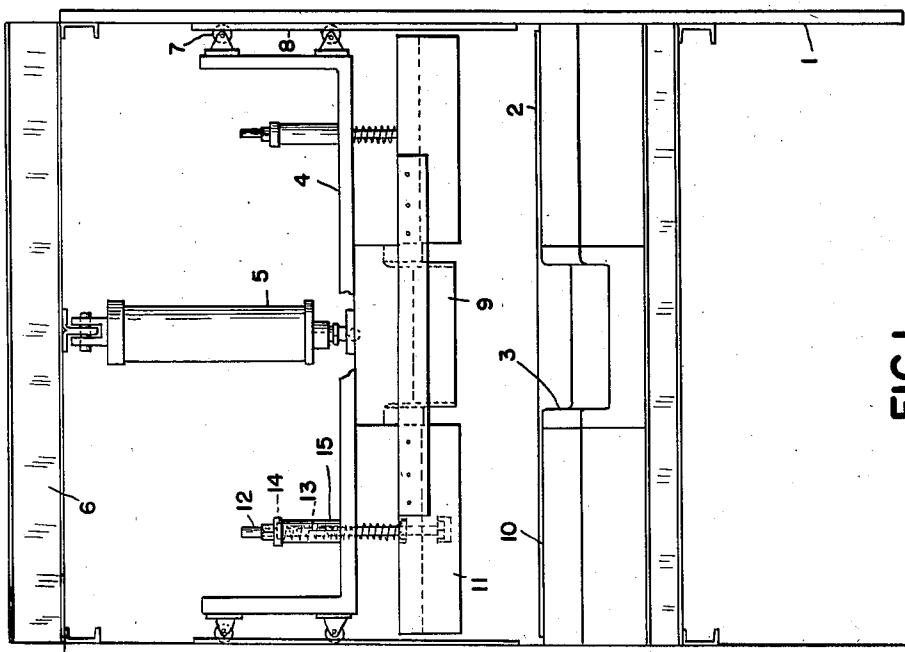


FIG. 1.

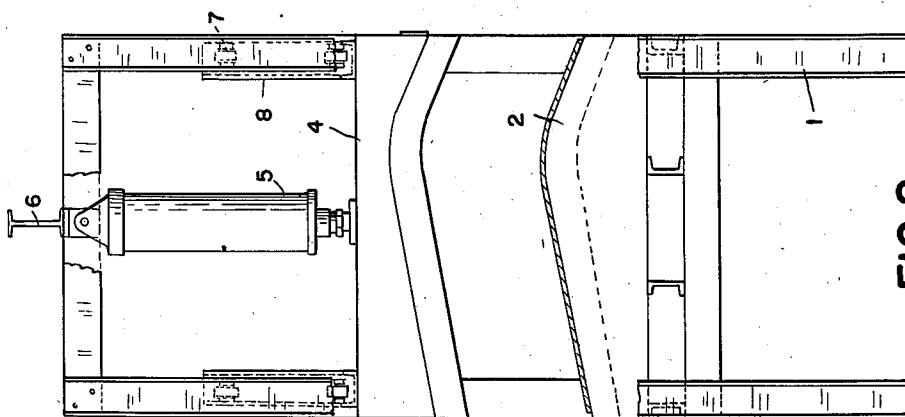


FIG. 2.

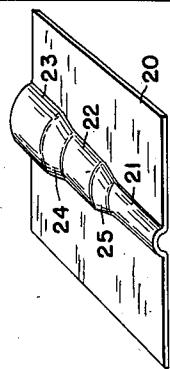


FIG. 3.

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## UNITED STATES PATENT OFFICE

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## CARPET TREATMENT

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7 Claims. (Cl. 154—2)

The present invention relates to carpet treatment and more particularly to a method of deforming a carpet to a desired shape.

In the manufacture of motor vehicles it is now common practice to provide carpeting for the floors of both the front and rear compartments. In some vehicles the floor is not flat, with the result that the carpet applied thereto must be shaped to conform to irregularities in the floor. A familiar instance is in the case of vehicles having a raised housing projecting rearwardly through the compartment to receive the propeller shaft. Furthermore, in some cases these projections are curved in three dimensions with the result that it is desirable to initially deform the carpet to correspond to the floor.

According to the present invention I deform the carpet to correspond to the contour of the floor to which they are applied and preferably give them a more or less permanent set. In other words the carpet is permanently stretched as necessary to cause it to take the desired configuration, and furthermore it is treated with suitable stiffening materials so that it tends strongly to retain its deformed shape.

Briefly described, the method comprises coating the rear of the carpet with an aqueous cement adapted to stiffen or harden on setting. Preferably a thermo-setting cement is employed. The carpet is then subjected to an initial forming operation which forms it to an intermediate stage and at the same time it is subjected to temperatures above the boiling point of water. Since the cement employed is an aqueous cement this vaporizes the water therein and releases it in the form of steam. At this time preferably the carpet is confined or at least partly confined with the result that the steam acts on the carpet and conditions the same for further stretching or forming.

It is accordingly an object of the present invention to provide a novel method for permanently deforming a carpet.

It is a further object of the present invention to provide a novel method for deforming and stiffening carpets characterized in part by use of an aqueous, thermo-setting cement and in the application of heat during the forming process sufficient to release steam from the cement to steam the carpet.

It is a further object of the present invention to provide a novel method of permanently deforming and setting carpets which includes the step of applying an aqueous cement to the back of the carpet and thereafter applying a sheet of

absorbent material over the cement to absorb some of the water therefrom and to immobilize the cement.

Other objects of the invention will be apparent as the description proceeds, and when taken in conjunction with the accompanying drawing wherein

Figure 1 is a front elevation of the press employed in the present method;

Figure 2 is a side elevation of the press employed in the present method; and

Figure 3 is a perspective view illustrating a deformed carpet.

Referring first to Figures 1 and 2 I employ in the present method a press comprising a frame 1 supporting a bedplate 2 having a recess 3 therein in the shape of the desired carpet formation. Vertically movable on the frame 1 is a carrier frame 4 actuated by a suitable power means such as for example as an air cylinder 5 suspended from a crosspiece 6 carried by the frame 1. The carrier frame 4 is herein illustrated as provided with suitable rolls 7 adapted to move in a correspondingly formed track 8 carried on the frame 1. The carrier frame 4 carries a forming projection 9 adapted to cooperate with the recess 3 of the bedplate 2 previously referred to and adapted to form the carpet into the recess 3 so as to give it the desired deformation. Laterally spaced from the recess 3 the bedplate 2 presents generally smooth surfaces 10 upon which the carpet initially rests. The carrier frame 4 is provided with relatively movable blocks 11 carried by means of rods 12 projecting upwardly through the carrier frame 4. Compression springs 13 surround the rods 12 and are seated between the carrier frame 4 and a nut 14 carried by the rod 12. Preferably the springs 13 are received within suitable housings indicated at 15.

The forming projection 9 previously referred to is rigidly secured to the carrier frame 4 in any desired manner.

It is very important that the carpet be guided smoothly into the recess 3, because any wrinkles or folds appearing as a result of the forming operation are more or less permanently set into the carpet. The blocks 11 serve this function. Preferably the blocks are provided with frictional lower surfaces so that they tend to hold the carpet smoothly, and permit it to be drawn evenly into recess 3 by downward movement of projection 9.

Suitable means (not illustrated) are provided for heating the die, and these means may be electrical resistance elements or steam conduits or

the like. Temperatures employed are above the boiling point of water in order to vaporize the aqueous cement as previously mentioned but are, of course, low enough so that no injury to the carpet results.

In order to deform the carpet an aqueous cement is applied liberally to the rear surface of the carpet at the areas to which a permanent deformation is to be imparted. This cement may be a latex or vulcanizing rubber cement, a resin such as a urea resin, phenol or furfural formaldehyde, or the like, in an aqueous carrier. In some cases other carriers than aqueous may be employed, although aqueous carriers are preferred for the reason that these are cheap and vaporize readily, thus steaming the carpet. After the application of the cement the carpet may be allowed to air dry or may be dried in an oven for a period sufficient to immobilize the cement, the period however being insufficient to completely dry the cement.

As an alternative and in some ways preferred method, a ply of absorbent material such for example as absorbent paper, preferably crepe, may be applied to the cement coated surface immediately after application of the cement. By employing a crepe paper, rupture thereof during forming is avoided. This absorbent material absorbs a portion of the water from the cement and immobilizes the cement. At the same time the water absorbed from the cement is retained in the absorbent material for the time being and is later released as steam to effect the steaming operation of the carpet. The ply of absorbent material remains as a part of the finished article.

In either case the carpet, after the cement has been immobilized, is placed over the bedplate 2 and the carrier frame 4 is moved downwardly. Downward movement of the carrier frame is arrested before complete deformation of the carpet. Downward movement of the carrier is arrested only after the heated projection 9 has contacted the cement or the paper over the cement when such is used. If desired, the carpet may be partly deformed, or it may be in substantially unshaped condition at this time. Attention is directed to the fact that at this time the carpet and cement are confined, members 9 and 11 contacting its upper surface; and bedplate 2 supporting its edges. As previously stated, downward movement of the carrier is arrested at this time and the parts are retained in this position for a substantial interval. The elements of the die, either the recess 3 or the projection 9, or both, are held above the boiling point of water and at this time the moisture or water is vaporized. In the event that an absorbent sheeting has been employed, the moisture which was absorbed by this is also released in the form of steam. As will be evident, the carpet is substantially confined at this time with the result that the steam thus released permeates the carpet and conditions the same for further deformation. Without this steaming of the carpet, certain operations cannot be performed without injury to the carpet. When, however, the carpet is first partly deformed and is then subjected to steam, the fibers thereof are conditioned for stretching and the complete deforming operation may be performed without injury to the carpet.

After the moisture has been vaporized, the carrier frame 4 is moved downwardly until the carpet is tightly compressed within the recess 3. It is retained therein for a substantial interval sufficient to substantially cure the cement. This

interval will of course depend upon the nature of accelerators employed as well as the nature of the cement, but the operation may normally be complete within a very few minutes.

I have referred herein to the material applied to the carpet as a cement, but it is obvious of course that it is not employed as an adhesive for adhering the carpet to another surface. Instead its function is multiple. In the first place it serves to stiffen the carpet and to cause the carpet to retain the shape to which it is deformed. It serves an additional function in acting to prevent recovery of the carpet from the amount of deformation. The second function is distinct from the first and is of considerable importance. Without the cement, the carpet after release from the press would recover from its stretched condition, and would be flexible and substantially formless. Where the cement is employed, elastic recovery from deformation is materially retarded, and the final product is quite stiff and has body due to the presence of the cement. The cement also performs the function previously elaborated of releasing vapor to facilitate deformation of the carpet.

The final product may have any one of many desired shapes, but in Figure 3 I have illustrated a carpet 20 having cylindrically formed portions 21, 22 and 23 connected by tapered sections 24 and 25. As will be evident, this typical formation requires an actual stretching of the carpet in addition to the simple forming operation.

While I have described a specific embodiment of my invention it will be understood that this has been done merely to enable those skilled in the art to practice the same and is not intended to limit the invention the scope of which is indicated by the following claims.

What I claim as my invention is:

1. The method of imparting a permanent deformation to a carpet which comprises applying an aqueous cement to the back of said carpet, placing said carpet in a forming press, partly closing said press to confine the carpet and cement, subjecting the cement to temperatures above 212° F. to vaporize the water and steam the carpet, completely closing the press, thus shaping the carpet to the desired form, and continuing the application of heat to set the cement.

2. The method of imparting a permanent deformation to a carpet which comprises applying an aqueous cement to the back of said carpet, drying the cement sufficiently to immobilize but not to completely dry the same, placing said carpet in a forming press, partly closing said press to confine the carpet and cement, subjecting the cement to temperatures above 212° F. to vaporize the water and steam the carpet, completely closing the press, thus shaping the carpet to the desired form, and continuing the application of heat to set the cement.

3. The method of imparting a permanent deformation to a carpet which comprises applying an aqueous cement to the back of said carpet, applying an absorbent sheet material over the cement to absorb moisture therefrom to immobilize said cement, placing said carpet in a forming press, partly closing said press to provide a preliminary formation of the carpet and to confine the carpet and cement, subjecting the cement to temperatures above 212° F. to vaporize the water and steam the carpet, completely closing the press, thus shaping the carpet to the desired form, and continuing the application of heat to set the cement.

4. The method of imparting a permanent deformation to a carpet which comprises applying an aqueous, thermal-curing cement to the back of said carpet, applying an absorbent sheeting over said cement to absorb some moisture therefrom and to immobilize the cement, subjecting the carpet to temperatures above the boiling point of water while at least partly confining said carpet to steam said carpet, and then shaping said carpet under pressure at elevated temperatures for a period sufficient to set said cement.

5. The method of imparting a permanent deformation to a carpet which comprises applying an aqueous, thermal-curing cement to the back of said carpet, applying an absorbent creped paper over said cement to absorb some moisture therefrom and to immobilize the cement, subjecting the carpet to temperatures above the boiling point of water while at least partly confining said carpet to steam said carpet, and then

shaping said carpet under pressure at elevated temperatures for a period sufficient to set said cement.

6. The method of imparting a permanent deformation to a carpet which comprises applying an aqueous, thermal-curing cement to the back of said carpet, applying an absorbent sheeting over said cement to absorb some moisture therefrom and to immobilize the cement, partly confining said carpet and preliminarily shaping the same while subjecting the same to temperatures above 212° F., and finally completing shaping said carpet under heat and pressure and curing said cement.

15 7. In the method of deforming a carpet having a coating of thermal-setting, aqueous cement, the step of initially forming said carpet to an intermediate form under temperature conditions such as to vaporize the water in said cement to steam 20 the carpet.

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