Aug. 10, 1965 D. O. WIDMARK 3,199,819

CHAIR LEG CUSHIONING DEVICE AND METHOD OF MAKING THE SAME

Filed March 14, 1963

FIG. 1

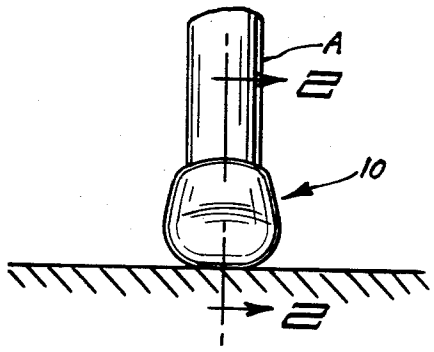


FIG. 2

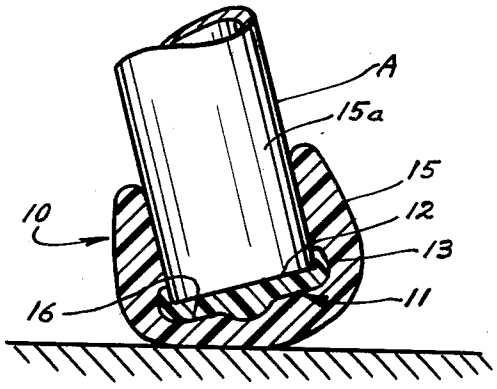


FIG. 3

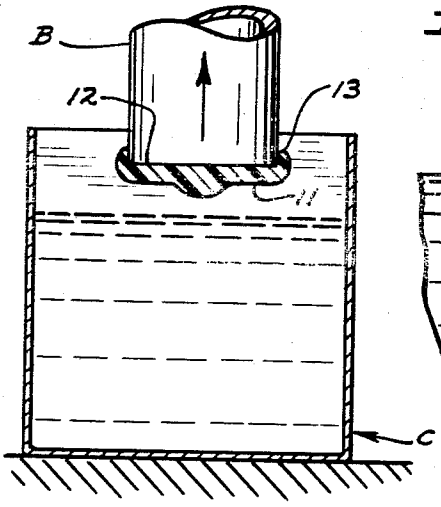
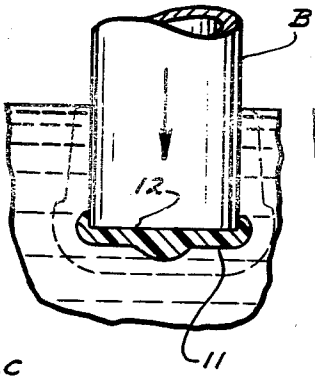


FIG. 4



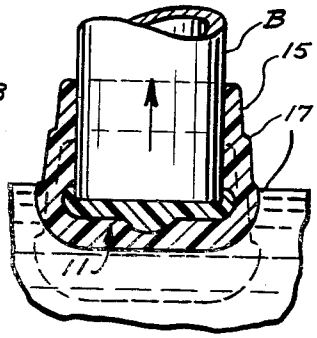


FIG. 5

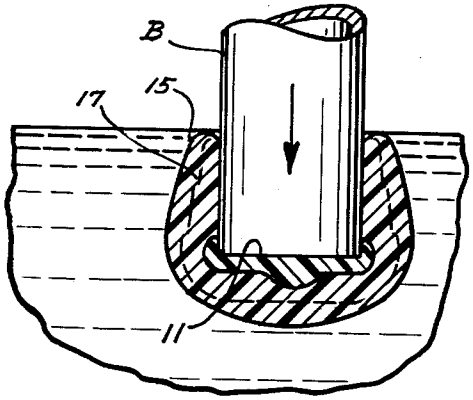


FIG. 6

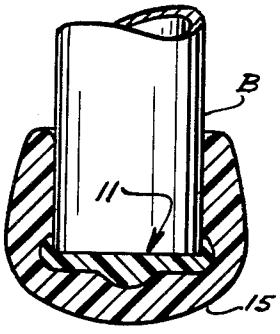


FIG. 7

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CHAIR LEG CUSHIONING DEVICE AND METHOD OF MAKING THE SAME

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This invention relates generally to cushioning devices for the tip of a chair leg and the like, and more specifically to a leg tip cushioning device provided with a relatively stiff molded inner member to abut the end of the leg so as to prevent cutting of the softer cushioning portion thereof and to the method for molding the same.

Many tables, chairs and similar articles are now constructed with tubular legs which must be provided with a cushioning device so they will not cut into or slide upon a floor. Up to this time, however, no simple protective cushioning device has been developed which will properly protect the floor and still be of sufficient strength to resist the cutting action of the leg through the material. Various methods, such as inserting a steel washer into a cushioning cap, have been tried, but have either proven too costly to manufacture or have failed after a very short period of use. To eliminate this problem the inventor has developed a leg tip cushioning device which is not only resilient so as to prevent marring of or slippage on the floor, but is also designed with an integrally molded inner element having sufficient strength to withstand the cutting action of a tubular leg.

It is an object of the present invention to provide a molded pliable leg tip cover which will fit tightly around the tip of a leg such that the cover will remain thereon though the leg is moved arcoss the floor.

It is a specific object of the present invention to provide a resilient leg tip cover having a substantially less resilient inner member molded therein which will abut with the leg end and extend a short distance longitudinally along the leg to prevent the leg end from contacting and cutting through the more resilient material.

It is a further specific object of the present invention to provide a method of dip molding to produce an integrally molded leg tip cover wherein two materials having substantially different physical properties may be joined to form a complete unit.

It is still another object of this invention to provide a method for manufacturing a composite leg tip cover which comprises a molded inner member of material having a durometer value which will resist cutting and be relatively stiff and an exterior shell molded thereto of material having a durometer value somewhat lower than that of the insert so as to be resilient and pliable to conform to the tip of a leg.

These and other objects of this invention will appear to those skilled in the art from the following detailed description taken with the accompanying drawings, in which:

FIG. 1 is an elevation view of the cover as it may be applied to a leg;

FIG. 2 is a partial section taken substantially along line 2—2 of FIG. 1;

FIG. 3 is a partial section showing the completed insert being removed from the dip tank;

FIG. 4 is a partial section showing the first step of dipping to apply the exterior shell for the invention;

FIG. 5 is an intermediate step showing the withdrawal sequence in applying the exterior shell of the invention;

FIG. 6 is a partial section showing the final total submersion to apply the desired finish thickness to the exterior shell; and

FIG. 7 is a partial section showing the completed tip before removal from the dipping plug.

This invention, as illustrated in the accompanying drawings, consists of an integrally molded chair tip cover generally designated 10 and comprises an inner molded member 11 and an exterior shell covering designated 15. As best illustrated in FIG. 2, the interior member 11 comprises a generally flat circular bearing surface 12 such that it may abut with the endmost tip of a leg A. For ease of manufacture these legs A are usually cut from a length of tube and no further machining operations are provided on the leg such that it will leave a sharp square corner on the end.

As further illustrated in FIG. 2, a flange portion 13 is provided at the outermost end of the flat abutment portion 12 and is arranged substantially normal thereto such that when placed on the end of a leg A, it will extend a short distance longitudinally thereon. This, of course, will aid in holding the leg A on said inner member 11 and will not allow the leg to slide off and cut into the exterior covering 15. The exterior shell 15 is substantially spherical in shape with a leg-receiving opening 15*a* therein and is of such a length that it will extend along the leg a distance greater than that of the insert flange 13. In the form shown, the leg-receiving opening 15*a* of the exterior shell 15 is designed for a specific leg such that it will be closely held thereto due to the pliability of the material used to mold the same.

It has been found most economical to produce a chair tip 10 of this design by having an integrally molded leg abutting member 11 whereon the exterior shell 15 is molded therearound in a series of dipping operations. In this manner the inner leg abutting member 11 is held within a seat 16 of the exterior shell 15 by a portion of the shell 15 which laps thereover.

To produce this leg tip cover the material used is a liquid form of polyvinyl chloride plastisol. It has been found that by varying the amount of plasticizer, used as the reaction agent with the polyvinyl chloride, that the durometer value of the finished product may be varied. By using less plasticizer the end result is a material of a high durometer value and using more plasticizer will result in a more resilient material having, of course, a lower durometer reading. In this procedure, the plasticizer content of the dipping material has been varied such that the inner leg abutting member 11 has a durometer reading of 95 on the Shore A scale and the exterior shell has a durometer value of 70 Shore A. These hardness values for the separate items result in a finished product having a substantially pliable and resilient outer cover and a leg abutting member sufficiently stiff as to resist cutting of the leg therethrough though used over a long period of time.

In order to integrally mold the chair tip cover 10, two separate dipping tanks, such as the tank C illustrated in FIG. 3, are provided in which the materials previously supplied with appropriate amounts of plasticizer are stored. The process is initially started by providing a proper sized dip plug B of aluminum material which is pre-heated to a temperature of approximately 240°–260° F. which will jel the material for the leg abutting member 11 and cause it to adhere thereto. The plug is then dipped a short distance into the bath such that the flange 13 will form upwards along the side of the plug B. As shown in FIG. 3, the plug B is substantially flat along the bottom which, of course, forms the abutment surface 12 of the finished insert 11. By varying the time of submersion of the aluminum plug B in the bath C, the thickness of the material may be varied. It has been found that varying the submersion time will result in a respectively thinner or thicker cross-section of material which, of course, may be varied according to the application required for the finished product.

The next step in the process is to reheat the aluminum plug B to a temperature of approximately 315°–335° F. which is important to not only heat the plug to the jel temperature of the second liquid but also to partially cure the already dipped portion **11**. In the second stage the aluminum plug with its now molded member **11** is submerged into the liquid which will give the more resilient outer covering **15** to a depth of approximately ¾ inch. In this dipping process, as best illustrated in FIGS. 4 and 5, the aluminum plug B is dipped to the total length for approximately 12 seconds. It is then withdrawn approximately ⅓ of the total height, which in this case would be approximtaely ¼ inch and held at this level for an additional twenty seconds. The plug is then withdrawn to a third step, again approximately ¼ inch, at which point it is held for approximately ½ minute. As illustrated in FIG. 5, it is obvious at this time the outer shell **15** comprises a series of steps **17** having a slightly greater cross-sectional area at each of the steps. Without removal from the solution the aluminum plug B and partially formed outer shell **15** are completely re-submerged to the initial starting point as best illustrated in FIG. 7. At this point the withdrawal process is started and continues for a twenty second period such that the material will fill in the steps **17** and a smooth outer surface will result. After removal, as shown in FIG. 7, the aluminum plug B is withdrawn from the now completed chair tip cover **10** and no further manufacturing processes are needed.

It is obvious from the description of the method used that the final product comprises a semi-resilient inner member **11** which is securely nested within an exterior shell **15** such that the inner member **11** may not be easily removed therefrom due to not only overlapping of the exterior shell **15** but also due to the partial adherence of the inner member **11** to the outer shell **15** due to timing the dipping processes such that the second dip into the less resilient material takes place before the insert **11** has completely hardened thus forming a cohesive bond therebetween.

It should be obvious that this leg tip cover **10** may be produced to fit upon any size leg simply by altering the size of the aluminum dipping plug and that different applications may be accounted for by providing less

plasticizer in the insert material mix which will, of course, give a higher durometer reading and a stiffer bearing surface.

It will, of course, be understood that various changes may be made in the form, details, arrangements and proportion of parts without departing from the scope of the invention, which generally stated consists in the matter set forth in the appended claims.

What I claim is:

1. A cushioning tip for tubular leg structures including:
   (a) an outer shell of relatively soft cushioning material having an imperforate bottom portion with a portion extending upwardly therefrom having a generally cylindrical inside leg embracing portion defining a leg receiving cavity;
   (b) an inner reinforcing member disposed in fixed relation in the bottom of said cavity having an upwardly extending flange portion integrally formed therewith to surround the lower marginal portion of a leg inserted into said cavity;
   (c) said inner member being made of substantially harder, more durable material than the outer cushioning material for engaging the end of the tubular leg to prevent the leg from cutting through the softer material of the outer shell.

2. The structure as set forth in claim **1** wherein the material comprising the outer shell and the material comprising said inner reinforcing member are compatible such that the outer member may be molded around said inner member.

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