This invention relates to improvements in bowling pins and particularly to improvements in the bowling pin described and claimed in my prior application Serial No. 608,036 filed September 5, 1956, now patent No. 3,159,402.

The bowling pin covered by that application consists essentially of a wooden pin of standard shape and dimensions with a band of molded nylon seated in a circumferential groove around its mid-portion. The entire surface of the pin including the band is coated with a film of nylon applied by repeatedly dipping the banded pin in a solution of nylon in a volatile solvent, such as methanol.

The bowling pin covered by the above application has a useful life considerably greater than the conventional wooden pin and other advantages as set forth in said application. I have found that the useful life of the pin can be still further increased by the modifications hereinafter disclosed.

My present invention consists essentially in stretching over the pin, after applying thereto one or more coatings of nylon, a sleeve of knitted or woven nylon filaments and thereafter applying, by dipping or otherwise, additional coatings of nylon such as described in my above-mentioned application.

In the accompanying drawings I have illustrated my improved pin and certain of the steps in its manufacture and in the said drawings:

FIG. 1 is a side elevation partly in section of a bowling pin embodying my invention;

FIG. 2 is a perspective view of the nylon sleeve;

FIG. 3 is an enlarged detail view of the portion of FIG. 1 marked FIG. 3;

FIG. 4 is a similar view of the portion of FIG. 1 marked FIG. 4;

FIG. 5 is a schematic view showing a step in the method of making the bowling pin of my pending application; and

FIG. 6 is a view similar to FIG. 5 showing this step as modified when no band is used.

Referring to the drawings and particularly to FIG. 1, 1 indicates the wooden pin which is of conventional shape except for a circumferential groove 3 around its mid-portion. The circumferential surface of the groove is not curved axially but is cylindrical and concentric with the axis of the pin. In the manufacture of the pin the groove is initially formed with the surface between the radial shoulders 4 axially convex as shown in FIG. 5, and the wood between the shoulders is then compacted by repeated blows of a hammer 9 overlying an anvil 8 as more fully described in my said application. A nylon band 2 is seated in the groove 3 and firmly bound to the pin by a layer of nylon cement. A base 6 of nylon is attached to the bottom of the pin and after the band and base are applied the entire pin is dipped a number of times in a solution of nylon in methanol to form on the entire surface of the pin a continuous unbroken coating of nylon strongly adherent to the wooden surface of the pin and the nylon surfaces of the band and base. To promote the adherence of the coating to the band and base the nylon surfaces are wiped or sprayed with a dilute solution of phenol.

According to my present invention the pin of my prior application made as above described is modified by incorporating in the nylon coating a sleeve of nylon filaments or threads which is so imbedded in the coating as to be an integral part of the coating itself.

In making my improved pin I proceed as above described in shaping the pin and applying the band, but do not apply the base. After the band is applied the exposed surface of the band is wiped or sprayed with a dilute solution of phenol and the pin is dipped in the nylon-methanol solution to give the initial nylon coating to the entire surface of the pin as described in my above-mentioned application. The nylon sleeve may be applied after the initial coating but the pin is preferably given a second coating before the application of the sleeve. A time interval of approximately one-half hour between dips allows sufficient drying of the nylon film to insure uniform thickness of the finished nylon coating throughout the surface of the pin.

After the second dip the surface of the pin is wiped or sprayed with a dilute solution of phenol and the sleeve marked 10 in the drawing is drawn over the pin. The sleeve is preferably a seamless tube of nylon filaments so woven or knitted as to be extensible in all directions and sufficiently elastic to fit smoothly over the entire surface of the pin between the edges of the seats for the cap and base and to contract over the edges of the seats (see FIG. 4). In FIGS. 3 and 4 the thickness of the nylon coatings is greatly exaggerated in order for the drawing to show the preferred number of layers. The thickness and number of the layers may be varied. A total thickness of 0.035 inch for a coating consisting of a sleeve and five layers of nylon film has been found satisfactory.

After the sleeve is applied, the base 6 and the cap 12 are applied to their seats. The base and cap are coated on their inner faces with nylon cement. The surface of the pin is again sprayed or wiped with the phenol solution and given a third dip in the methanol-nylon solution.

The nylon-methanol solution may be a clear solution or may contain a pigment. Bowling pins are usually white and, as stated in my above-mentioned application, I have found that a coating containing titanium dioxide as the pigment is particularly suitable for bowling pins. When the coating is built up by successive coatings of the coatings may be clear and some pigmented. In the pin shown in the drawings the first coat is clear and the second pigmented. The sleeve is then applied followed by a third coating of clear solution and a fourth coating of a pigmented solution. The decal markings are then applied and the pin is given a final dip in a clear solution.

The addition of the nylon sleeve to the pin of my previous application adds significantly to the useful life of the pin. The combination of the nylon coating and nylon sleeve provides a casing for the wooden pin which is structurally unitary and homogeneous in composition and gives to the pin a greater durability than can be obtained with the nylon coating of the pin of my prior application or with the addition of the sleeve in conjunction with coatings of other compositions.

The nylon coating and nylon sleeve combination may be used with advantage on pins which are not banded and when so used the wooden pins are preferably compacted in the impact zone in the manner shown in FIG. 6. As here shown the pins are initially shaped with a greater convexity at the mid-zone than desired in the finished pin, as indicated at 15. The pins are then subjected to repeated blows by a hammer 16 overlying an anvil 17 both of which are shaped to the desired curvature.

The coatings, sleeve, base and cap are then applied to the pin in the manner above described. The compacting of the impact zone prevents to a large measure the loosen-
ing of the encircling nylon, whether band or coating, in this area which is one of the causes of failure of coated pins now on the market.

It will be understood that whereas I have shown and described my improved pin in detail my invention is not limited to such details except insofar as they are recited in the appended claims.

I claim:

1. A bowling pin comprising a solid body of wood and a multi-coating of nylon film layers covering the surface of said pin, said coating including, between the inner and outer layers thereof, a tubular sleeve of nylon filaments, said coating having a bond between said film layers and between said layers and said sleeve, said bond having structural characteristics resulting from having been formed by fusing together the contacting surfaces between said layers and between said layers and said sleeve, the degree of fusing of said sleeve to adjacent layers being restricted so as to retain in said sleeve an interior filamentary structure, whereby there is formed a unitary coating structure of homogeneous composition.

2. The pin of claim 1 wherein the wood of the pin at its mid-portion is compacted.

3. The pin of claim 1 wherein one end of said pin is covered by a molded nylon member with the edge of said sleeve between the edge of said member and a shoulder on said end of said pin.

4. The pin of claim 1 wherein the wooden body of said pin is formed with a circumferential groove and a band of molded nylon is seated in said groove.

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