July 21, 1964 V. A. UNTERBRINK 3,141,672

BOWLING PIN

Filed March 1, 1955

FIG. 1.

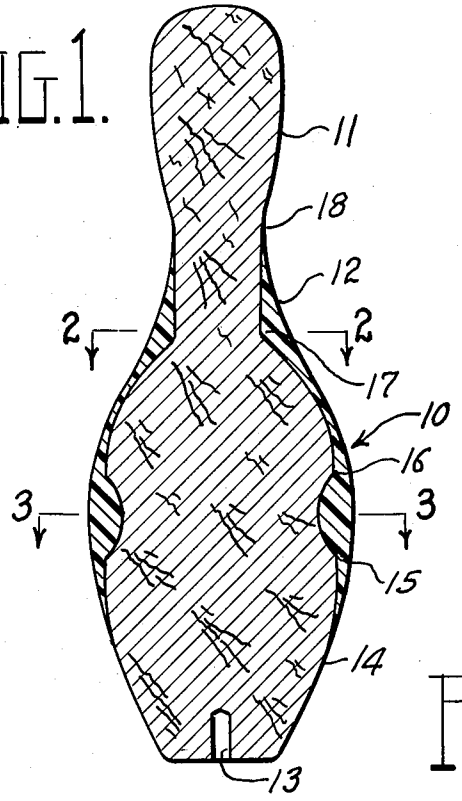


FIG. 2.

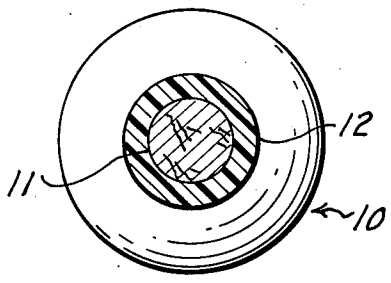
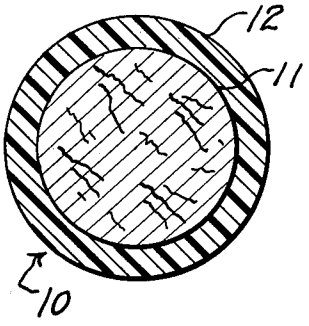


FIG. 3



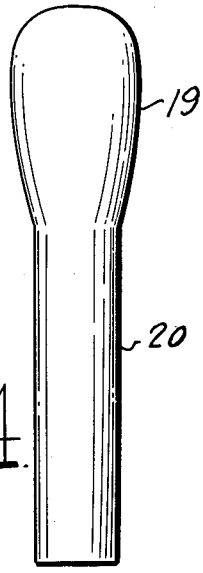


FIG. 4.

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BOWLING PIN

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This invention relates to an improved bowling pin, and, more particularly, to such a pin wherein a wooden base member is reinforced by an exterior layer of a hard, tough material which is resistant to impact.

It has long been recognized that bowling pins, which are traditionally turned from maple, have a short life under the severe conditions to which they are subjected in use. Pins are subjected not only to the impact of the ball, but also to impact with other pins, and with the backstop which is conventional in bowling alleys. Service conditions are so severe that a set of pins ordinarily lasts only through from about 500 to about 1000 lines before it must be replaced.

Various suggestions have heretofore been made for treating bowling pins to increase their useful life, but, so far as is known, all such suggestions have failed to solve the problem involved. Two particular points of weakness have been observed in bowling pins. These points are at the "belly" of the pin, about four to five inches above its base, where impact of a ball is likely to cause disintegration of the wood, and at the neck where splitting frequently occurs.

Any treatment that is used in connection with bowling pins to increase their life must be one which does not destroy the natural maple wood ring, or the pin action upon impact, and must be one which provides a pin within the specifications as to weight established by the American Bowling Congress. So far as is known, no previously suggested way for increasing the useful life of bowling pins has been suggested that is capable of avoiding both splintering at the pin belly and splitting at the neck, and at the same time results in a pin having the natural maple ring, the necessary pin action upon impact, and a weight within the indicated specifications.

The instant invention is based upon the discovery that a tough, hard exterior layer resistant to impact can be applied to certain portions of a maple core to provide a bowling pin, and that the exterior layer will increase by four to five times the useful life of the pin without destroying the natural maple ring or the pin action upon impact, and will produce a completed pin within the American Bowling Congress weight specifications.

It is, therefore, an object of the invention to provide an improved bowling pin.

It is a further object of the invention to provide a wooden bowling pin with a tough, hard, impact resistant exterior layer constituting certain portions thereof.

Other objects and advantages will be apparent from the description which follows, reference being had to the accompanying drawings, in which—

FIG. 1 is a view in vertical section showing a bowling pin according to the invention;

FIG. 2 is a horizontal sectional view along the line 2—2 of FIG. 1;

FIG. 3 is a view in horizontal section along the line 3—3 of FIG, 1; and

FIG. 4 is an elevational view of an upper pin section that is particularly advantageous in repairing pins according to the invention.

Referring now in more detail to the drawings, a bowling pin according to the invention is indicated generally at **10** in FIG. 1. The pin **10** comprises a wooden portion **11** and a tough, hard, resilient exterior layer **12** applied to selected parts of the wooden portion **11**. A setting hole **13** is provided in the base of the wood portion **11**.

In the specific embodiment of the invention shown, the coating **12** begins at a point **14** on the pin which is about 2½" above the base, and gradually increases in thickness to a point **15** which is about 3¾" above the base. Between the point **15** and a point **16**, which is approximately 5¼" above the base of the pin, the wooden portion **11** is shaped away from the exterior of the overall pin to allow a thickening of the exterior layer **12** in the area of impact between a pin and a bowling ball. Above the point **16** the wooden member **11** follows generally the exterior contour of the pin and then continues on a regular curve to a point **17** which is approximately 8½" above the base, at which point the wooden member **11** has a diameter of approximately 1⅝", which is about the minimum bowling pin diameter at its neck, 10" above the base, as specified by the American Bowling Congress. From the point **17** to a point **18**, which is approximately 9¾" above the base of the pin, the diameter of the wooden portion is substantially constant at about 1⅝". As a consequence, the thickness of the layer **12** is approximately constant for a short distance above the point **16**, and then progressively increases to a maximum at the point **17**, and gradually decreases to zero at the point **18**.

Although it is not essential that the portion **11** have the configuration shown, it is important that the exterior layer adhered thereto be reasonably thick at the point of impact between a pin and a ball, namely from about four to about five inches above the base of the pin. Optimum results have been achieved in practice when the material at such point is from about ⅜" to about ½" in thickness. It is also essential that the layer **12** be continuous from the point of impact with a ball to approximately the neck of the pin, about 10" above the base thereof. Carrying the layer above the neck of the pin is unsatisfactory because it destroys the natural wood ring, while terminating the layer **12** substantially short of the neck of the pin is unsatisfactory because neck splitting is not then eliminated or minimized.

The layer **12** is shown in the drawings as being of a plastic material. Satisfactory results can be achieved using polyethylene, polytetrafluorethylene, and other similar materials which combine toughness, hardness, resiliency and moldability. Such materials can be compression molded around the wooden portion **11**. Particularly good results have been achieved by applying as the layer **12** an air drying cellulose nitrate, and by using a material formulated from about 25 parts by weight of ethyl cellulose, about 60 parts of a suitable solvent, for example a petroleum fraction commercially available under the trade designation "916 Oil," 10 parts of castor oil, 3 parts of paraffin, and about one to two parts di-ter-butyl-p-cresole as a stabilizer. The latter material is air drying, and of such consistency that it can be applied to the wooden portion **11** with a putty knife; after drying it can be turned to dimension on a lathe. The reinforcing exterior material **12** can also be a laminated structure built up, for example, from leather or paper-reinforced glue or laminating resin. Other tough, hard, resilient and impact resistant materials suitable for this use will occur readily to one skilled in the art. If desired, the exterior surface of the wooden portion **11** can be serrated, either horizontally or vertically, or at an intermediate angle at all points where it contacts the exterior reinforcing layer **12**, in order to improve adhesion.

It has been found in actual practice that bowling pins according to the invention show no sign of deterioration after having been used for 5000 lines of bowling, and that, when a fault does appear, it is usually a split in the neck thereof, above the reinforcement **12**. Most pins that have developed such a fault can be repaired by means of a doweled upper pin part **19** shown in FIG. 4. A pin that has a split or broken neck can be repaired by

cutting away any wood that protrudes above the point **18** shown in FIG. 1, drilling, axially of the remaining pin, a hole closely matched in size with a dowel **20** of the upper pin portion **19**, and gluing the dowel **20** to the so prepared pin. The diameter of the dowel **20** equals the diameter of the neck of the pin, so that a repaired pin is as strong as a new one. The life of bowling pins can be further extended a substantial extent by such expedient. If desired, the drilled hole can be over size, and the dowel **20** threaded. The hole can then be packed with a hardening plastic material, and the threaded dowel turned thereinto.

The technique described in the preceding paragraph can also be used to produce new pins from two old and worn wooden pins. A pin part **19** can be produced from one pin, a lower portion from the other, and the two parts assembled as described.

It will be apparent that various changes and modifications can be made from the specific details of the invention discussed above and shown in the attached drawings without departing from the spirit of the following claims. In its essential details, the invention comprises a bowling pin having a wooden base member and a tough, resilient, hard reinforcing material adhered to a part of the exterior portion thereof, intermediate its ends. The reinforcement begins slightly nearer the base of the pin than the point of impact between the standing pin and a bowling ball, and extends continuously from such height on the pin to the neck thereof, which is the point of minimum diameter approximately 10" above the base.

What I claim is:

1. A bowling pin of standard tenpin size and shape, said pin comprising a wooden base member having a lower body portion which extends upwardly about 8½ inches from the bottom of the base member and a neck portion which extends upwardly from said body portion, and a tough, resilient, hard reinforcing material adhered to a portion of the exterior thereof, said reinforcing material extending from a point nearer the base than the point of impact between a bowling ball and the pin, when standing, extending continuously from such height to the upper portion of the neck of the pin, and having thickened portions extending from about four inches above the base of the pin to about five inches above the base of the pin, and starting at the point of juncture of the neck and the lower body portion of said wooden base member and tapering in thickness to zero at about the upper portion of the neck of said base member of the pin from said second thickened portion, said wooden base member having a generally uniform diameter neck about 1⅝ inches in diameter, and said reinforcing being tightly confined about the point of juncture of said neck and the bottom portion of said wooden base member and extending outwardly to the standard contour of a tenpin so as to decrease in thickness above and below said point of juncture to provide a reinforcing collar of a generally V-shaped cross section at said point of juncture.

2. A tenpin as claimed in claim 1 wherein the reinforcing material is polytetrafluoroethylene.

3. A tenpin as claimed in claim 1 wherein the reinforcing material is polyethylene.

4. A tenpin as claimed in claim 1 wherein the reinforcing material is an air drying cellulose derivative.

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