March 6, 1956 H. A. C. BRINKMANN 2,737,391

BOWLING PIN

Filed March 17, 1954 2 Sheets-Sheet 1

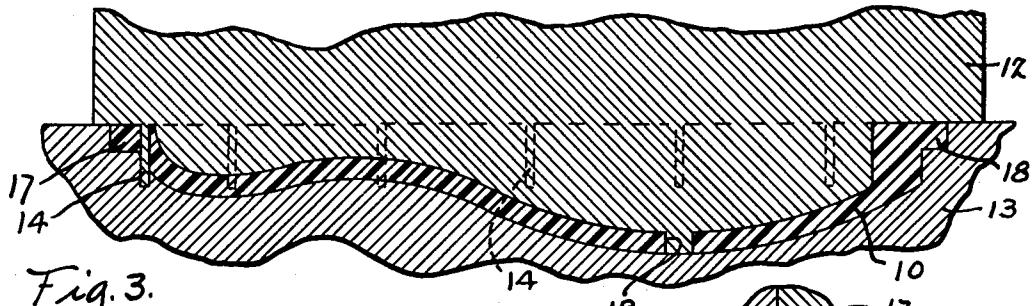


Fig. 3.

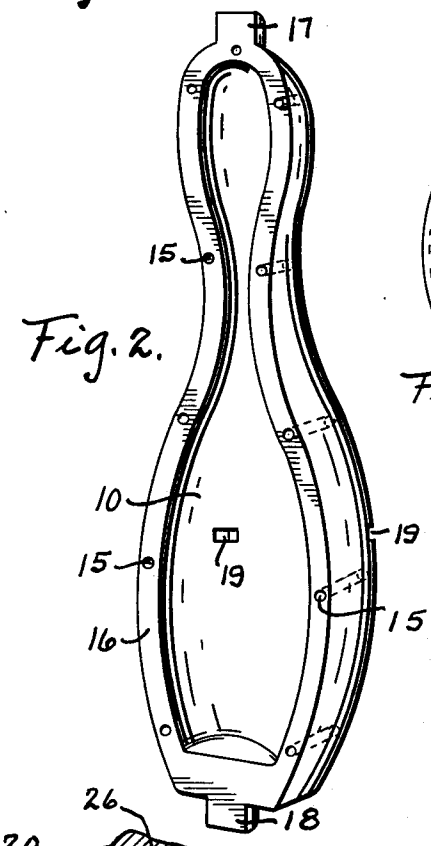


Fig. 2.

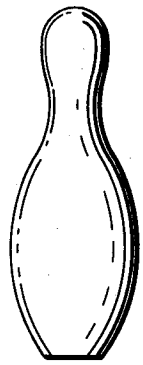


Fig. 1.

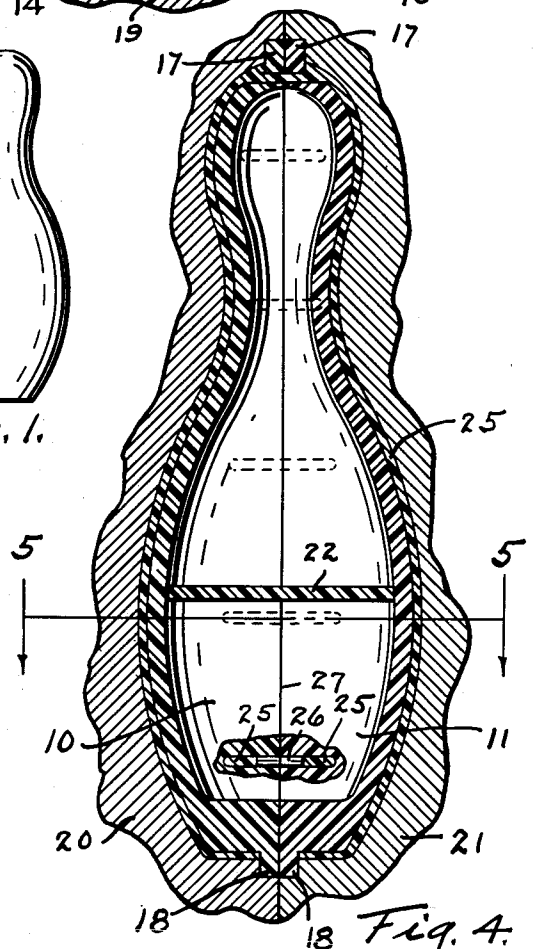


Fig. 4.

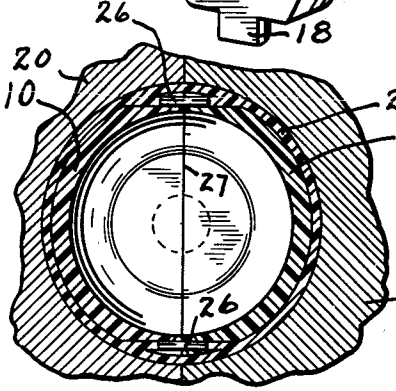


Fig. 5.

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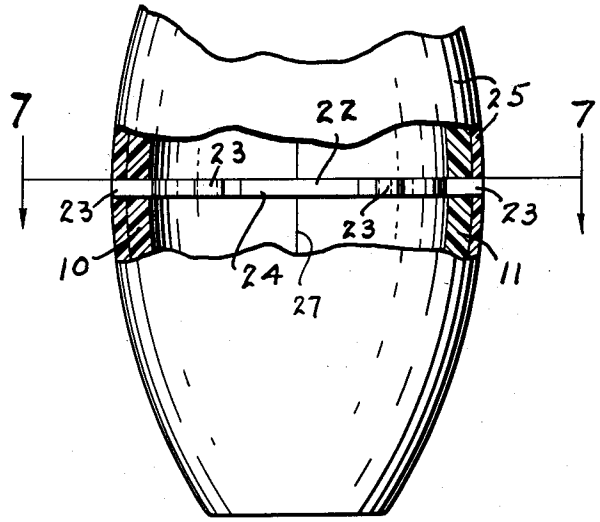


Fig. 6.

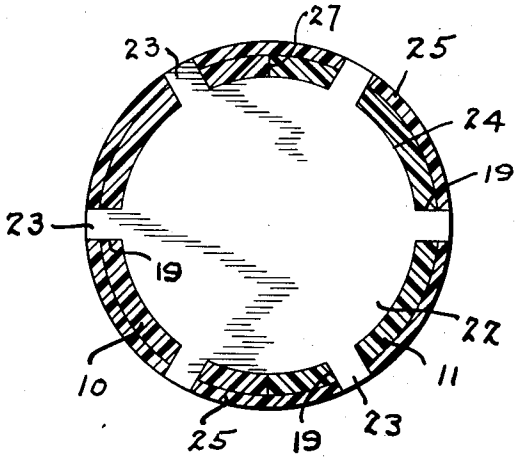


Fig. 7.

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BOWLING PIN

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Application March 17, 1954, Serial No. 416,741

1 Claim. (Cl. 273—82)

This invention relates to a bowling pin wherein the pin is built up from a plurality of shell sections united one to the other and then enclosed by a surrounding covering of synthetic resin or plastic. This invention is an improvement over the invention disclosed and claimed in my Patent No. 2,487,218 issued November 8, 1949.

With increasing difficulty being had in securing proper grades of maple wood to make bowling pins as they have been made heretofore, the industry is turning to other materials as possible sources. One particular source which shows exceeding promise is one or more of the present known synthetic resins or plastics. The qualifications of such material must include the setting up of the material into a finished form of sufficient hardness to withstand the impact of the bowling balls, and at the same time have sufficient resilience to rebound and act much as the maple wood pin has done, and also which will give the same general impact sound. The pin of my invention is hollow and I am aware of the fact that other attempts have been made to make hollow pins in different forms and constructions. However, it seems that none of these prior construction disclosures has been sufficiently successful to be found on the market. At least they are not found in common usage.

My invention has a number of advantages over the prior attempts to solve the problem in that particularly the overall weight of the pin does not exceed the normal weight of a maple wood pin, and while my construction presents a hollow pin, nevertheless it has an exceedingly uniform thickness of wall and has a peculiar reinforcement at the circumferential line around the pin following the line of normal impact of the bowling ball. The uniform thickness of the wall of the pin is very essential in order that the pin may react normally under impact of the ball, regardless of which side of the pin may be presented toward the oncoming ball.

These and other advantages of the invention will become more apparent to those versed in the art in the following description of the invention which is made in reference to one particular form as illustrated in the accompanying drawing in which:

Fig. 1 is a view in side elevation on a reduced scale of a finished bowling pin embodying the invention;

Fig. 2 is a view in perspective of one section of the shell entering into the pin;

Fig. 3 is a view in diametrical section through a portion of a mold in which a shell section is formed;

Fig. 4 is a view in central vertical section through a pair of matching shells in a mold being invested by a finishing envelope;

Fig. 5 is a view in transverse section on the line 5—5 in Fig. 4;

Fig. 6 is a detail in side elevation and partial section of the lower portion of the finished pin; and

Fig. 7 is a view in transverse section on the line 7—7 in Fig. 6.

The pin may be built up from a plurality of individual shell sections, herein shown as two in number and

designated by the numerals 10 and 11. These shell sections 10 and 11 are identical in shapes and dimensions. Each shell 10 and 11 is made to have precise dimensions and thickness of wall by any suitable method, one method being suggested by the mold section in Fig. 3, wherein there is one mold part 12 fitting over a second mold part 13 to leave a cavity therebetween which is the thickness and shape of the shell, a shell 10 being shown as having been formed between the two mold parts 12 and 13. One of these mold parts, the part 12, is shown having a plurality of pins 14 entering down and into the part 13 to form dowel pin holes 15 in the section 10. Preferably the holes 15 are carried entirely through the wall of the shell 10, the axis of each hole 15 being perpendicular to a diametrical flat face 16 of the section 10.

The section 10 has a half-round, cylindrical core print 17 at one end and 18 at the other end. Also the shell section 10 is provided with one or more openings 19 therethrough spaced on a normally horizontally disposed center line at the greatest diameter of the shell, three such holes being herein shown and opening entirely through the wall of the shell.

The shell section 11 is made in exactly the same manner and to have the same characteristics particularly in respect to the dowel pin holes 15 and the holes 19.

The two shells 10 and 11 are brought face to face after having those faces coated with a resin or plastic preferably the type which has the tendency to in effect dissolve the surface of the shells 10 and 11 so that eventually the two shells are intimately bonded one to the other over the entire abutting surfaces. The two shells so placed one against the other are then put in an investing mold herein shown, Fig. 4, as a two-part mold made of the members 20 and 21.

These parts 20 and 21 are so made that they will receive the core prints 17 and 18 of the respective sections 10 and 11 to center those sections within parts 20 and 21 to leave a uniform clearance between the outer surfaces of the sections and the faces of the parts 20 and 21 around the sections 10 and 11.

An important feature of locating these sections 10 and 11 within the parts 20 and 21 consists of the placing of a diaphragm or disc 22, one piece, within the sections 10 and 11 so that the disc 22 becomes in effect an integral and non-removable part of the finished pin. This member 22 is best shown in Fig. 7, and has a plurality of fingers 23, herein shown as six in number, passing out through the holes 19 in both of the sections 10 and 11, these pins 23 each having a length to extend outwardly beyond the outer surfaces 10 and 11 and to come into abutment with the faces of the mold parts 20 and 21, the length of the pins 23 extending beyond the outer face of the sections, the extensions being equal to the thickness of the intended envelope or investment to be placed about the sections 10 and 11 in this molding process. Also it is essential that the disc 22 contact the inner surface of each of the sections 10 and 11 circumferentially therearound by the disc surface 24. It is to be noted that this member 22 is not initially an integral part of the sections 10 and 11, but constitutes a third member of the pin. An initial purpose of the member 22 is to hold the central portion of the sections 10 and 11 equally spaced from the surfaces of the mold parts 20 and 21 so that there is left a space entirely around the sections 10 and 11 within the parts 20 and 21 of precise thickness to receive the final investment envelope 25 which is injected into the mold around the sections 10 and 11 under pressure.

As an additional anchoring means between the sections 10 and 11, there is preferably placed a dowel pin 26 in each of the holes 15 to extend across the parting line 27, Fig. 5, and then also preferably, the dowel pin in each instance is made to have a length less than the

entire combined length of the holes 15 which match by their ends across the parting plane 27 so that the investment envelope 25 may flow into the ends of the holes 15 presented on the outer sides of sections 10 and 11 whereby the investment material 25 tends to secure the pins 26 against displacement, and further these holes 15 beyond the outer ends of the dowel pins 26 serve as anchoring means for the investment 25.

Thus, when the shell sections 10 and 11 are assembled, prior to being put between the mold parts 20 and 21, they are in effect "cemented" one to the other; there is the disc-like member 22 within the two sections intimately in contact with their inner surfaces across the major diameter portions of the two sections; there are the fingers 23 extending through the holes 19 of the sections 10 and 11 into abutment with the mold parts 20 and 21; and there are cylindrical core prints 17 and 18 forming two half-cylindrical members 17 and 18 on the upper and lower ends of the section 10 and 11, so that when the structure thus assembled is placed between the parts 20 and 21 and those parts are closed to engage the core prints 17 and 18, the two shell sections 10 and 11 are further supported by means of the fingers 23 abutting these mold sections so that the sections are very precisely held between the parts 20 and 21 in order that the investment material 25 then flowed into the cavity around the shell sections 10 and 11 assumes a very uniform thickness, and in this investing process, this envelope material 25 intimately bonds to the wall of each of the sections 10 and 11, and across the outer parting plane 27 lines. Then when the invested pin is removed from the mold parts 20 and 21, all that remains to be done is to cut off the ends of the core prints 17 and 18 flush with the outer surface of the investing material 25. The ends of the fingers 23 are visible at the outer surface of the investment material 25, but this is desirable so that the impact of the ball happening to come exactly at the exposed end of a finger 23 will be taken directly by that pin member and transmitted through the member 22 to the opposite side of the pin. In so doing, the member 22 which is relatively thin as opposed to the overall thickness of the pin wall can absorb a considerable amount of the impact stress without any undue deformation, and thus, through its elasticity retain the pin in its normal and full-sized shape over long periods of usage. By use of this member 22, the pin will be permitted to be strained rather than being absolutely rigid which would tend to institute a fracture, and the strain is then overcome by the elasticity

of the overall structure including the member 22. The investing material 25 may be made out of the same material forming the wall of each of the sections 10—11, or it may be made of a more resilient material, yet it must be of such a characteristic that the impact of the bowling ball will not cause permanent indentations therein.

While I have herein shown and described my invention in the one particular form, showing a laminated wall pin, made of the two sections, it is obvious that a plurality of sections may be employed as above noted, and that the laminations do not necessarily have to be limited to two in number, although it is required that the overall thickness be held to a minimum, and other structural variations may be employed particularly in the method of producing the structure, I do not desire to be limited to that precise form beyond limitations that may be imposed by the following claim.

I claim:

A composite, hollow bowling pin comprising two identically shaped and dimensioned synthetic resin shell sections of uniform wall thickness, each section having longitudinally disposed matching planar, edge portion faces; said sections abutting each other throughout the extent of said faces; a disc of synthetic material disposed within said sections at a right angle to the axis of the combined sections and having a periphery in contact with the interior sides of the walls of said sections; fingers extending from said disc through and beyond said section walls; a second wall integrally extending completely circumferentially around the outsides and throughout the heights of said sections and bonded thereto; and means in addition to said second wall securing said sections together across their said abutting faces; said fingers extending through and being of the same resiliency as that of said second wall and being bonded thereto as an integral part thereof; and said disc being of less thickness than the combined thickness of said section wall and said second wall.

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