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3,238,609

MACHINE FOR APPLYING BANDS TO BOWLING PINS

Filed May 14, 1962

FIG. 1

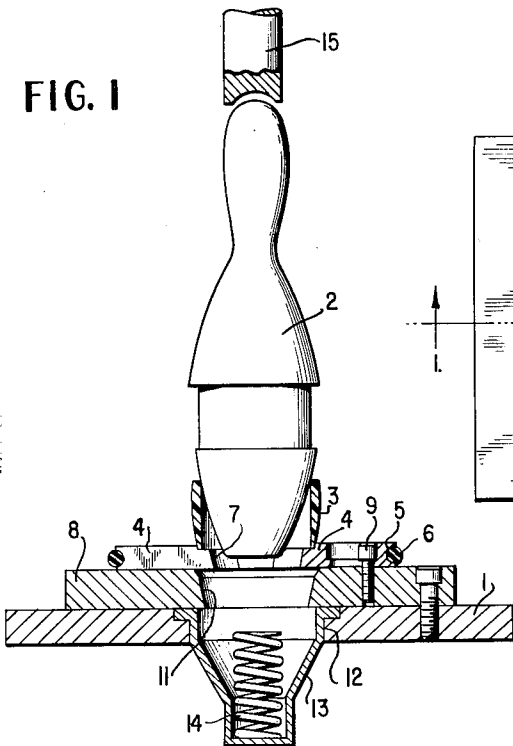


FIG. 2

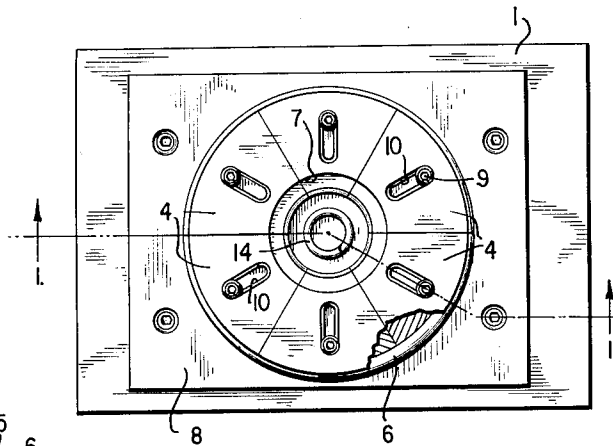
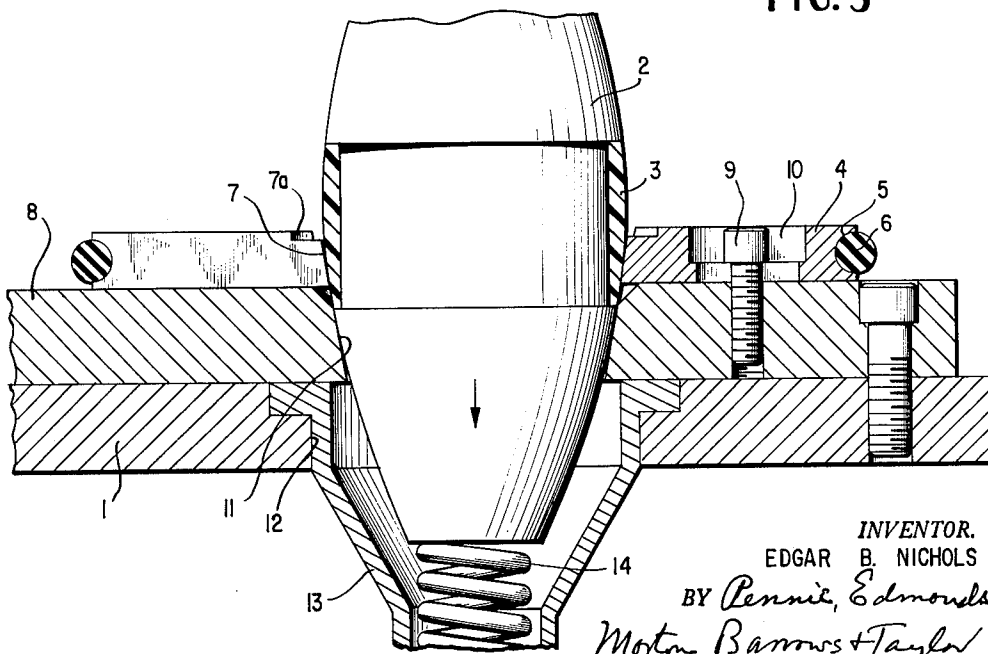


FIG. 3



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MACHINE FOR APPLYING BANDS TO BOWLING PINS

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3 Claims. (Cl. 29—235)

This invention relates to apparatus for applying bands to bowling pins and more particularly to apparatus for use in making the bowling pin disclosed in my application Serial No. 608,036, filed September 5, 1956, and now Patent No. 3,159,402. The bowling pin therein described is made by forming around the mid portion a wide shallow groove with shoulders at each edge, the shoulder at the upper edge being somewhat higher than the shoulder at the lower edge of the groove. A band of nylon is fitted in the groove, the band being of the same shape and dimensions as the groove with its outer surface curved to form with the contiguous portions of the pin a continuous curved surface of the same contour as the conventional all wood pin.

The band is preformed and is applied to the pin by heating the band so that it will stretch sufficiently to be pushed over the shoulder at the lower edge of the groove without exceeding the elastic limit of the nylon. The invention of this application is an apparatus for applying the band to the pin and seating it correctly in the groove.

In the accompanying drawings I have illustrated a preferred embodiment of my invention as it is now used in making my improved pins.

In the said drawings:

FIG. 1 is a vertical section on line 1—1 of FIG. 2 showing the pin and band and the parts of the apparatus at the beginning of the assembling operation;

FIG. 2 is a plan view of the apparatus shown in FIG. 1; and

FIG. 3 is a vertical section similar to FIG. 1 but on an enlarged scale and showing the position of the parts at the end of the assembling operation.

Referring to the drawings, 1 indicates the base plate of the machine which is supported by legs, not shown, or otherwise at a convenient height for the operator to place the pin 2 and band 3 on the band supporting members 4 in the position shown in FIG. 1.

The band supporting members 4 are sector shaped pieces of sufficient number, here shown as six, to form a complete circle. The pieces are grooved as shown at 5 on their outer circumferential surface to provide a seat for an extensible ring 6 of rubber which normally holds the pieces closely together with their radial edges in contact and with their inner curved ends 7 forming a continuous circle.

The inner curved ends 7 are inwardly inclined from top to bottom and curved to fit the surface of the band just below its mid diameter. The pieces 4 are provided on their upper faces at their inner ends with curved shoulders 7a which form when the pieces are in pin-receiving position, a seat for the lower end of the band 3. The pieces 4 are attached to the upper surface of a plate 8 by means of screws 9 positioned in radial slots 10 in the pieces 4.

The plate 8 has a circular opening 11 in axial alignment with the circular opening formed by the inner edges 7 of the pieces 4, and the surface of the metal of the plate surrounding the opening is inclined inwardly from

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top to bottom and curved to fit the surface of the pin just below the bottom edge of the band receiving groove.

The plate 8 is attached to the plate 1 and the plate 1 has an opening 12 beneath the opening 11 in the plate 8 and supported in the opening 12 is a cup 13 containing a compression spring 14 positioned to be engaged by the bottom of the pin when the pin is pushed downwardly from the position shown in FIG. 1 to the position shown in FIG. 3.

The pin is moved downward by means of a plunger 15 supported for vertical movement in axial alignment with the opening 12, and having on its bottom face a concave seat 16 for engaging the upper end of the pin. The plunger 15 may be operated either manually or by power by any suitable mechanism such as commonly used for punch presses and the like.

In operation the pin with the band over its lower end is placed on the pieces 4 with the lower edge of the band in the seat formed by the shoulders 7a and the head of the pin immediately beneath the plunger 15. The surface of the pin within the band-receiving groove is coated with a cement consisting essentially of a solution of nylon in a non-aqueous solvent. The plunger is lowered, thereby forcing the pin down into the band which has been sufficiently heated to expand without rupture as the lower shoulder of the groove passes through the band.

As the pin moves downwardly it engages the end faces of the pieces 4, forcing them radially outward until the shoulder at the lower edge of the groove is aligned with the lower edge of the band. At this point in the downward movement of the pin the band is free to contract into the groove and to move downwardly with the pin by reason of the engagement of the upper shoulder of the groove with the upper edge of the band. The downward movement is continued until the pin is seated in the opening 11 in the plate 10 as shown in FIG. 3. In this position the lower edge of the band is below the upper surface of the plate 10 so that the band is pressed inwardly on all sides by the pieces 4. When the plunger 15 moves upwardly the spring 14 expands, thereby lifting the pin so that it may be readily removed.

After the bands are applied as above described the pins are sanded to provide a continuous smooth surface for the nylon coating as described in my above mentioned application. As the wood is more affected by the sanding operation than the nylon the shoulders at the edges of the groove are somewhat higher than the thickness of the band at the adjacent ends. By reason of this the bands will be fully seated in the grooves without requiring narrow manufacturing tolerances.

The apparatus above described consists of a single unit for applying the band to one pin at a time, but it will be understood that a number of the units could be assembled on a suitable carrier to thereby increase the output per operator. It will also be understood that the invention is not limited to the specific structure disclosed except as defined in the appended claims.

I claim:

1. An apparatus for applying bands to bowling pins comprising a base plate having an annular opening of greater diameter than the end of the bowling pins, sector-shaped members mounted on said base plate for radial movement with respect to the axis of said opening, the inner ends of said members being curved to form, when

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in their innermost positions, an annular opening of a diameter greater than the end of the bowling pin but smaller than the diameter of the band, the curved surfaces of said members converging axially, and means for resiliently biasing said members inwardly.

2. The apparatus of claim 2 wherein the curved surface of the annular opening in said support also converges axially to form a continuation of the converging surfaces of said members when said members are moved radially outward.

3. The apparatus of claim 2 wherein the opening in said support is of greater diameter at the upper surface of said support than the outer diameter of the lower edge of said band.

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