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BALL POINT TIP WITH TANGENTIALLY-FORMED LIP PORTION  
AND METHOD OF FORMING SAME  
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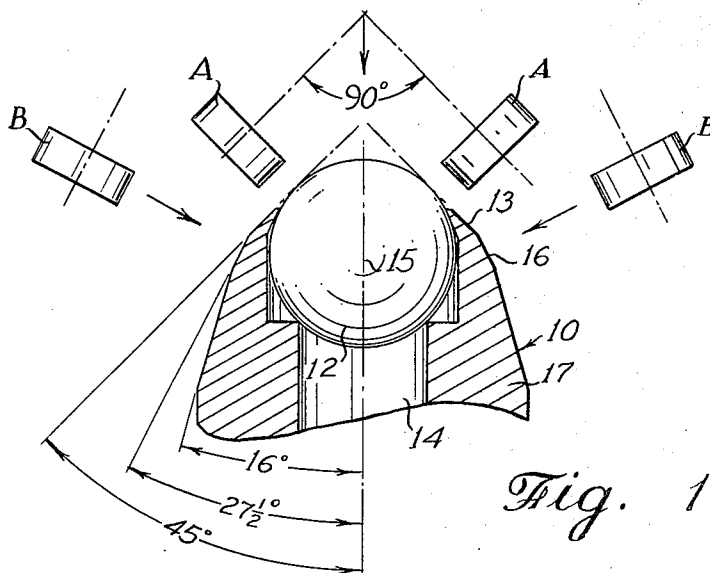


Fig. 1

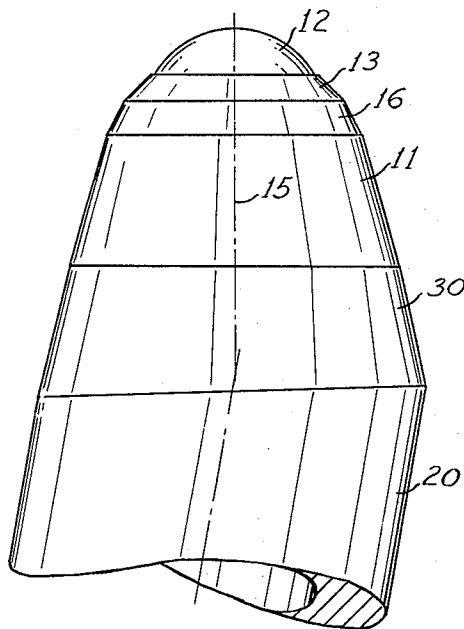


Fig. 2

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## BALL POINT TIP WITH TANGENTIALLY-FORMED LIP PORTION AND METHOD OF FORMING SAME

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1 Claim. (Cl. 120—42.4)

This invention relates to writing instruments and more particularly to an improved tip construction for a ball point pen and a method of making same.

The ball tip construction of the present invention is characterized by having a terminal lip portion that is formed as a shoulder surface which is tangential to the ball.

In the past ball tips terminated in a thin lip that presented only a point contact when the ball was brought in contact with the writing surface. This type of tip construction was quite susceptible to wear as the abrasive action of writing was concentrated at a point rather than being distributed over an area as in the present application.

In fact some prior art ball tip constructions attempted to overcome the lip wear problem by making an extremity of the point terminate in a shoulder surface; however, these prior art surfaced lips were not formed tangentially to the ball and were found to restrict the flexibility of writing angle as the point had to be held in the near vertical position to bring the ball in contact with the writing surface.

The novel step in the method by which the tangential shoulder lip of the present application is formed is to subject the lip portion to a spinning operation with a spinning tool that has a 90° included angle between the axis of its roller thereby forming the tangential shoulder adjacent the ball at a 45° angle.

These and other advantages and features of the present application will be apparent from consideration of the following specification taken in conjunction with the accompanying drawing, in which:

FIG. 1 is a diametrical cross sectional view of the ball tip construction of the present application showing its novel tangential shoulder lip and the spinning tool arrangement for forming same; and,

FIG. 2 is a side elevational view of an inclined ball tip construction incorporating the tangential shoulder lip of the present application.

Now referring to the drawing the ball tip unit is generally denoted by the numeral 10 having a housing 11 and a ball 12. It should be noted that the extremity of the tip is formed with a shoulder 13 that lies in a plane that is tangential to the ball 12. This is the novel structural feature of the present application that prevents wear to the lip of the ball tip housing.

This tangential shouldered lip feature is particularly important in an inclined tip construction as shown in FIG. 2 since the point is always held in a given position which concentrates the wear on a given edge of the lip as contrasted to the conventional point that is subject to various positioning depending upon its rotation in the user's hand.

The inclined point construction has a main cylindrical

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portion 20 and a conical portion 30 formed about an axis that is inclined to the axis of the cylindrical portion 20 and may be made to have internal structural features of the type disclosed and claimed in U.S. Patent 2,518,770, issued August 15, 1950 to Thomas B. Gibbs.

The ball tip construction of the present application has its terminal lip formed by a spinning operation with a tool having an included angle of 90° between the axis of the rollers. The sequence of steps in the present method are listed below with the novel step being Step 5:

Step 1.—Skive the outer surface of the housing at a 16° angle and counterbore to provide space for housing ball 12.

Step 2.—Drill central hole 14 along terminal axis 15 that connects tip 10 to ink reservoir (not shown).

Step 3.—Stamp in feed grooves.

Step 4.—Seat ball.

Note: (Steps 3 and 4 provide an internal construction of the type shown in U.S. Patent 2,390,636, issued December 11, 1945 to L. J. Biro).

Step 5.—Spin tangentially to the ball to form shouldered lip 13 having an angle of 45° with tool A that has the axis of its rollers positioned to form an included angle of 90°.

Step 6.—Spin rearwardly of said terminal shoulder lip surface 13 to free the ball and form secondary shoulder 16 at a 27.5° angle with tool B that has the axis of its rollers positioned to form an included angle of less than 90°.

As pointed out previously, Step 5 is the novel step present in the above discussed method of ball construction which produces the novel structural features of a terminal lip that is a shoulder surface that is tangential to the ball.

The embodiment here present is by way of illustration only and is meant to be no way restricted except as defined in the appended claim with just consideration being given to a full range of equivalents.

I claim:

In a ball point pen having a ball retained within a housing, the improvement of said housing being formed at its extremity with a shoulder surface lip portion adjacent said ball, said shoulder surface lip portion lying in a plane that is tangential to said ball to prevent wear at said lip, and a spun shoulder surface formed adjacent said tangential lip portion, said spun shoulder surface lying in a plane that does not intersect said ball to provide a freely rotatable ball.

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