April 24, 1962 E. SATTMANN 3,030,926

BALL POINT PEN

Filed Jan. 13, 1959

FIG. 1

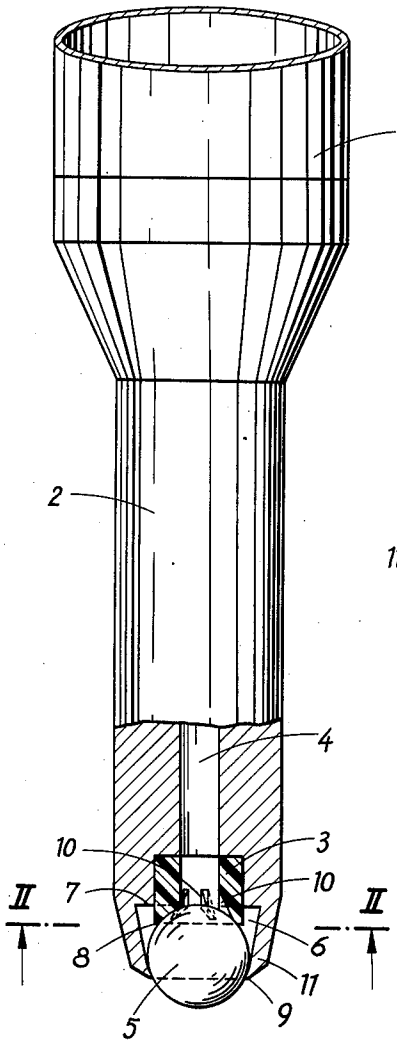
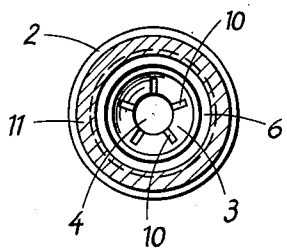


FIG. 2



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United States Patent Office 3,030,926 Patented Apr. 24, 1962

3,030,926

BALL POINT PEN

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Filed Jan. 13, 1959, Ser. No. 786,508
Claims priority, application Germany Mar. 28, 1958
6 Claims. (Cl. 120—42.4)

The present invention relates to ball-point pens. More particularly, the present invention relates to a ball-point pen with a ball beaded into the tip of the pen, wherein the socket of the ball is recessed at the inside to permit an increased flow of ink paste to pass in one particular writing direction in order to achieve a characteristic handwriting with lines of different thicknesses.

One way in which this object may be attained would be to enlarge the cross-sectional area of the ball-retaining socket at least at one point at the inside thereof or, alternatively, to provide an inner conical enlargement or recess which extends all around the ball, and to press the ball forwardly against the beading by means of a spring.

It has now been found that an economical production of the latter embodiment is not possible as it is very difficult to make the small spring of the proper dimensions and strength and to mount the same within the pen. Furthermore, such a mechanical spring action is not sufficiently reliable in the practical use of such a pen.

It is an object of the present invention to overcome these disadvantages of the last-mentioned construction by replacing the spring mounting of the ball by means of a resilient ball seat which consists of a cushion insert of a highly elastic material for supporting the ball within its socket. This elastic insert is provided with a bore extending the ink channel through which the ink paste is fed to the ball, and this bore merges into a plurality of additional ink channels in the elastic insert at the side thereof facing toward the ball.

Another feature of the present invention consists in the provision of an insert forming a resilient ball seat of the type as above described which has a very particular and greatly improved elasticity. Such elasticity is attained by extending the front edge of the insert which faces toward the ball so as to project freely for a certain distance beyond the base of the conical ball socket. Therefore, when writing the ball is usually pressed upwardly in an inclined direction, the projecting part of the resilient ball seat can also yield in a lateral direction. This results in an increase in the size of the annular slot at the side of the ball at which the writing pressure is applied which, in turn, results in an increased supply of ink paste to the ball and from the ball upon the paper. If the writer increases the pressure upon the pen, especially during the downstrokes, toward his body, he will thus produce heavy lines, while during the lighter upstroke, he will produce thin lines. Consequently, the writing produced will be characteristic of a person's handwriting with pen strokes of varying thickness similar to those attained by a regular pen point.

These objects, features, and advantages of the present invention will appear in greater detail from the following description thereof, particularly when read with reference to the accompanying drawings, in which—

FIGURE 1 shows an enlarged side view partly in section of the front end of a ball-point pen according to the invention; while

FIGURE 2 shows a cross section taken along line II—II of FIGURE 1.

FIGURE 1 of the drawings shows the reduced shaft-like end 2 of a ball-point filler 1 with a ball 5 mounted in the front end thereof. This ball 5 is held by an inwardly bent beading 9 within a socket 11 which forms a conical

ball chamber 6, and it normally rests under a slight pressure upon a ball seat formed by a resilient insert 3 which is secured within a recess in shaft 2 above and coaxial to the annular bottom 7 of socket 11. This ball-seat insert 3 consists of an elastic material and has a central bore forming a continuation of the bore 4 in the shaft 2 leading to the ink-paste reservoir in the main body of filler 1. As indicated in FIGURE 2, the seat portion at the front end of the resilient insert 3 is preferably provided with a plurality of ink channels 10 leading from bore 4 to the front edge 8 of insert 3 so as to insure that a proper amount of ink will be supplied to ball 5 and be retained thereon despite the wiping action of the resilient ball seat.

The ball-seat insert 3 is preferably designed so that the front edge 8 thereof projects to a certain extent beyond the annular base 7 of the conical ball chamber. Thus, when in writing with the ball-point pen according to the invention, an increased pressure is exerted upon ball 5 in an oblique direction, the freely projecting portion of insert 3 will provide the ball with a lateral support of a great resilience.

The conical inner shape of socket 11 is most easily attained by first making the wall thereof cylindrical and then beading it conically inwardly toward ball 5.

The ball seat insert 3 is preferably produced by a spraying or extrusion process from a synthetic plastic, such as, for example, a highly molecular polyethylene or the like.

When the ball-point pen according to the invention is not in use, the ball-seat portion of the resilient insert 3 presses the ball 5 uniformly against the beading 9. When writing with this pen and especially during a heavy downstroke thereof, ball 5 will be pressed upwardly in an oblique direction and the resilient insert 3 will then not only act like a spring upon the ball but its very resilient projecting portion 8 will also yield in a lateral direction. This, in turn, will permit an increased supply of ink paste to the ball at the opposite side of the resilient ball seat and especially through the ink channels 10 at that side. The rotary movement of the ball will therefore be elastic similar to action of a normal pen point, and the supply of ink paste taken along by the ball will depend upon the pressure on the ball as it is passed along the paper. Thus, it is possible to vary the pen stroke and to make heavy downstrokes and light upstrokes with lines of corresponding thicknesses.

Although my invention has been illustrated and described with reference to the preferred embodiments thereof, I wish to have it understood that it is in no way limited to the details of such embodiments, but is capable of numerous modifications within the scope of the appended claims.

Having thus fully disclosed my invention, what I claim is:

1. In a ball-point pen having a shaft ending in a beaded tip defining a socket having a hollow conical shape tapering outwardly toward said beaded tip, and a ball within said socket and retained therewithin by said beaded tip, the improvement comprising a tubular member of resilient material in said shaft and extending into said socket, said member being deformable in axial and lateral directions to provide for said ball an elastic seat which allows said ball, under the influence of pressure exerted thereon during writing, to move in an oblique direction, said member having an outer diameter smaller than that of said ball and resiliently pressing said ball against said beaded tip so that said ball normally engages said beaded tip along an annular surface.

2. A ball-point pen as defined in claim 1 and having an ink paste reservoir and an ink channel in said shaft communicating with said reservoir and extending toward the tip of the pen, wherein said elastic ball seat forms an

insert in said shaft having a central bore forming a continuation of said ink channel, said ball seat having a plurality of additional ink channels therein at the end thereof facing toward said ball and communicating with said first ink channel, said additional channels extending in radial direction.

3. A ball-point pen as defined in claim 1, wherein said conical socket has an annular bottom and wherein the front end of said elastic ball seat projects from said annular bottom of said conical socket toward said ball and forms a highly elastic portion normally in annular engagement with said ball in said socket.

4. A ball-point pen as defined in claim 3 and having an ink paste reservoir and an ink channel in said shaft communicating with said reservoir and extending toward the tip of the pen, wherein said elastic ball seat forms an insert in said shaft having a central bore forming a continuation of said ink channel, said insert having a plurality of additional ink channels therein at the end thereof facing toward said ball and terminating in said projecting portion, said additional ink channels communicating with said first ink channel.

5. A ball-point pen as defined in claim 2, wherein said insert forming the ball seat consists of an elastic synthetic plastic which is capable of being shaped by extrusion.

6. A ball-point pen as defined in claim 5, wherein said plastic is a highly molecular polyethylene.

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