

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11)

EP 0 969 973 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:

05.06.2002 Bulletin 2002/23

(21) Application number: **98913056.2**

(22) Date of filing: **24.03.1998**

(51) Int Cl.7: **B43K 7/12, B43K 8/24**

(86) International application number:
PCT/US98/05688

(87) International publication number:
WO 98/43828 (08.10.1998 Gazette 1998/40)

(54) **MARKING INSTRUMENTS**

SCHREIBGERÄT

INSTRUMENTS DE MARQUAGE

(84) Designated Contracting States:
DE FR GB IT

(30) Priority: **27.03.1997 GB 9706461**

(43) Date of publication of application:
12.01.2000 Bulletin 2000/02

(73) Proprietor: **Berol Corporation**
Freeport, IL 61032 (US)

(72) Inventors:
• **STEVENS, Christopher, John**
Reading, Berkshire RG4 8BD (GB)

• **SIMMS, Graham, John**
Reading, Berkshire RG4 9EB (GB)

(74) Representative:
Ebner von Eschenbach, Jennifer et al
Ladas & Parry,
Dachauerstrasse 37
80335 München (DE)

(56) References cited:
US-A- 2 946 311 **US-A- 3 594 091**
US-A- 4 544 297

EP 0 969 973 B1

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

[0001] This invention relates to marking instruments and in particular the invention is concerned with retractable marking instruments, that is marking instruments of the type comprising a barrel, and a member carrying a marking tip which is movable relative to the barrel, frequently by means of a retraction mechanism included within a rear end portion of the barrel, for displacement between an operative position in which the marking tip protrudes from the open forward end of the barrel, and an inoperative position in which the marking tip is retracted within the barrel. Retractable marking instruments are convenient when the marking tip is of a kind which will not dry out during periods of non-use, such as a ball point pen which use a viscous ink, since it is not then required to form an enclosure around the tip when it is retracted. For other kinds of marking instrument, such as pens with nibs or ball points which use liquid ink, fibre tip pens, felt tip markers, etc where there is a tendency for the marking fluid to dry out at the tip and cause problems when the instrument is to be next used again, it is most common for the barrel to be supplied with a removable cap for fitting to the barrel to enclose the tip during periods of non-use. Separate caps are effective in avoiding the dry out problem, but are not ideal in that they can become misplaced or lost. Various attempts have been made to include a sealing arrangement within the barrel of a retractable marking instrument, but none have proved both satisfactory and acceptable. Many of the prior art sealing arrangements demand the use of large barrel diameters, are expensive to manufacture, or can not ensure a satisfactory seal. One example of such is United States Patent 3,594,091 which provides a perforated rubber disk fixed within the front portion of the barrel. Another is United States Patent 4,544,297 which provides an O-ring fixed within the barrel.

[0002] According to the present invention there is provided a marking instrument including a barrel having an opening at the forward end thereof, a member carrying a marking tip for movement through said opening between an operative position protruding from said barrel and an inoperative position retracted within said barrel, an annular sealing element arranged within said barrel for frictional contact with an inner surface of said barrel and said member characterized in that said sealing element rolls therebetween during movement of said marking tip between said operative and inoperative positions.

[0003] A sealing element as provided in a marking instrument according to the invention is economic to manufacture and assemble within the barrel and it can provide an effective sealing performance without demanding a barrel of large diameter. The sealing effect can be produced by the sealing element in different ways. The sealing element may close the barrel interior forwardly of the retracted tip to form an enclosed space around

the tip. Alternatively the sealing element may contact or envelope the retracted marking tip to seal off the tip. The sealing element is conveniently formed substantially in the shape of a torus and it may have slits or slots around its periphery to reduce the stresses created in the material of the sealing element during its rolling motion. The sealing element may be made of a soft rubber or rubber-like material with a substantially circular initial cross-section which is deformed into oval shape when the sealing element is engaged between the barrel and the marking member. It may be advantageous for the sealing element to roll through substantially one complete revolution during movement of the marking tip between the inoperative and operative positions so that, in the normal rest positions of the sealing element, the natural inner and outer surfaces of the sealing element are at the inner and outer peripheries, respectively. To relieve compressive stresses on the sealing element when the marking tip is in the extended operative position, the internal barrel surface over which the sealing element rolls can be arranged to taper rearwardly.

[0004] In order to allow the length of stroke of the marking tip between the operative and inoperative positions to be reduced without the sealing element becoming unduly stressed in its stationary positions, a lost motion connection can be included enabling the member carrying the marking tip to move relative to the barrel, without being accompanied by rolling of the sealing element, over a forward portion of the stroke when the sealing element does not make contact with the marking tip. Conveniently the lost motion connection is between the sealing element and the member carrying the marking tip and comprises a collar slidable longitudinally on the member. During advancement of the marking tip from the retracted position, the sealing element initially rolls between the barrel and the marking tip and then rolls off of the marking tip and onto the collar. Once the sealing element is substantially clear of the marking tip, the member carrying the marking tip continues to move forwardly to bring the marking tip into the operative position while the sealing element and collar remain stationary relative to the barrel. To help ensure reliable operation of the lost motion mechanism over a large number of advancement and retraction movements of the marking tip, in a preferred construction the collar is biased to a forward most position by a spring, such as a coil compression spring.

[0005] The invention is especially applicable to a writing instrument in which a replaceable refill unit is accommodated in the pen barrel and includes an ink reservoir as well as a writing tip. With such pens the sealing element could conveniently be arranged for replacement with the refill unit.

[0006] A full understanding of the invention will be gained from the following detailed description of some embodiments, reference being made to the accompanying drawings, in which:

Figure 1 is an axial section through a forward end portion of a retractable pen according to the invention, the writing tip being in a retracted position; Figure 2 shows the pen of Figure 1 with the writing tip at an intermediate position during movement from the retracted position to an operative position; Figure 3 shows the pen of Figure 1 with the writing tip in the extended operative position; Figure 4 shows in perspective a sealing element; Figure 5 shows in perspective view a modified sealing element; Figure 6 shows an alternative method of sealing the pen writing tip; Figure 7 shows on a larger scale the sealing arrangement of Figure 6; Figure 8 is an axial section through the forward end part of another pen embodying the invention; Figures 9, 10 and 11 are views corresponding to Figures 1, 2 and 3 showing a modified construction; Figures 12, 13 and 14 are views corresponding to Figures 1, 2 and 3 showing another modified construction; Figures 15, 16 and 17 are views corresponding to Figs 1, 2 and 3 showing an embodiment incorporating a lost motion device; and Figures 18, 19 and 20 are views corresponding to Figs. 15, 16 and 17 showing an embodiment with a spring collar lost motion device. Figures 21, 22 and 23 correspond to Figs. 18, 19, 20 and illustrate a modification to that embodiment; Figures 24, 25, 26 correspond to Figs 18, 19, 20 and illustrate another modification of that embodiment; Figure 27 is a cross-section through an alternative form of sealing element; Figure 28 is a partial cross-section showing the sealing element of Figure 27 fitting within a ball pen; Figure 29 is a cross-section through a sealing element having a diaphragm; and Figure 30 is a view similar to Figure 28 showing another form of sealing element.

[0007] The retractable pen partially illustrated in Figures 1-3 has a barrel 1 housing a replaceable refill unit 2 which, in a manner well known in the art, includes an ink reservoir and a writing tip 3. The pen includes a retraction mechanism for advancing and retracting the refill unit relative to the barrel for moving the writing tip from the retracted inoperative position shown in Figure 1 to the extended operative position of Figure 3 in which the marking tip protrudes through the opening 4 at the forward end of the barrel. The retraction mechanism has not been shown as it forms no part of the present invention and it may be any of the many forms of retraction mechanisms known in the art which provide for axial displacement of the refill unit, preferably without requiring the unit to rotate.

[0008] Received within the barrel 1 for cooperation

with the refill unit 2 is an annular sealing element 6 having the form of a torus with a small central through hole 7 as shown in Figure 4. The sealing element is made of a soft rubber or rubber-like material, such as a copolymer, so that it makes frictional, non-sliding contact with the interior surface of the barrel 1 and with the refill unit 2. The sealing element has a substantially circular initial cross-section, but can be readily deformed into an oval shape between the barrel and refill unit. In the retracted position of the marking tip the sealing element 6 closes the internal cross-section of the barrel forwardly of the writing tip, the sealing element being radially compressed within the barrel so that the hole 7 through the sealing element is held closed. When the refill unit is driven forwards by actuation of the retraction mechanism, the writing tip 3 is pushed through the sealing element 6, the central hole 7 becoming opened up due to the soft nature of the material. As the refill unit continues its advancement, the sealing element 6 rolls between the barrel and the refill unit, as indicated by the arrows in Figure 2, and is displaced towards the forward end of the barrel, the sealing element occupying the position shown in Figure 3 when the writing tip is in the fully extended operative position. When the refill unit is subsequently retracted again, the sealing element 6 rolls back to the Figure 1 position so as to close off the barrel. If it is required or desired to form a closed space around the retracted writing point, a further sealing device of any convenient form can be provided between the barrel and the refill unit rearwardly of the sealing element 6. The further sealing device could be provided by a second rolling sealing element. To reduce the internal stresses within the material of the sealing element when it is at its normal rest positions of Figures 1 and 3, it is beneficial to arrange for the sealing element to roll through a complete number of turns, preferably one turn, when the refill unit moves between the operative and inoperative positions. In this way the sealing element does not become parked in a completely or partially inside-out condition. To reduce stresses created during the rolling motion, the sealing element 6 can be provided with slots 10 around its periphery as shown in Figure 5. When the sealing element is compressed within the barrel the slots can become closed up so that a sealing cooperation between the sealing elements and the barrel is still obtained.

[0009] With some types of marking tip it is possible for the sealing element 6 to be effective in preventing dry out of marking fluid without having to seal across the barrel cross-section. Figures 6 and 7 show such a sealing arrangement in connection with a roller ball point. The hole 7 through the sealing element 6 remains open, but the sealing element engages the tip so that the annular orifice defined between the ball 12 and the rim 14 of the tip is covered by the sealing element which makes contact with the ball and rim.

[0010] In many instances the sealing element will remain in correct position within the barrel without requir-

ing any special measures to be taken. However, if desirable or found necessary a stop means can be included in the barrel or perhaps on the refill unit, to define one or both end positions of the sealing element. Figure 8 shows an embodiment in which a rear stop is provided by an internal shoulder 15 in the barrel 1, the sealing element being located adjacent the shoulder when the refill unit 2 is retracted. Figure 8 also depicts the sealing element closing off the barrel to seal a space 16 around the writing tip. Figures 12-14 illustrate an embodiment in which opposed shoulders 15A and 15B are spaced apart along the barrel to define front and rear end stops, respectively. The sealing element 6 is confined between the two shoulders and rolls along the barrel between the shoulders during projection and retraction movements of the refill unit. The sealing element abuts the shoulder 15A when the writing tip is fully projected and abuts the shoulder 15B when the refill unit is fully retracted. In the fully retracted position the sealing element seals the writing tip as described above. Confining the sealing element between opposed stops will preclude any tendency for the sealing element to migrate along the barrel or refill unit, which could have an adverse effect on its sealing performance.

[0011] In the embodiments described above the barrel has a substantially constant diameter over the internal surface portion along which the sealing element is arranged to roll. Figures 9-11 illustrate another construction in which the barrel surface portion 18 with which the sealing element has rolling contact tapers rearwardly. As a result of this barrel configurations, the sealing element is allowed to expand when the writing tip is advanced to its operative position (Figure 11) relieving the stresses within the material of the sealing element when it is not required to perform a sealing function, and the sealing element 6 becomes radially compressed when the writing tip is retracted (Figure 9) to ensure an effective seal at or adjacent the tip 3.

[0012] As mentioned above it may be desirable for the sealing element to roll through a complete turn to avoid it becoming parked in a stressed condition when the refill unit occupies the fully retracted or fully projected position. This, in addition to the fact that the sealing element itself moves longitudinally of the barrel when the refill unit is displaced between the retracted and operative positions, means that the stroke of the refill unit between these positions may be relatively long. This potential drawback can be avoided by providing the refill unit with a lost motion device, e.g. a collar which is movable longitudinally relative to the writing tip. An embodiment incorporating a sliding collar arrangement is illustrated in Figures 15 to 17. The collar has the form of a sleeve 20 which is slidable on the reduced diameter forward end portion of the refill unit 2 between a stop defined adjacent the writing tip and a shoulder formed by an increase in diameter of the refill unit 2. In the retracted position of the refill unit (Fig. 15) the sealing element 6 seals off the writing tip 3 in the same manner as described above

with reference to the embodiment of Figures 1-3. When the refill unit is displaced forwardly towards the operative position, the sealing element 6 rolls forwardly with respect to the barrel 1 and rearwardly relative to the refill unit 2 until it is engaged substantially completely with the sleeve, as shown in Figure 16. Upon continued forward displacement of the refill unit 2 it slides forwardly relative to the sleeve 20 and the sealing element 6 which remain stationary within the barrel 1, until the writing tip 3 reaches its operative position, as shown in Figure 17. During subsequent retraction of the refill unit the movements are reversed, the refill unit 2 sliding rearwardly until the stop adjacent the writing tip engages the forward end of the sleeve 20 and forces the sleeve to move with the refill unit. thereby causing the sealing element 6 to roll into position to seal closed the writing tip. The forward end of the barrel tapers towards the opening 4 at its front end and this produces compression of the sealing element as it rolls forwardly in the barrel to ensure good frictional cooperation with the sleeve in order to obtain the desired movements of the sleeve and sealing element relative to the refill unit 2. To help ensure that the sleeve is not displaced prematurely on the refill unit during protection of the tip it is preferably arranged to have frictional contact with the refill unit, for which purpose the sleeve may be slit longitudinal so that the sleeve grips the refill unit, or the sleeve can be dimpled. Other ways of achieving the desired frictional cooperation are of course possible. During retraction of the writing tip the frictional cooperation between the sleeve and refill unit should allow the sleeve to slide to a forwardmost position before the sealing element is caused to roll.

[0013] In the retractable pen of Figures 18 to 20, the collar of the lost motion device is biased to a forward most position on the refill unit by a spring 22. The spring is a coil spring which is interposed between the collar 20 and a shoulder defined between the reduced diameter front end part of the refill unit and a larger diameter rear part of the refill unit. As shown the collar 20 is formed integrally with the spring by a closely coiled spring section. The sealing arrangement in this embodiment functions as described in connection with Figures 15 to 17, but the spring 22 provides additional reliability in ensuring correct sliding movement of the collar over a large number of operations of the pen retraction mechanism. With this embodiment a shoulder on the refill unit limiting forward displacement of the collar 20 is not essential and as an alternative the rear end of the spring 22 can be anchored to the refill unit so the spring also serves to limit forward movement of the collar 20 relative to the refill unit.

[0014] The embodiment of the retractable pen shown in Figures 21 to 23 is the same as that of Figures 17 to 20 except that the sealing element is accommodated between front and rear stop shoulders 15A and 15B within the barrel 1, as described above in relation to Figures 12-14. The stop shoulders limit the movement of

the sealing element 6 and define its two end positions within the barrel 1, thereby achieving additional security of correct operation of the sealing arrangement over long term use of the writing instrument during which the writing tip may be advanced and retracted a very large number of times. It will be noted that the stop shoulders 15A, 15B are closer together in the pen of Figs. 21-23, compared with that of Figs. 12-14, since the movement of the sealing element within the barrel is reduced as a consequence of the lost motion device constituted by the collar 20.

[0015] There is shown in Figures 24 to 26 an embodiment of a retractable pen which is identical to that of Figures 21 to 23 other than for the fact that the barrel section between the stop shoulders 15A, 15B includes a forward portion which tapers inwardly. As well as ensuring good frictional engagement between the sealing element 6 and the collar 20 when the writing tip 3 is advanced, the tapered portion allows the conical nose of the barrel to be made shorter, which may be desirable with a view to improving tip visibility during writing.

[0016] A modified form of sealing element suitable for use in any of the embodiments described above is illustrated in Figures 27 and 28. As mentioned above in relation to Figures 6 and 7, the sealing element can seal a ball point tip by closing the annular orifice between the ball and the rim of the tip, the sealing element being arranged to contact both ball and rim for this purpose. To provide added sealing reliability the sealing element 6 of Figure 27 is formed with a conical inner sealing surface portion 25 which is more strongly inclined to the axis of the tip than that surface portion of a sealing element of circular cross-section which engages the writing tip. In this way reliable sealing contact between the ball and rim of the tip is ensured. As may be seen from Figure 28 which shows the sealing element of Figure 27 installed in a pen and in sealing cooperation with the ball 12 and rim 14 of the writing tip. It may be noted that the second conical surface 26 is provided so that the sealing element is symmetrical and does not therefore require orientation during assembly with the refill unit. A conical sealing surface for engagement with the writing tip is not essential of course and Figure 30 illustrates an embodiment in which the sealing element 6 has a concave surface 28. This surface can lie at a large angle to the writing tip axis in the region where the surface makes contact with the ball 12 and rim 14 of the writing tip 2 so as to ensure effective sealing of the retracted tip.

[0017] There can be a very long delay between a refill unit being manufactured and it being first used in a writing instrument avoiding dry out of ink during this period is of crucial importance. The sealing element of Figure 29 is adapted to provide additional security against dry out of ink before use of a refill unit by tightly sealing around the tip and for the purpose the sealing element incorporates a membrane 30, conveniently moulded integrally with the sealing element, to close the passage through the centre of the sealing element. At the time of

first use, when the tip is projected for writing, it is pushed through and ruptures the membrane, after which the sealing element functions as described above in relation to the previous embodiments.

Claims

1. A marking instrument including a barrel (1) having an opening (4) at the forward end thereof, a member (2) carrying a marking tip (3) for movement through said opening (4) between an operative position protruding from said barrel (1) and an inoperative position retracted within said barrel (1), an annular sealing element (6) arranged within said barrel (1) for frictional contact with an inner surface of said barrel (1) and said member (2) **characterized in that** said sealing element (6) rolls therebetween during movement of said marking tip (3) between said operative and inoperative positions.
2. A marking instrument according to claim 1, **characterized in that** the sealing element (6) is formed substantially in the shape of a torus.
3. A marking instrument according to claim 1 or 2, **characterized in that** the sealing element (6) has slots (10) spaced around the periphery thereof.
4. A marking instrument according to claim 1 to 3, **characterized in that** a hole (7) through the sealing element (6) is closed by radial compression of said sealing element (6) within the barrel (1) when the marking tip (3) is in the inoperative position.
5. A marking instrument according to any of claims 1 to 4, **characterized in that** the sealing element (6) contacts the marking tip (3) in the retracted inoperative position thereof.
6. A marking instrument according to any of claims 1 to 5, **characterized in that** the annular sealing element (6) has a substantially conical or concave inner surface for cooperation with the marking tip (3).
7. A marking instrument according to any of claims 1 to 6, **characterized in that** the interior of the barrel includes stop means (15, 15B) to limit rolling movement of the sealing element (6) rearwardly along said barrel (1).
8. A marking instrument according to any of claims 1 to 7, **characterized in that** the interior of the barrel (1) includes stop means (15A) to limit movement of the sealing element (6) forwardly along the barrel (1).
9. A marking instrument according to any of claims 1

to 8, **characterized in that** the barrel (1) includes a rearwardly tapering internal surface portion (18) along which the sealing element (6) rolls when the marking tip (3) is moved between the operative and inoperative positions.

10. A marking instrument according to any of claims 1 to 9, **characterized in that** the barrel (1) includes a forwardly tapering internal surface portion along which the sealing element (6) rolls when the marking tip (3) is advanced from the inoperative position to the operative position.
11. A marking instrument according to any of claims 1 to 10, **characterized in that** the sealing element (6) rolls through substantially one or more complete revolutions during movement of the marking tip (3) between the inoperative and operative positions.
12. A marking instrument according to any of claims 1 to 10, **characterized in that** a lost motion connection is provided and allows the marking tip (3) to move longitudinally of the barrel (1) without causing rolling motion of the sealing element (6) during a forward end part of the stroke of movement of said marking tip (3) between the operative and inoperative positions.
13. A marking instrument according to claim 12, **characterized in that** the lost motion connection comprises a lost motion device positioned between the sealing element (6) and the member (2) carrying the marking tip (3).
14. A marking instrument according to claim 13, **characterized in that** the lost motion device comprises a collar (20) slidably carried on the member (2).
15. A marking instrument according to claim 14, **characterized in that** the collar (20) is urged forwardly on the member (2) by a spring (22).
16. A marking instrument according to claim 15, **characterized in that** the spring (22) is a coil spring, a forward part of the spring (22) having the coils thereof closely coupled and forming the collar (20).
17. A marking instrument according to any of the preceding claims, **characterized in that** the sealing element (6) is provided with a membrane (30) closing the hole (7) therethrough, said membrane (30) being rupturable by advancement of the marking tip (3) during movement from the inoperative position to the operative position.

Patentansprüche

1. Schreibgerät, das einen Schaft (1) mit einer Öffnung (4) an seinem vorderen Ende, ein Element (2), das eine Schreibspitze (3) zur Bewegung durch die Öffnung (4) zwischen einer Arbeitsposition, in der sie aus dem Schaft (1) vorragt, und einer Ruheposition trägt, in der sie in den Schaft (1) eingezogen ist, und ein ringförmiges Abdichtungselement (6) enthält, das für Reibungskontakt mit einer Innenfläche des Schaftes (1) und dem Element (2) in dem Schaft (1) angeordnet ist, **dadurch gekennzeichnet, daß** das Abdichtungselement (6) während der Bewegung der Schreibspitze (3) zwischen den Arbeits- und Ruhepositionen dazwischen rollt.
2. Schreibgerät nach Anspruch 1, **dadurch gekennzeichnet, daß** das Abdichtungselement (6) im wesentlichen in Gestalt eines Torus ausgebildet ist.
3. Schreibgerät nach Anspruch 1 oder 2, **dadurch gekennzeichnet, daß** das Abdichtungselement (6) Schlitze (10) aufweist, die um dessen Umfang im Abstand angeordnet sind.
4. Schreibgerät nach Anspruch 1 bis 3, **dadurch gekennzeichnet, daß** ein Loch (7) durch das Abdichtungselement (6) durch radiales Zusammendrücken des Abdichtungselements (6) in dem Schaft (1) verschlossen wird, wenn die Schreibspitze (3) sich in der Ruheposition befindet.
5. Schreibgerät nach irgendeinem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, daß** das Abdichtungselement (6) die Schreibspitze (3) in deren eingezogenen Ruheposition berührt.
6. Schreibgerät nach irgendeinem der Ansprüche 1 bis 5, **dadurch gekennzeichnet, daß** das ringförmige Abdichtungselement (6) eine im wesentlichen konische oder konkave Innenfläche zur Zusammenwirkung mit der Schreibspitze (3) aufweist.
7. Schreibgerät nach irgendeinem der Ansprüche 1 bis 6, **dadurch gekennzeichnet, daß** das Innere des Schaftes Anschlagmittel (15, 15B) zum Begrenzen der Rollbewegung des Abdichtungselements (6) in rückwärtiger Richtung entlang des Schaftes (1) enthält.
8. Schreibgerät nach irgendeinem der Ansprüche 1 bis 7, **dadurch gekennzeichnet, daß** das Innere des Schaftes (1) Anschlagmittel (15A) zum Begrenzen der Bewegung des Abdichtungselements (6) nach vorne entlang dem Schaft (1) enthält.
9. Schreibgerät nach irgendeinem der Ansprüche 1 bis 8, **dadurch gekennzeichnet, daß** der Schaft (1)

einen sich nach hinten verjüngenden Innenflächenbereich (18) enthält, entlang dessen das Abdichtungselement (6) rollt, wenn die Schreibspitze (3) zwischen den Arbeits- und Ruhepositionen bewegt wird.

10. Schreibgerät nach irgendeinem der Ansprüche 1 bis 9, **dadurch gekennzeichnet, daß** der Schaft (1) einen sich nach vorne verjüngenden Innenflächenbereich enthält, entlang dessen das Abdichtungselement (6) rollt, wenn die Schreibspitze (3) aus der Ruheposition zur Arbeitsposition vorbewegt wird.

11. Schreibgerät nach irgendeinem der Ansprüche 1 bis 10, **dadurch gekennzeichnet, daß** das Abdichtungselement (6) über im wesentlichen eine oder mehrere vollständige Umdrehung(en) während der Bewegung der Schreibspitze (3) zwischen den Ruhe- und Arbeitspositionen rollt.

12. Schreibgerät nach irgendeinem der Ansprüche 1 bis 10, **dadurch gekennzeichnet, daß** eine Leergangverbindung vorgesehen ist und der Schreibspitze (3) erlaubt, sich in Längsrichtung des Schaftes (1) zu bewegen, ohne eine Rollbewegung des Abdichtungselements (6) während eines vorderen Endteils des Bewegungshubs der Schreibspitze (3) zwischen den Arbeits- und Ruhepositionen zu verursachen.

13. Schreibgerät nach Anspruch 12, **dadurch gekennzeichnet, daß** die Leergangverbindung eine Leergangeinrichtung umfaßt, die zwischen dem Abdichtungselement (6) und dem die Schreibspitze (3) tragenden Element (2) positioniert ist.

14. Schreibgerät nach Anspruch 13, **dadurch gekennzeichnet, daß** die Leergangeinrichtung einen gleitfähig auf dem Element (2) getragenen Bund (2) umfaßt.

15. Schreibgerät nach Anspruch 14, **dadurch gekennzeichnet, daß** der Bund (2) von einer Feder (22) auf dem Element (2) nach vorne getrieben wird.

16. Schreibgerät nach Anspruch 15, **dadurch gekennzeichnet, daß** die Feder (22) eine Spiralfeder ist, wobei ein vorderer Teil der Feder (22) deren dicht gekoppelten Spiralen aufweist und den Bund (20) bildet.

17. Schreibgerät nach irgendeinem der vorangehenden Ansprüche, **dadurch gekennzeichnet, daß** das Abdichtungselement (6) mit einer das dort hindurchgehende Loch (7) verschließenden Membran (30) versehen ist, wobei die Membran (30) durch Vorbewegen der Schreibspitze (3) während der Bewegung aus der Ruheposition zur Arbeitsposition

zerreißbar ist.

Revendications

5

1. Instrument de marquage comportant un corps (1) ayant une ouverture (4) à son extrémité avant, un organe (2) portant une pointe de marquage (3) pour un mouvement à travers ladite ouverture (4) entre une position active en saillie à partir dudit corps (1) et une position inactive rétractée à l'intérieur dudit corps (1), un élément d'étanchéité annulaire (6) agencé à l'intérieur dudit corps (1) pour un contact à frottement avec une surface intérieure dudit corps (1) et ledit organe (2), **caractérisé en ce que** ledit élément d'étanchéité (6) roule entre ceux-ci pendant le mouvement de ladite pointe de marquage (3) entre lesdites positions active et inactive.

10

15

20

2. Instrument de marquage selon la revendication 1, **caractérisé en ce que** l'élément d'étanchéité (6) est formé sensiblement sous la forme d'un tore.

25

3. Instrument de marquage selon la revendication 1 ou 2, **caractérisé en ce que** l'élément d'étanchéité (6) a des fentes (10) espacées autour de sa périphérie.

30

4. Instrument de marquage selon l'une quelconque des revendications 1 à 3, **caractérisé en ce qu'un** trou (7) traversant l'élément d'étanchéité (6) est fermé par une compression radiale dudit élément d'étanchéité (6) à l'intérieur du corps (1) lorsque la pointe de marquage (3) est dans la position inactive.

35

40

5. Instrument de marquage selon l'une quelconque des revendications 1 à 4, **caractérisé en ce que** l'élément d'étanchéité (6) est en contact avec la pointe de marquage (3) dans la position inactive rétractée de celle-ci.

45

6. Instrument de marquage selon l'une quelconque des revendications 1 à 5, **caractérisé en ce que** l'élément d'étanchéité annulaire (6) a une surface intérieure sensiblement conique ou concave pour coopérer avec la pointe de marquage (3).

50

7. Instrument de marquage selon l'une quelconque des revendications 1 à 6, **caractérisé en ce que** l'intérieur du corps comporte des moyens d'arrêt (15A, 15B) pour limiter un mouvement de roulement de l'élément d'étanchéité (6) vers l'arrière le long dudit corps (1).

55

8. Instrument de marquage selon l'une quelconque des revendications 1 à 7, **caractérisé en ce que** l'intérieur du corps (1) comporte des moyens d'arrêt

(15A) pour limiter le mouvement de l'élément d'étanchéité (6) vers l'avant le long dudit corps (1).

9. Instrument de marquage selon l'une quelconque des revendications 1 à 8, **caractérisé en ce que** le corps (1) comporte une partie de surface intérieure rétrécie vers l'arrière (18) le long de laquelle roule l'élément d'étanchéité (6) lorsque la pointe de marquage (3) est déplacée entre les positions active et inactive. 5 10
10. Instrument de marquage selon l'une quelconque des revendications 1 à 9, **caractérisé en ce que** le corps (1) comporte une partie de surface intérieure rétrécie vers l'avant le long de laquelle roule l'élément d'étanchéité (6) lorsque la pointe de marquage (3) est avancée de la position inactive à la position active. 15
11. Instrument de marquage selon l'une quelconque des revendications 1 à 10, **caractérisé en ce que** l'élément d'étanchéité (6) roule sur pratiquement un ou plusieurs tours complets pendant le mouvement de la pointe de marquage (3) entre les positions inactive et active. 20 25
12. Instrument de marquage selon l'une quelconque des revendications 1 à 10, **caractérisé en ce qu'une** liaison de course morte est prévue et permet à la pointe de marquage (3) de se déplacer longitudinalement par rapport au corps (1) sans provoquer un mouvement de roulement de l'élément d'étanchéité (6) pendant une partie d'extrémité avant de la course de déplacement de ladite pointe de marquage (3) entre les positions active et inactive. 30 35
13. Instrument de marquage selon la revendication 12, **caractérisé en ce que** la liaison de course morte comporte un dispositif de course morte positionné entre l'élément d'étanchéité (6) et l'organe (2) portant la pointe de marquage (3). 40
14. Instrument de marquage selon la revendication 13, **caractérisé en ce que** le dispositif de course morte comporte une bague (20) supportée de manière coulissante sur l'organe (2). 45
15. Instrument de marquage selon la revendication 14, **caractérisé en ce que** la bague (20) est poussée vers l'avant sur l'organe (2) par un ressort (22). 50
16. Instrument de marquage selon la revendication 15, **caractérisé en ce que** le ressort (22) est un ressort hélicoïdal, une partie avant du ressort (22) ayant ses spires accouplées étroitement et formant la bague (20). 55

17. Instrument de marquage selon l'une quelconque des revendications précédentes, **caractérisé en ce que** l'élément d'étanchéité (6) est muni d'une membrane (30) fermant le trou (7) qui le traverse, ladite membrane (30) pouvant être rompue par l'avance de la pointe de marquage (3) pendant le mouvement de la position inactive à la position active.

FIG. 1

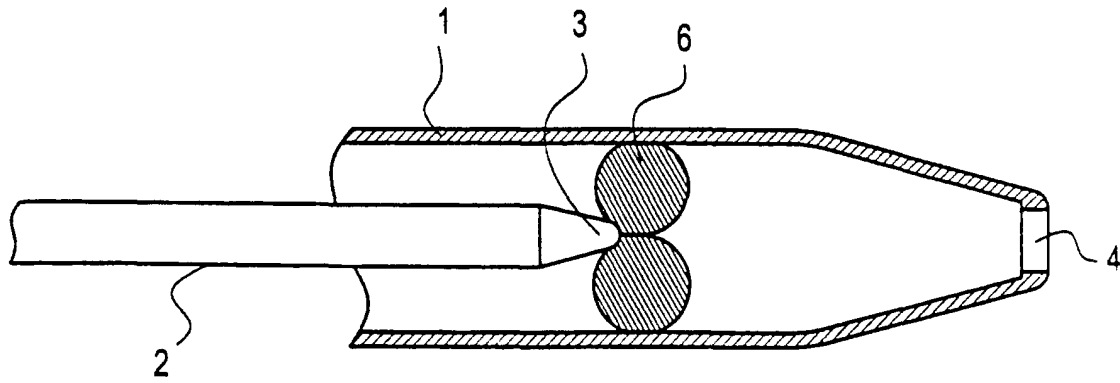


FIG. 2

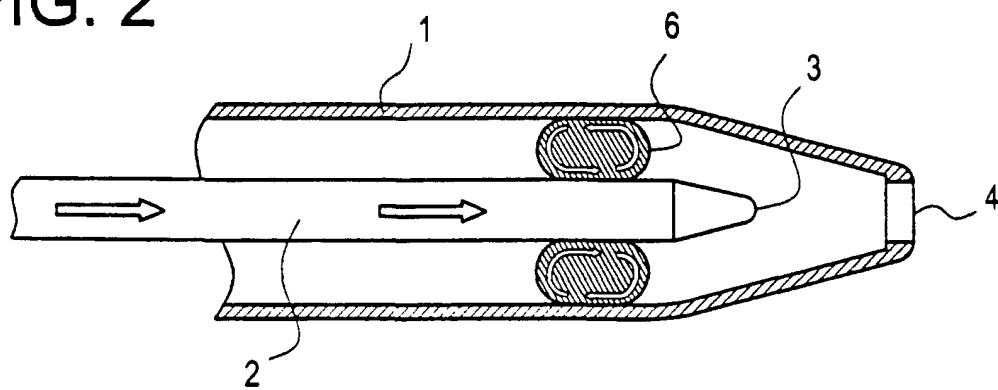
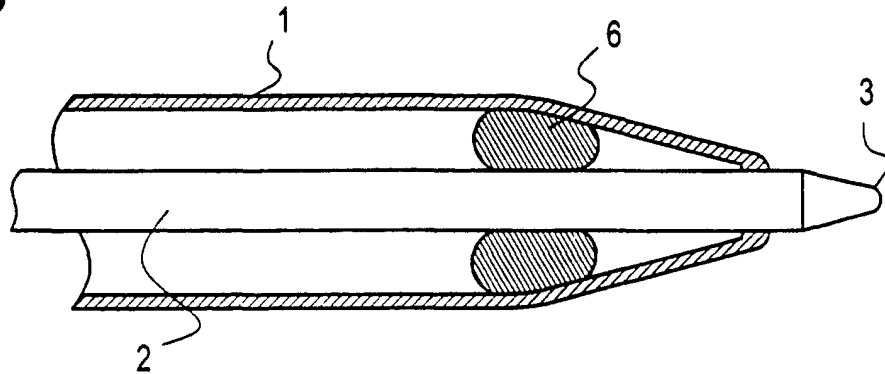


FIG. 3



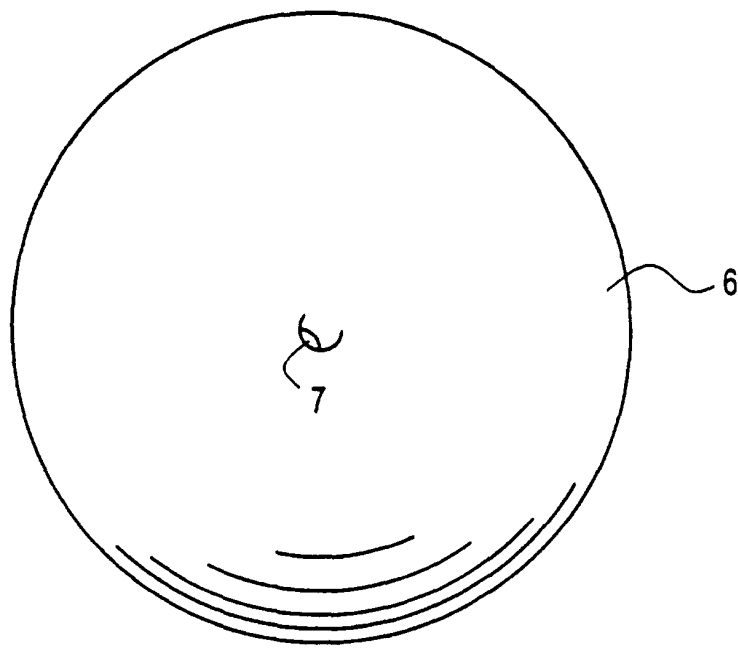


FIG. 4

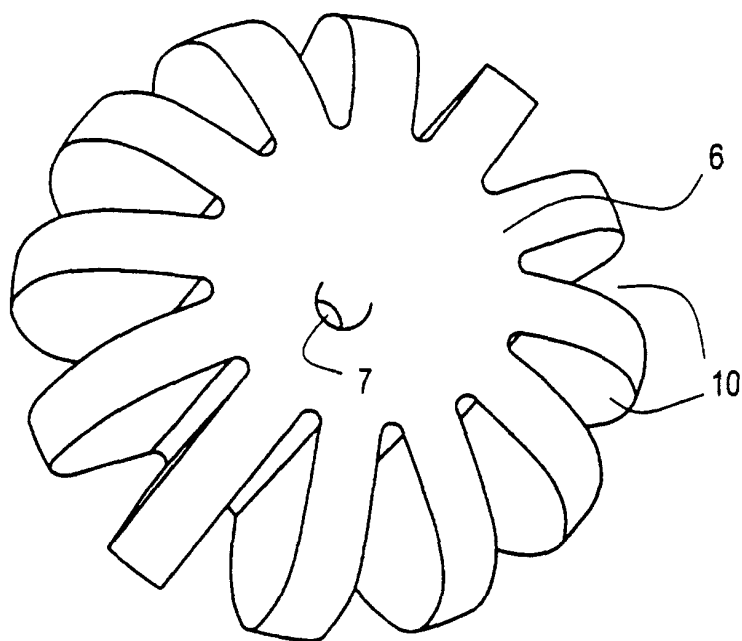


FIG. 5

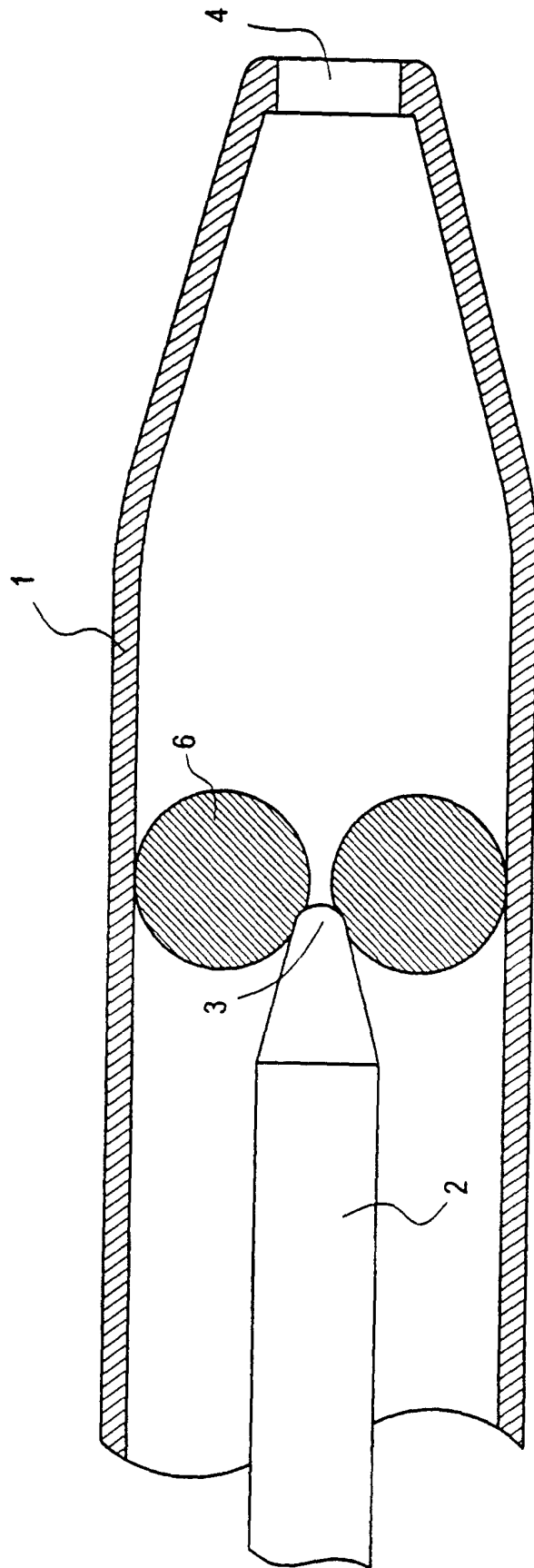


FIG. 6

FIG. 7

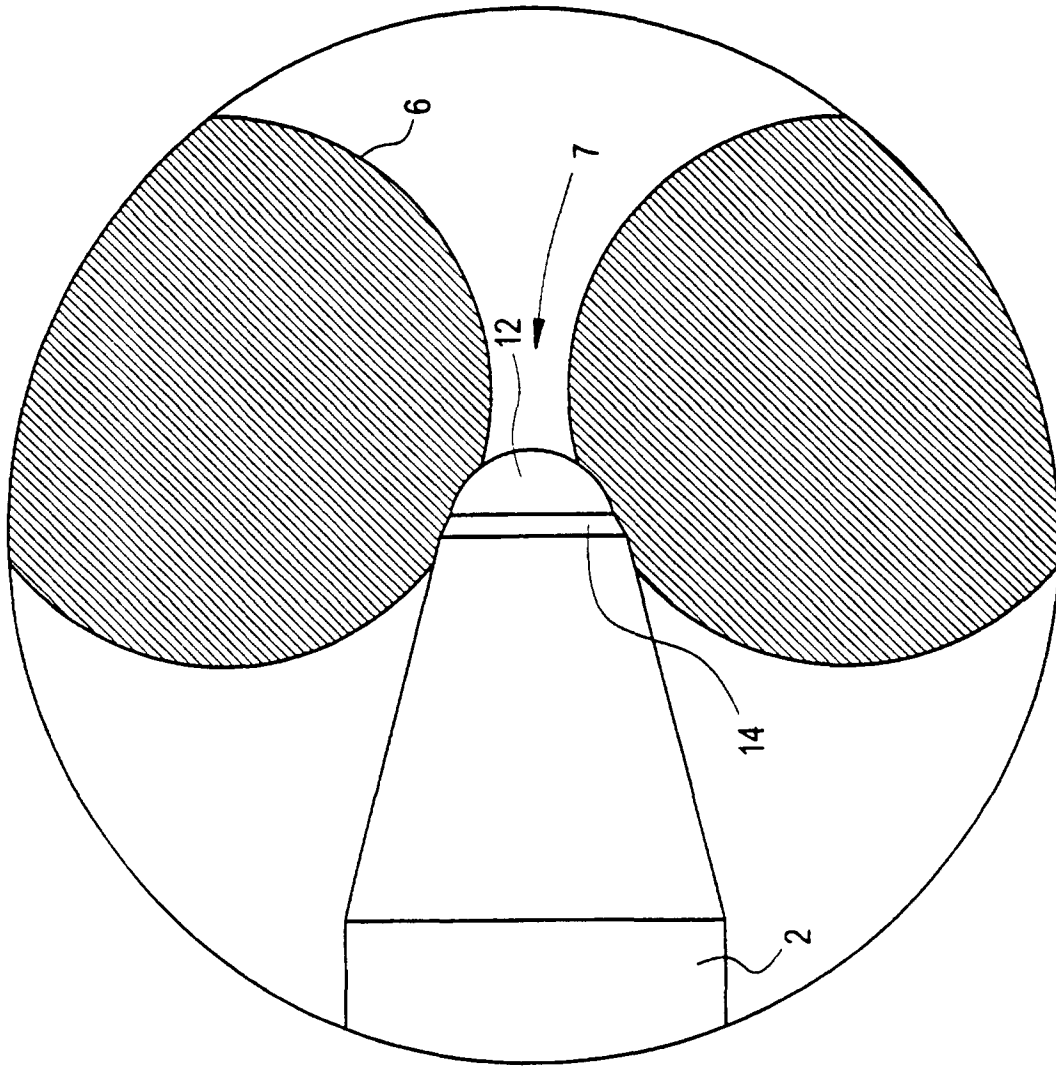


FIG. 8

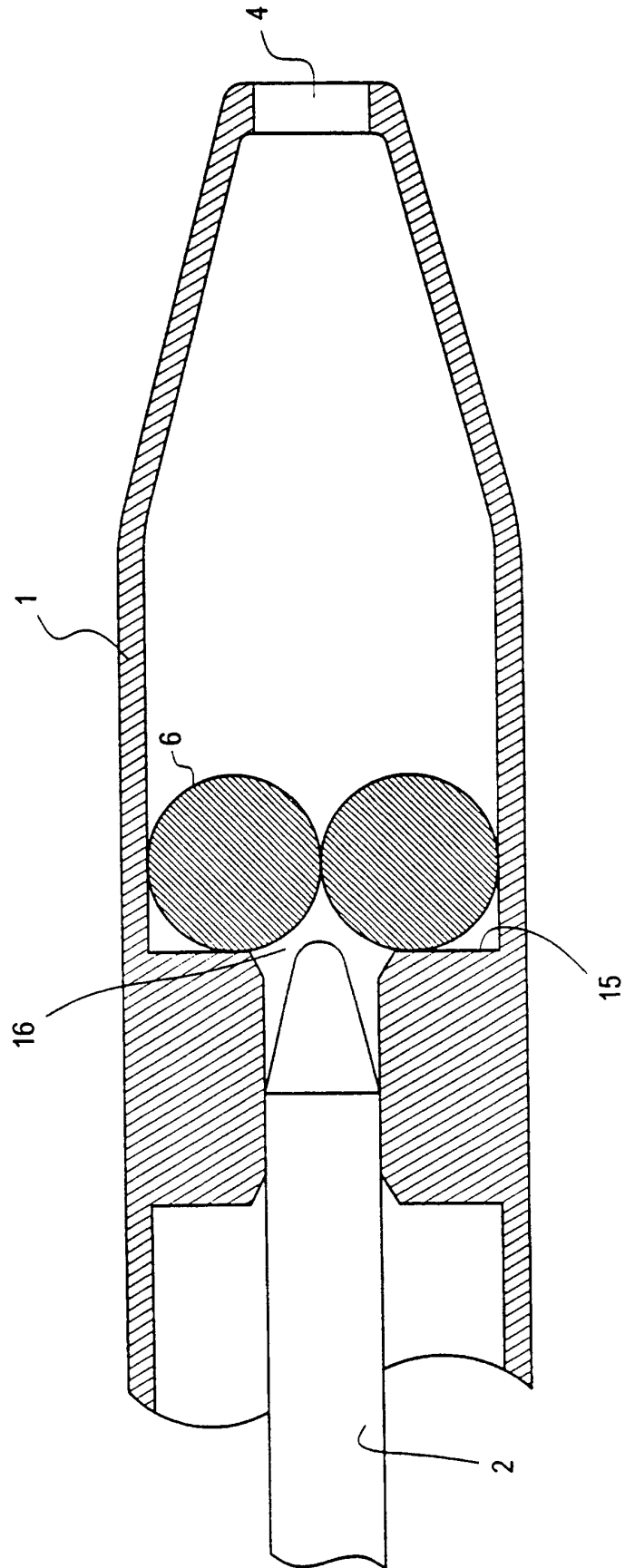


FIG. 9

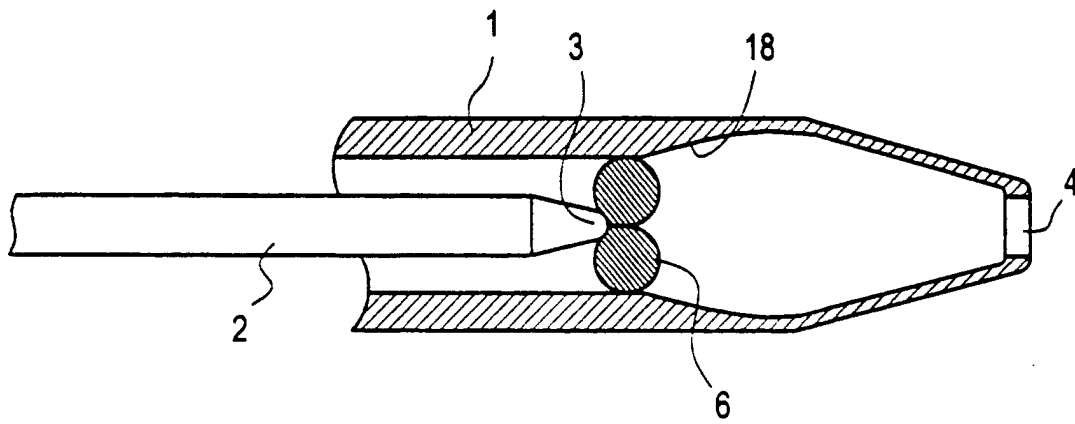


FIG. 10

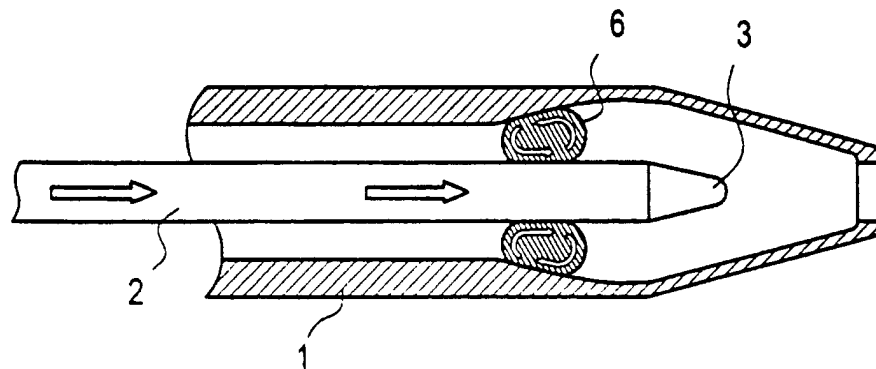


FIG. 11

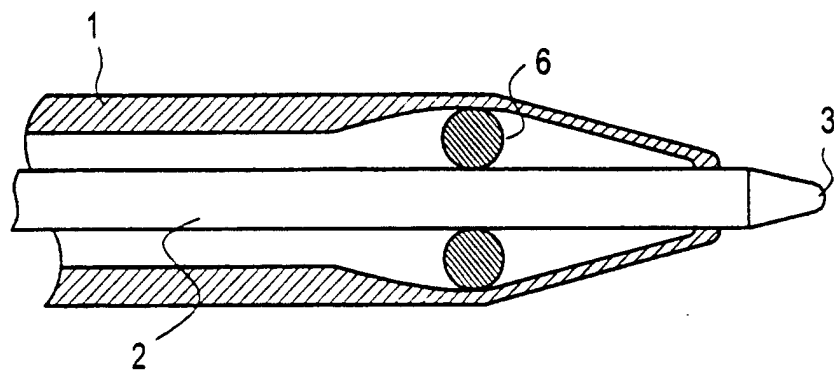


FIG. 12

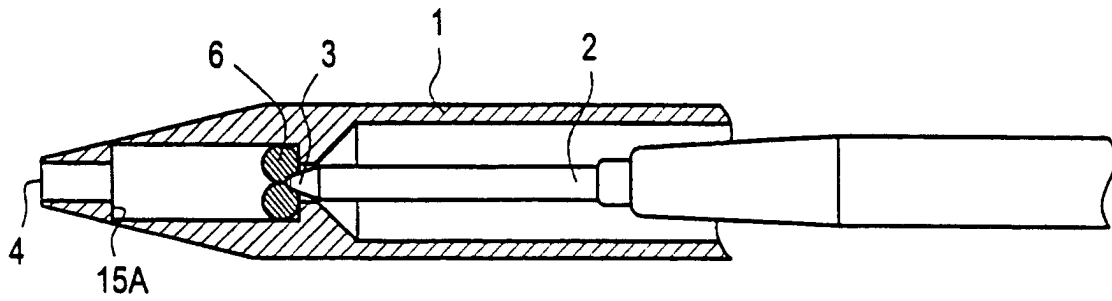


FIG. 13

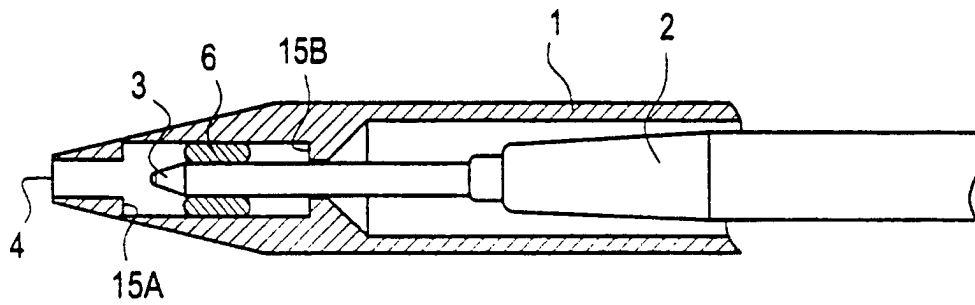


FIG. 14

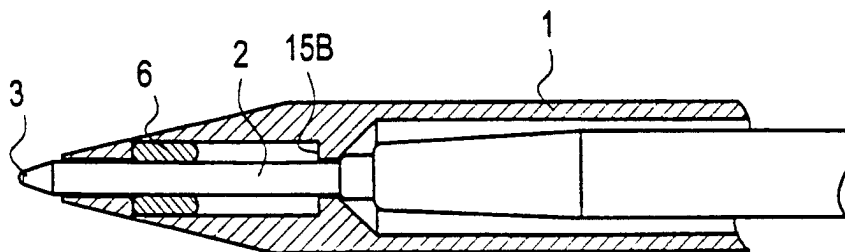


FIG. 15

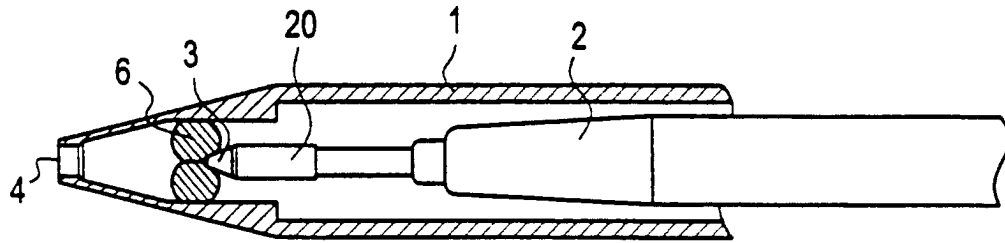


FIG. 16

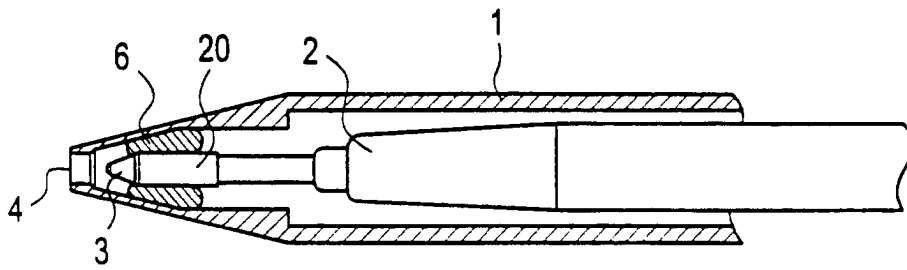


FIG. 17

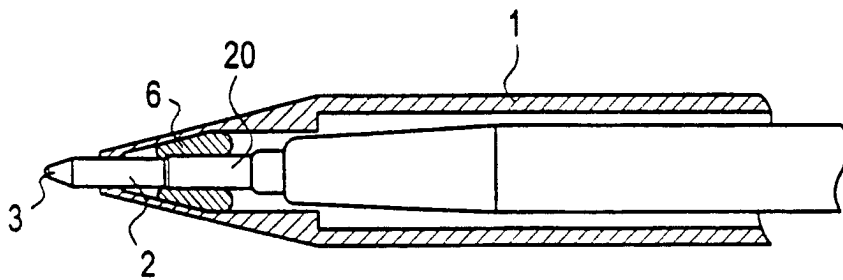


FIG. 18

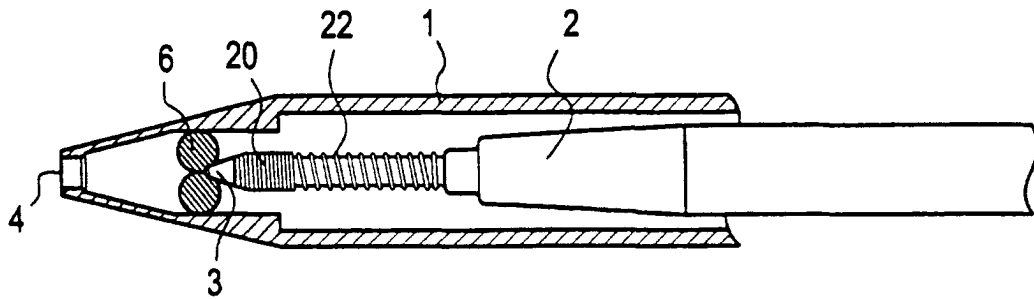


FIG. 19

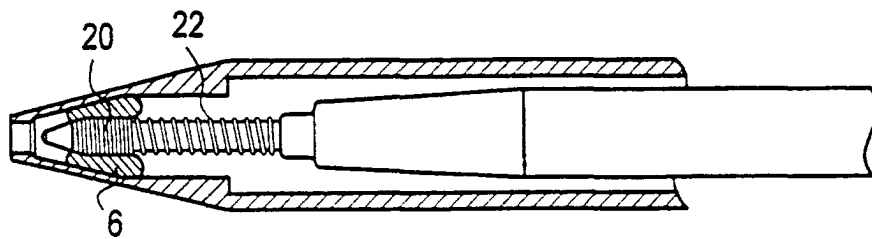


FIG. 20

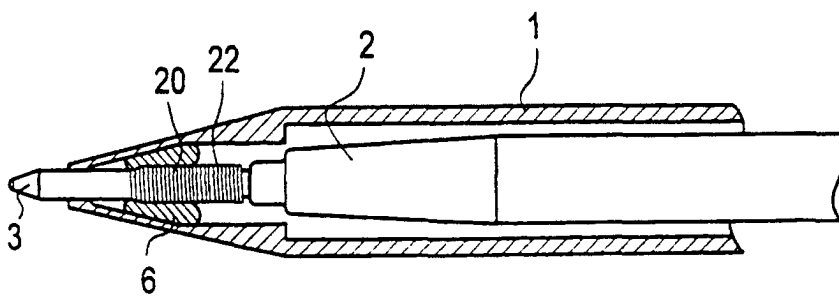


FIG. 21

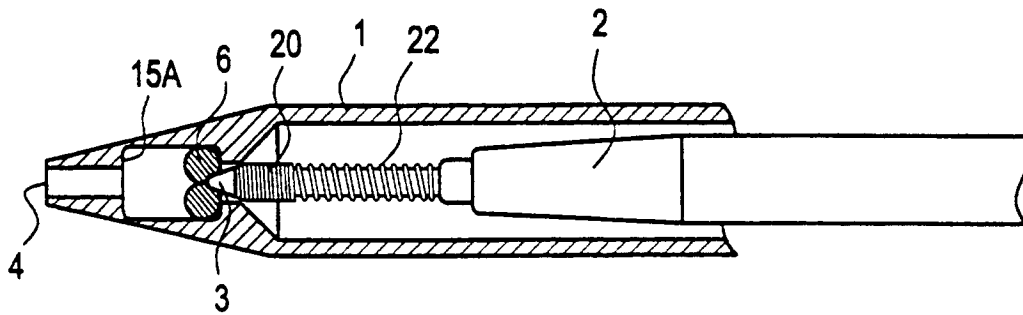


FIG. 22

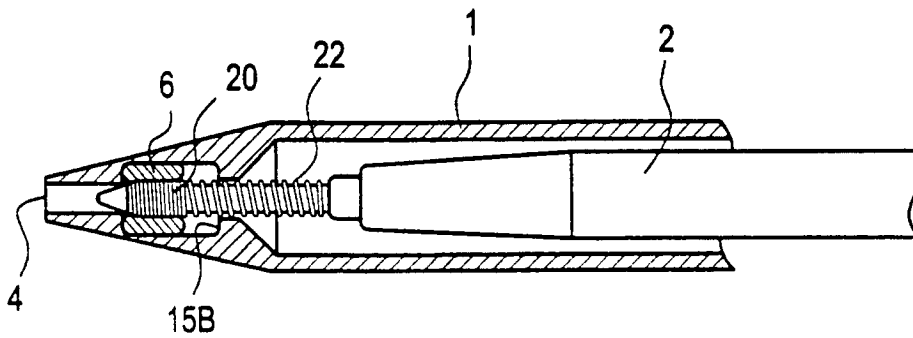


FIG. 23

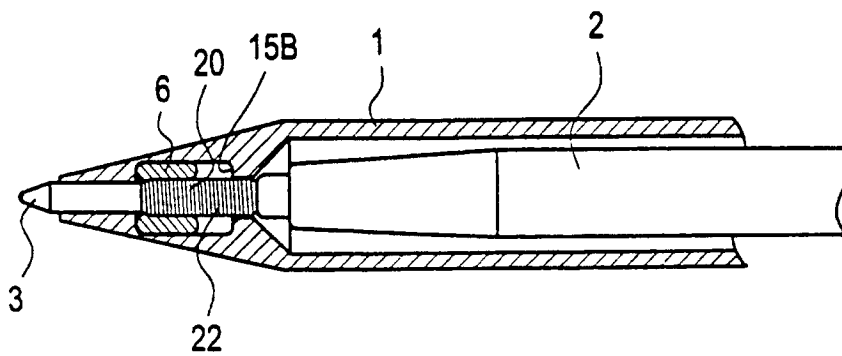


FIG. 24

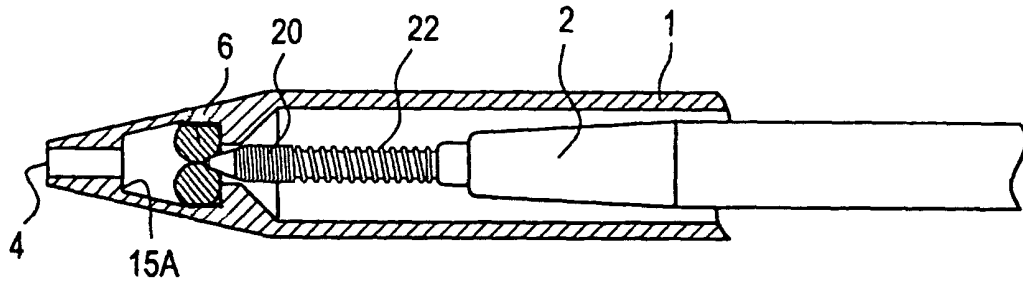


FIG. 25

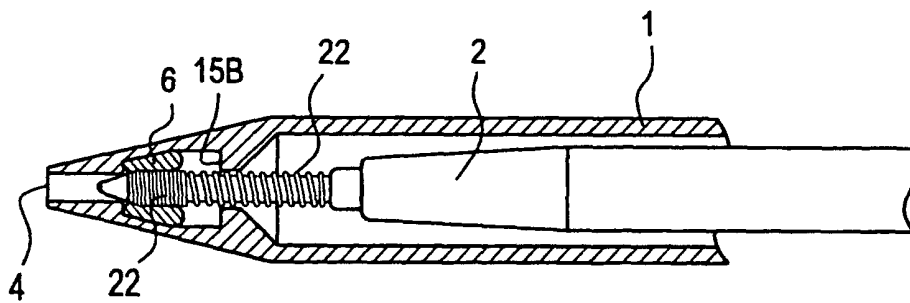


FIG. 26

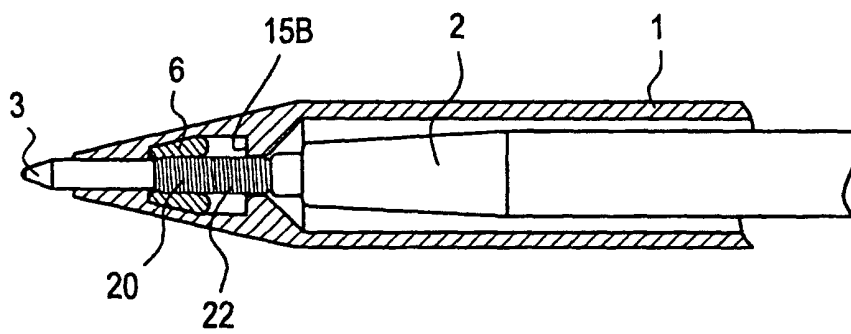


FIG. 27

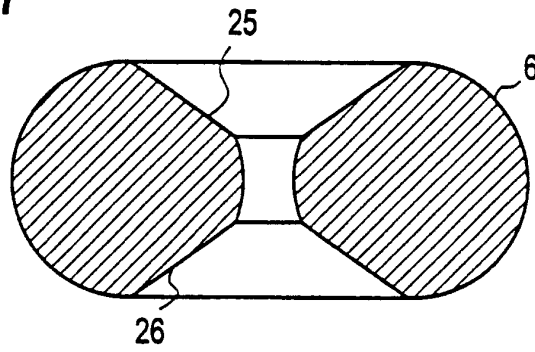


FIG. 28

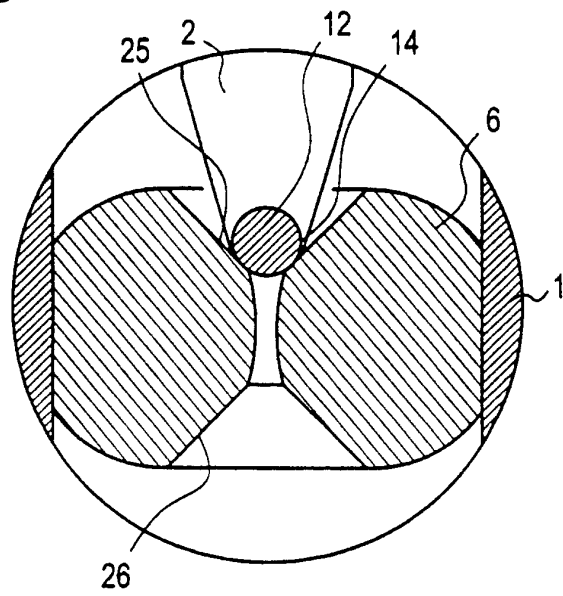
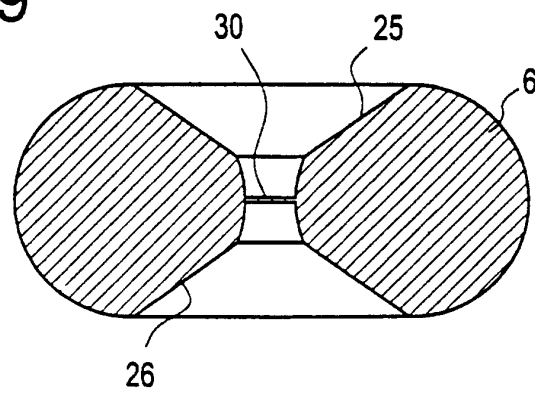


FIG. 29



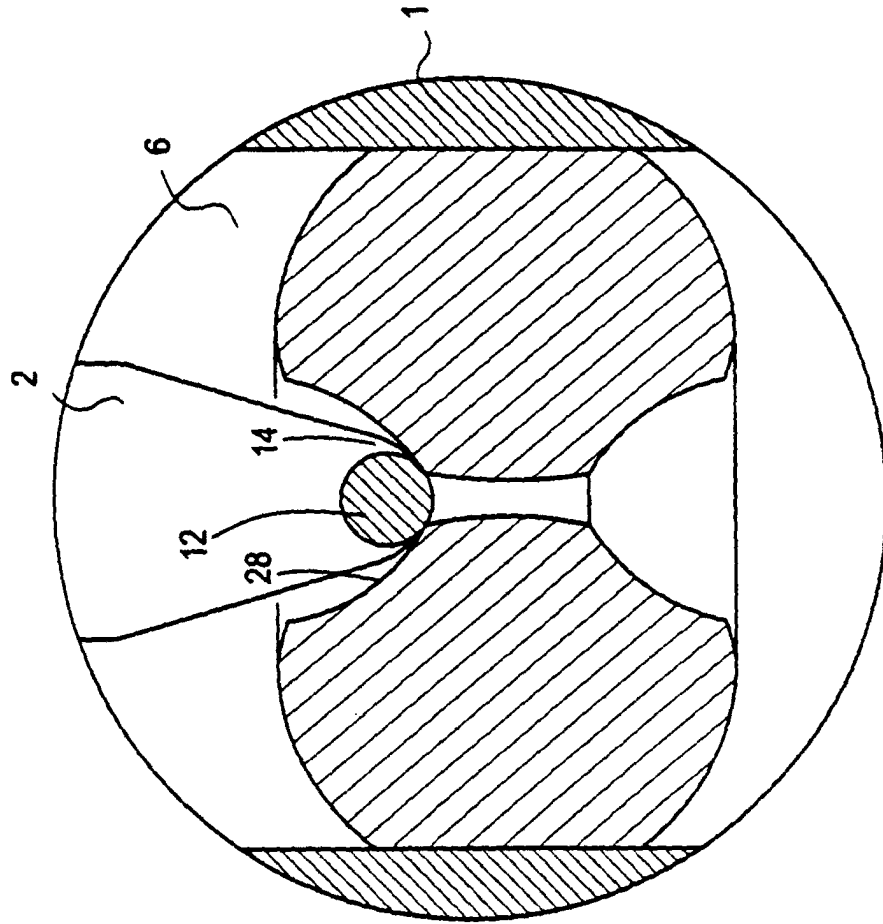


FIG. 30