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(54) **Piercing nozzle for pouch fitment.**

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Description

The present invention relates to an improved piercing nozzle for pouch fitments, which are used to control the removal of the contents of filled thermoplastic polymeric film pouches.

As is known, the use of plastic pouches is common with respect to packaging certain liquids and other fluid materials, e.g. milk, fruit juices, relish and the like. The plastic pouches are often made of polyethylene film. In order to remove the contents from the pouch, a simple method of cutting one of the corners, for example with scissors, has sufficed for many end uses. However, with institutional purchasers, this is inconvenient and the snipped-off corner may contaminate the material after it has been poured or squeezed from the pouch.

It is desirable that the pouch has a pouring spout, preferably one that can be resealed. It is known to incorporate pouring spouts into plastic pouches but this is expensive because of the need for one pouring spout per pouch. It would be economically more desirable if the pouring spout was able to be inserted into the pouch and used until the pouch is empty, then removed and cleaned for re-use with another pouch.

One such pouring spout is disclosed in Canadian Patent 1 192 164 to L. Obidniak. In L. Obidniak's configuration, the pouring spout comprises an elongated body, one of the ends being pointed and the other being integrally prolonged by a threaded stem. A passage is provided for flow of liquid from the pouch. The disclosure of L. Obidniak indicates that the passage is preferably T-shaped. The T-shaped passage is ineffective for removing thick materials which include particulates therein, for example relish, from the pouch.

The present invention endeavours to provide a spout which is easily inserted into a plastic pouch and which is adapted to allow removal of a wide variety of materials from such pouch.

Accordingly the present invention provides a spout, for insertion into and securement to a plastic pouch, comprising a tube having a piercing portion separated from a delivery portion by a film securement portion and having fluid flow communication from the piercing portion to the delivery portion; said film securement portion being adapted to secure, with a substantially liquid-tight seal, plastic film which has been pierced by the piercing portion; said piercing portion appearing, in one perspective, to have been sliced at an angle to the longitudinal axis, from a first location at one side of said tube adjacent the film securement portion to a second location at the other side of the tube, distal from the film securement portion, to form a tip, and the tip appearing, in a second perspective at 90° to the first perspective, to have been sliced symmetrically about the longitudinal axis of the tube to form a pointed piercing tip furthest away from the film securement portion.

In one embodiment the contour of the piercing portion is such that when the pointed tip is pushed into a polyethylene film, in a direction parallel to the longitudinal axis of the tube, the force required to push the piercing nozzle into the polyethylene film remains substantially constant after the tip pierces the film until the pierced edges of the film reach a position adjacent the film securement portion.

In another embodiment the angle of the tip is less than about 75°.

In a further embodiment the angle of the tip is from 60° to 45°.

In another embodiment, the piercing portion has a wall tapering from being thick adjacent the film securement portion to thin furthest away from the film securement portion, such that the piercing portion is frusto-conical.

In another embodiment the confluence and immediate surrounds of a) the portion appearing to have been sliced from one side of said tube to the other side of the tube and b) the portion appearing to have been sliced symmetrically about the longitudinal axis of the tube to form a pointed piercing tip, is shaped such that there is a smooth transition therebetween.

In yet another embodiment the edges of the piercing portion, at least adjacent the piercing tip, are keen.

In another embodiment the edges of the piercing portion, at least adjacent the piercing tip, are smoothed.

In another embodiment the film securement portion comprises a shoulder, a collar adapted to cooperate with the shoulder to trap said plastic film therebetween in a liquid-tight seal, and a locking nut adapted to hold the collar in engagement with the shoulder, and wherein the narrower portion of the shoulder faces the delivery portion.

In a further embodiment the delivery portion is adapted to have a cap or delivery nozzle attached thereto.

In yet another embodiment the piercing portion has a slot, in the sliced portion, which extends substantially to the shoulder.

In another embodiment the slice adjacent the film securement portion is in a plane at an angle of from 20 to 30° to the longitudinal axis of the tube.

In another embodiment the angle of the tip is from 60 to 45°.

In a further embodiment the internal diameter of the tube is from 10 to 30 mm.

One embodiment is shown in Figures 1 and 2 which are elevation and plan views respectively. Another embodiment is shown in Figures 3 and 4, which are elevation and plan views respectively. Figure 5 is a graph showing the force required to insert the pierc-

ing portion of the spout into a polyethylene film.

In Figures 1 and 2, the spout comprises tube 11 having an open end 12 and a sharpened end 13. Open end 12 is the delivery portion of the spout and the sharpened end is the piercing portion of the spout. The piercing and delivery portions are joined by film securement portion 22. The sharpened end 13 comprises a point 14 with a first portion 15 which is adjacent to a second portion 16. There is a shoulder 17 at the juncture of the first and second portions. As will be apparent the second portion appears to have been formed by slicing a tube from adjacent the film securement portion, at point 23, to the opposite side of the tube, i.e. towards point 14. Typically, the angle of this slice is about 25° to the longitudinal axis of tube 11. The tube then appears to have been sliced along the edges of portion 15 to form point 14. The "slices" are symmetrical about the longitudinal axis of tube 11 and are in planes which intercept in a line, the projection of which includes both the longitudinal axis of tube 11 and the extreme tip of point 14. It is preferable that the resulting angle of the tip, at point 14, be from 60 to 45°. The angle of the tip is the included angle between the edges of portion 15. Typically, the angle of the slices which form portion 15 is about 28° to the longitudinal axis of tube 11, thus forming a tip angle of 56°. The confluence of portions 15 and 16 is, in this instance, at shoulder 17. It is preferable that shoulder 17 be smoothed rather than angular so that it is easier to push into the film of a pouch. The wall thickness of tube 11 adjacent shoulder 21 is thick relative to thickness at point 14, thus making tube 11 frusto-conical in the piercing portion of the spout. Preferably, the edge of tube 11 leading to point 14, of tube 24, i.e. edge 18, is tapered at a narrow taper, for example from about 3° to 10°, especially 5° to 8°. The spout also has a tubular portion 19 which is adapted to receive a locking nut (not shown) which may be threaded onto threads 20. Threads 20 are adjacent shoulder 21, the functions of which are explained more in detail hereinafter. Because of the thickness of tube 11, the "slice" which forms portion 16 would normally cause the opening at the piercing portion to extend from point 14 to the dotted line 24. It is preferred, however, that tube 11 be cut away to form a slot 25 which extends substantially to shoulder 21. Slot 25 is to aid in draining material from the pouch and the width of the slot will be determined, in part by the size of particulates, if any, in the material. It is preferable that the point 14 be slightly blunted so that it does not form a skin puncturing hazard for the operator. It will be apparent from the drawings that the piercing portion is shaped somewhat similar to a pen nib, but the function and the manner of attachment to the remainder of the apparatus is, of course, very dissimilar. The spout is preferably made from a stiff material, e.g. metal or hard plastic, and may be made by known methods such as machining or injection moulding.

Although in Figures 1 and 2 it appears that the "slices" are linear, it is to be understood that the slices may be arcuate. In Figures 3 and 4 the spout is somewhat similar to that of Figures 1 and 2 but the confluence between portions 15 and 16 have been smoothed in order to form a spout which is easier to insert into a pouch. Also shown in this embodiment is that the threads 20 are spaced further from shoulder 21 in order to leave a smooth tubular portion adjacent shoulder 21. In Figures 1 to 4, shoulder 21 and portions adjacent thereto may be referred to as the film securement portion. Adjacent point 14 and along the edges of portion 15 and into the confluence between portions 15 and 16 it is preferable that the edges be smoothed.

Figure 5 is a combination of two graphs. With respect to line A, the abscissa relates to the distance along the longitudinal axis of tube 11, starting at point 14, and the ordinate shows the length of a single turn of taut thread which surrounds the spout at cross-sections of the spout, such cross-sections being at 90° to the longitudinal axis of tube 11. With respect to line B, the abscissa is the same as for line A and the ordinate shows the force required to push the piercing portion of the spout into a polyethylene film. Line A shows the "perimeter" of a spout similar to that shown in Figures 3 and 4, as a function of distance from the tip. Line B indicates the force required to push the piercing portion of the same spout into a polyethylene film, as a function of the distance from the tip. Spike C shows the force required to puncture the film initially. It will be seen that after the initial puncturing of the film, the force required for insertion of the piercing portion does not increase as the portion progressively penetrates the film. Indeed, in the embodiment shown, the force remains relatively constant. Dotted line D shows the force required when the confluence is not smoothed, as in the embodiment of Figures 1 and 2. As may be imagined, the embodiment shown with line A is preferred.

The spout of the present invention may be used for pouches containing a variety of different flowable materials, particularly foodstuffs, e.g. mayonnaise, relish, and the like. In operation a filled pouch is grasped, for example between thumb and forefinger, in such a manner that there is a slight negative pressure engendered in the pouch. The point 14 is then pushed into the film of the pouch, close to the place where the pouch was grasped. The spout is then pushed firmly into the pouch, so that the film is stretched around the perimeter of first portion 15 and then portion 16 until the hole in the pouch passes shoulder 21 and surrounds the tubular film securing portion. The collar (not shown) is placed over threads 20 and a locking nut (also not shown) is screwed tightly so that the film edges are trapped between shoulder 21 and the collar. The spout will then allow material from the pouch to flow through the tubular fitment.

Slot 25 allows the material in the pouch to be almost completely drained from the pouch. The present invention is particularly desirable for spouts which have internal diameters of about 8 mm or more, and especially from 10 to 30 mm. Typically, the internal diameter of the spout is about 14 mm.

The spout may have attached thereto, at end 12, a closure device (cap) so that the pouch may be stored without material leaking therefrom through the spout. Alternatively, the spout may have various fitments attached thereto, for example piping nozzles used for icing sugar. The cap or fitments fit against end 12 and are held in place by a further securing nut (not shown) or similar.

Claims

1. A spout, for insertion into and securement to a plastic pouch, comprising a tube (11) having a piercing portion (13) separated from a delivery portion (12) by a film securement portion (22) and having fluid flow communication from the piercing portion to the delivery portion; said film securement portion (22) being adapted to secure, with a substantially liquid-tight seal, plastic film which has been pierced by the piercing portion (13); said piercing portion appearing, in one perspective, to have been sliced at an angle to the longitudinal axis from a first location (23) at one side of said tube adjacent the film securement portion (22) to a second location (14) at the other side of the tube, distal from the film securement portion (22), to form a tip (14), and the tip appearing, in a second perspective perpendicular to the first perspective, to have been sliced symmetrically about the longitudinal axis of the tube to form a pointed piercing tip furthest away from the film securement portion (22).

2. A spout according to claim 1 wherein the contours of said slices are such that when the pointed tip (14) is pushed into a polyethylene film, in a direction parallel to the axis of the tube (11), the force required to push the piercing nozzle (13) into the polyethylene film remains substantially constant after the tip pierces the film until the pierced edges of the film reach a position adjacent the film securement portion (22).

3. A spout according to claim 1 or claim 2 wherein the angle of the tip (14) is less than about 75°.

4. A spout according to claim 3 wherein the angle of the tip (14) is from 60° to 45°.

5. A spout according to any one of the preceding claims wherein the piercing portion (13) has a wall tapering from being thick adjacent the film securement portion (22) to thin furthest away from the film securement portion, such that the piercing portion (13) is frusto-conical.

6. A spout according to any one of the preceding claims wherein the edges of the piercing portion (13), adjacent the piercing tip, are smooth.

7. A spout according to any one of the preceding claims wherein the film securement portion (22) comprises a shoulder (21), a collar adapted to cooperate with the shoulder to trap said plastic film therebetween in a liquid-tight seal, and a locking nut adapted to hold the collar in engagement with the shoulder, and wherein the narrower portion of the shoulder (21) faces the delivery portion (12).

8. A spout according to any one of the preceding claims wherein the delivery portion (12) is adapted to have a cap or delivery nozzle attached thereto.

9. A spout according to any one of the preceding claims wherein the piercing portion (13) has a slot (25) in the sliced portion which extends substantially to the shoulder.

10. A spout according to any one of the preceding claims wherein the slice adjacent the film securement portion (22) is a plane at an angle of from 20 to 30° to the longitudinal axis of the tube.

11. A spout according to any one of the preceding claims wherein the internal diameter of the tube (11) is from 10 to 30 mm.

Patentansprüche

1. Ausguß zum Einsetzen in und Befestigen an einem Kunststoffbeutel, umfassend ein Rohr (11), das einen Einstechbereich (13) aufweist, der von einem Abgabebereich (12) durch einen Filmhaltebereich (22) getrennt ist und Fluidfließkommunikation vom Einstechbereich zum Abgabebereich aufweist; wobei der genannte Filmhaltebereich (22) so ausgebildet ist, daß er den Kunststoffilm, der durch den Einstechbereich (13) durchstochen worden ist, mit einer im wesentlichen flüssigkeitsdichten Abdichtung hält, wobei der genannte Einstechbereich in einer Perspektive als in einem Winkel zur Längsachse von einer ersten Position (23) an einer Seite des genannten Rohres angrenzend an den Filmhaltebereich (22) zu einer zweiten Position (14) an der anderen Seite des Rohres, die distal

vom Filmhaltebereich (22) liegt, abgeschnitten erscheint, um eine Spitze (14) zu bilden, und die Spitze in einer zweiten Perspektive, die zur ersten Perspektive senkrecht steht, symmetrisch um die Längsachse des Rohres abgeschnitten erscheint, um vom Filmhaltebereich (22) am weitesten entfernt eine zugespitzte Einstechspitze zu bilden.

2. Ausguß nach Anspruch 1, worin die Konturen der genannten abgeschnittenen Teile so sind, daß, wenn die zugespitzte Spitze (14) in einer Richtung parallel zur Achse des Rohres (11) in den Poläthylenfilm hineingedrückt wird, die zum Hineindrücken des Einstechbereiches (13) in den Polyäthylenfilm erforderliche Kraft, nachdem die Spitze den Film durchsticht, im wesentlichen konstant bleibt, bis die durchstochenen Ränder des Filmes eine an den Filmhaltebereich (22) angrenzende Position erreichen.

3. Ausguß nach Anspruch 1 oder 2, worin der Winkel der Spitze (14) kleiner als etwa 75° ist.

4. Ausguß nach Anspruch 3, worin der Winkel der Spitze (14) von 60° bis 45° beträgt.

5. Ausguß nach einem der vorhergehenden Ansprüche, worin der Einstechbereich (13) eine Wand aufweist, die sich von einer dicken Stelle angrenzend an den Filmhaltebereich (22) zu einer am weitesten vom Filmhaltebereich entfernten dünnen Stelle verjüngt, sodaß der Einstechbereich (13) kegelstumpfförmig ist.

6. Ausguß nach einem der vorhergehenden Ansprüche, worin die Kanten des Einstechbereichs (13) angrenzend an die Einstechspitze abgerundet sind.

7. Ausguß nach einem der vorhergehenden Ansprüche, worin der Filmhaltebereich (22) eine Schulter (21), eine Unterlegscheibe, die zum Zusammenwirken mit der Schulter ausgebildet ist, um den genannten Kunststoffilm unter flüssigkeitsdichter Abdichtung dazwischen einzuschließen, und eine Haltemutter umfaßt, die ausgebildet ist, um die Unterlegscheibe mit der Schulter in Eingriff zu halten, und worin der engere Abschnitt der Schulter (21) dem Abgabebereich (12) zugewandt ist.

8. Ausguß nach einem der vorhergehenden Ansprüche, worin der Abgabebereich (12) so ausgebildet ist, daß er eine Kappe oder Abgabedüse daran befestigt aufweist.

9. Ausguß nach einem der vorhergehenden Ansprüche, worin der Einstechbereich (13) einen Schlitz (25) im abgeschnittenen Bereich aufweist, der sich im wesentlichen bis zur Schulter erstreckt.

10. Ausguß nach einem der vorhergehenden Ansprüche, worin der abgeschnittene Bereich angrenzend an den Filmhaltebereich (22) eine Ebene in einem Winkel von 20 bis 30° zur Längsachse des Rohres ist.

11. Ausguß nach einem der vorhergehenden Ansprüche, worin der Innendurchmesser des Rohres (11) von 10 bis 30 mm beträgt.

Revendications

1. Bec, pour insertion dans et fixation sur un sac en plastique, comprenant un tube (11) possédant une portion perçante (13) séparée d'une portion d'émission (12) par une portion de retenue de film (22) et ayant une communication d'écoulement de fluide de la portion perçante à la portion d'émission; ladite portion de retenue de film (22) étant apte à retenir, avec un joint essentiellement étanche au liquide, un film en plastique qui a été percé par la portion perçante (13); ladite portion perçante apparaissant, dans une perspective, comme ayant été coupée suivant un angle à l'axe longitudinal depuis une première localisation (23) à un côté dudit tube adjacent à la portion de retenue de film (22) à une deuxième localisation (14) à l'autre côté du tube, éloignée de la portion de retenue de film (22) pour former une pointe (14), et la pointe apparaissant, dans une deuxième perspective perpendiculaire à la première perspective, comme ayant été coupée symétriquement autour de l'axe longitudinal du tube pour former une pointe perçante pointue la plus éloignée de la portion de retenue de film (22).

2. Bec selon la revendication 1, dans lequel les contours desdites coupes sont tels que lorsque le bout pointu (14) est poussé dans un film en polyéthylène, dans une direction parallèle à l'axe du tube (11), la force nécessaire pour pousser le raccord perçant (13) dans le film en polyéthylène reste essentiellement constante après le perçage du film par la pointe jusqu'à ce que les bords percés du film atteignent une position adajcente à la portion de retenue de film (22).

3. Bec selon la revendication 1 ou la revendication 2, dans lequel l'angle de la pointe (14) est inférieur à environ 75°.

4. Bec selon la revendication 3, dans lequel l'angle

de la pointe (14) va de 60° à 45°.

5. Bec selon l'une des revendications précédentes, dans lequel la portion perçante (13) possède une paroi qui diminue depuis l'épaisseur adjacente à la portion de retenue de film (22) pour être mince au loin de la portion de retenue de film, de façon que la portion perçante (13) soit tronconique.

6. Bec selon l'une des revendications précédentes, dans lequel les bords de la portion perçante (13) adjacents à la pointe perçante, sont lisses.

7. Bec selon l'une des. revendications précédentes, dans lequel la portion de retenue de film (22) comprend un épaulement (21), un collier apte à coopérer avec l'épaulement pour piéger ledit film en plasique entre ceux-ci dans un joint étanche au liquide, et un écrou de verrouillage apte à maintenir le collier en prise avec l'épaulement et dans lequel la portion plus étroite de l'épaulement (21) est orientée vers la portion d'émission (12).

8. Bec selon l'une des revendications précédentes, dans lequel la portion d'émission (12) est conçue pour qu'il y soit attaché un capuchon ou un raccord ou buse d'émission.

9. Bec selon l'une des revendications précédentes, dans lequel la portion perçante (13) possède une fente (25) dans la portion coupée qui s'étend essentiellement à l'épaulement.

10. Bec selon l'une des revendications précédentes, dans lequel la coupe adjacente à la portion de retenue de film (22) se situe dans un plan suivant un angle allant de 20 à 30° à l'axe longitudinal du tube.

11. Bec selon l'une des revendications précédentes, dans lequel le diamètre interne du tube (11) va de 10 à 30 mm.

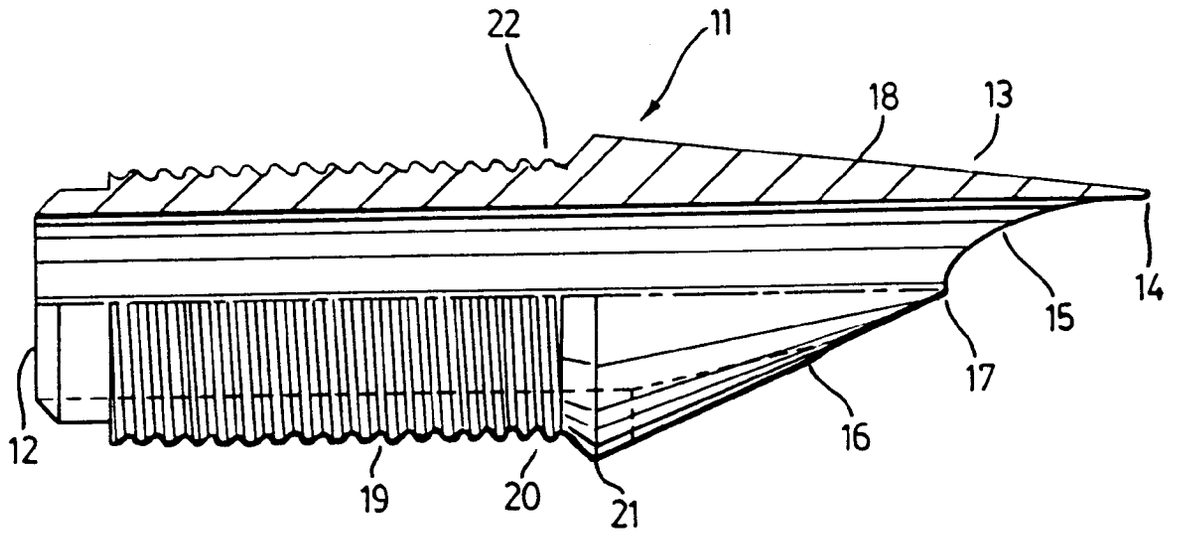
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FIG. 1

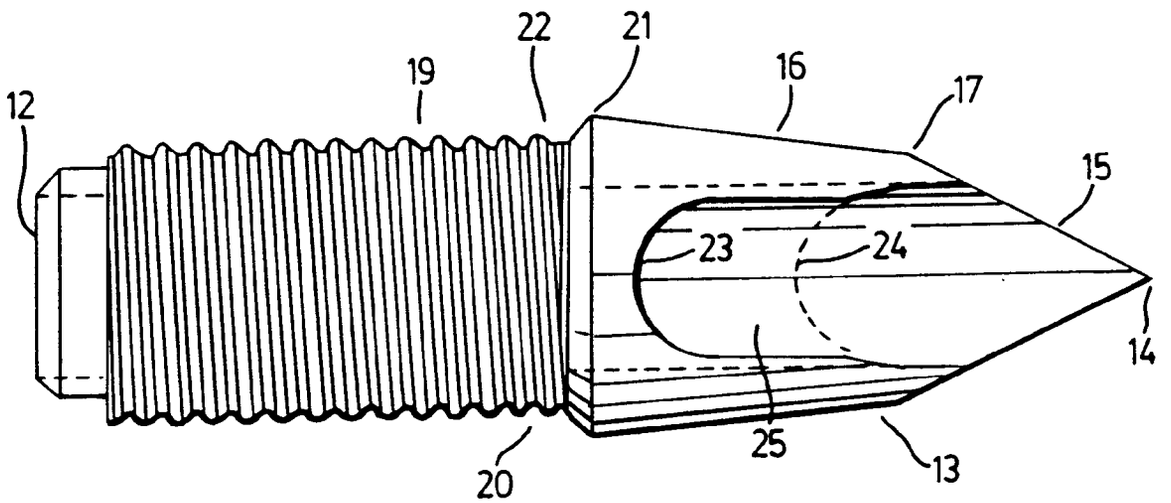
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FIG. 2

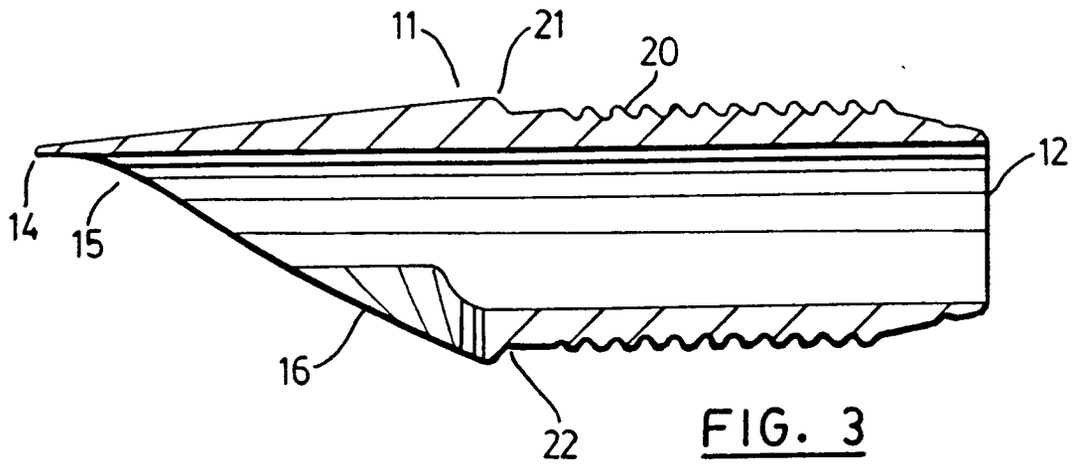

FIG. 3

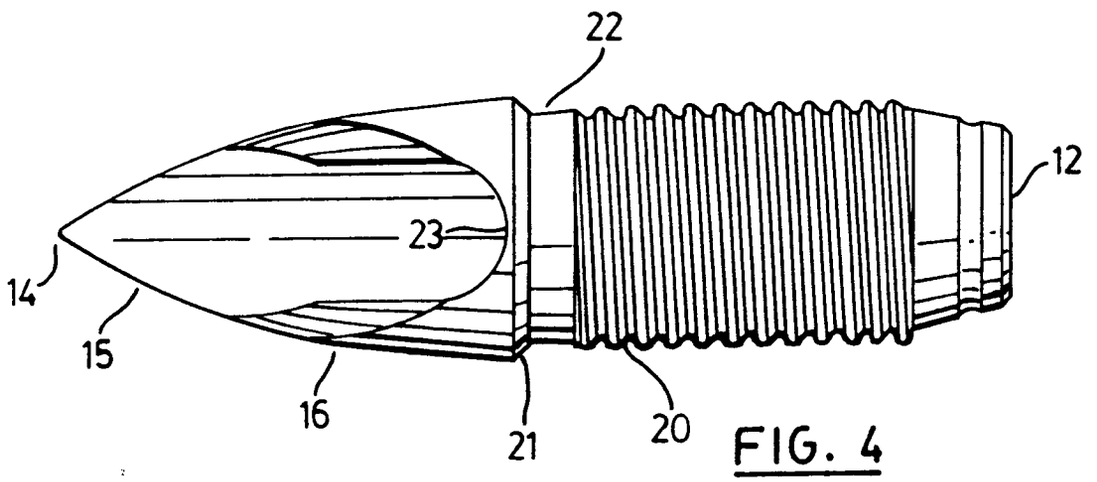

FIG. 4

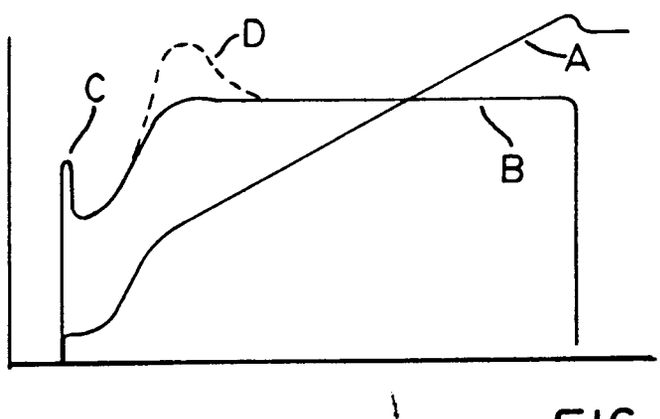

FIG. 5