

[54] **MEDICAL APPARATUS FOR INSERTION OF MEDICATIONS AND/OR HYGIENIC PREPARATIONS INTO BODY OPENINGS AND/OR CAVITIES**

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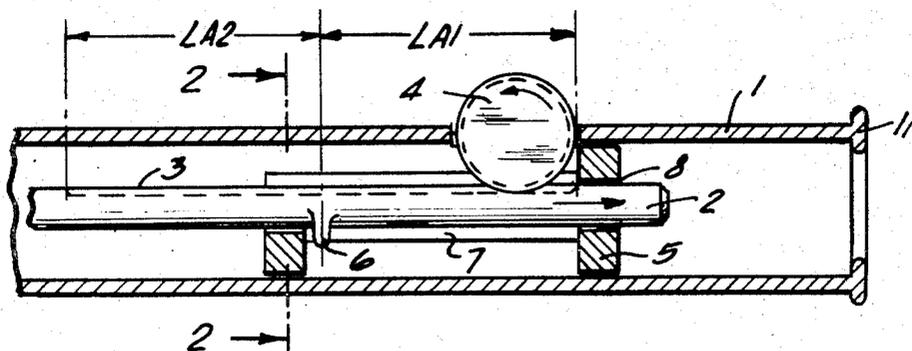
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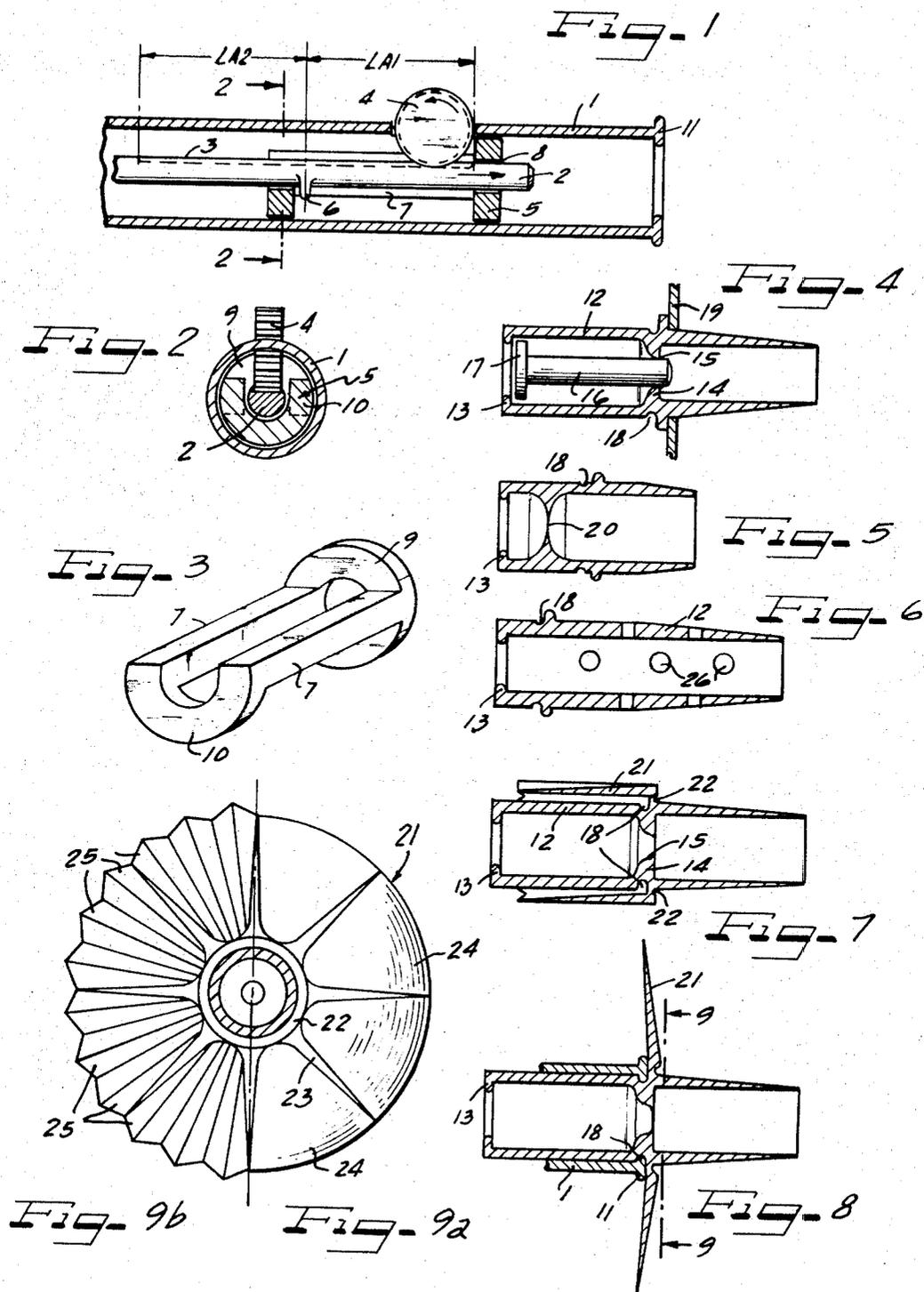
[57] **ABSTRACT**

This invention provides a medical apparatus for insert-

ing medications and/or hygienic preparations into body openings and/or cavities without use of an additional hand or fingers. The apparatus comprises: (a) a hollow cylindrical handle having a first longitudinal section positioned toward its front end and a second longitudinal section adjacent to the first section and positioned toward its back end; (b) a replaceable tubular insertion nozzle inserted in the front end of the hollow handle, the nozzle being adapted to have medications placed in its front end, said tubular nozzle having a stop ledge at its rear end and a central opening surrounded by an annular stop ledge and a ram positioned in its rear portion with the front end of the ram in the center opening and adhering to the annular ledge, said ram having a sealing plate on its rear end; (c) a piston slidably mounted in a longitudinal guide within the hollow cylindrical handle in which the guide is longitudinally displaceable, the upper side of the piston being formed as a rack and said piston having a collar arranged to engage with the opposite ends of the guide to limit the movement of the piston relative to the guide; and (d) a knurled wheel rotatably mounted in the hollow handle with a portion thereof extended outside of the hollow handle, the wheel being arranged to engage with the upper side of the piston whereby the counterclockwise rotation of the knurled wheel pushes the piston forward past the first longitudinal section against the sealing plate of the ram to move the ram forward through the center opening and the plate forward in adherence to the annular ledge, thereby pushing out the medication from the front end of the insertion nozzle.

11 Claims, 10 Drawing Figures





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MEDICAL APPARATUS FOR INSERTION OF MEDICATIONS AND/OR HYGIENIC PREPARATIONS INTO BODY OPENINGS AND/OR CAVITIES

BACKGROUND OF THE INVENTION

This invention relates to a medical apparatus for the insertion of medications and/or hygienic preparations into body openings and/or cavities, without the use of an additional hand or fingers.

There are various types and kinds of apparatuses and instruments which are utilized for inserting medications and the like into body openings and cavities. Most of these apparatuses generally have a nipple, a nozzle or some device on its end through which the medications pass from and into the body openings and cavities. In the apparatuses having a disposable nozzle placed on its end, there have been problems with the nozzle in that during or after the insertion of a medication into the body, the nozzle will come loose and inadvertently be pushed into the body opening and/or cavity and have to be removed by hand or some other means. This procedure is not only an inconvenience and inefficient but more importantly is unsanitary and a departure from the sterile requirements for placing medications in body openings and/or cavities.

Another disadvantage of the nozzleed apparatuses is that after a nozzle has been used, it generally has to be removed by hand or by some other additional means not a part of the apparatus on which it is placed. The removal of the nozzle by hand is not only an inconvenience but is unsanitary in that the nozzle has been in contact with a body opening and/or cavity.

In order to prevent the apparatus from contacting the body, a nozzle has been provided having a screening disk on the end to be placed on the apparatus. The screening disk has been effective, however, it is bulky and requires the nozzle to be packed in larger packages before use which increases the packing volume and cost.

In view of these disadvantages of medical apparatuses utilizing disposable nozzles, there is a need for an apparatus designed to prevent the inadvertent insertion of a nozzle in a body opening and/or cavity, and arranged to remove and expel the nozzle without the use of any means not a part of the apparatus.

SUMMARY OF THE INVENTION

Accordingly, we have provided a medical apparatus for inserting medications into body openings which has means to prevent the inadvertent insertion of a nozzle into a body cavity and means to expel the nozzle after use. The medical apparatus comprises: (a) a hollow cylindrical handle having a first longitudinal section positioned toward its front end and a second longitudinal section adjacent to the first section and positioned toward its back end; (b) a replaceable tubular insertion nozzle inserted in the front end of the hollow handle, the nozzle being adapted to have medications placed in its front end, the tubular nozzle having a stop ledge at its rear end and a central opening surrounded by an annular stop ledge and a ram positioned in its rear portion with the front end of the ram in the center opening and adhering to the annular ledge, said ram having a sealing plate on its rear end; (c) a piston slidably mounted in a longitudinal guide within the hollow cylindrical handle in which the guide is longitudinally displaceable,

the upper side of the piston being formed as a rack and said piston having a collar arranged to engage with the opposite ends of the guide to limit the movement of the piston relative to the guide; and (d) a knurled wheel rotatably mounted in the hollow handle with a portion thereof extended outside of the hollow handle, the wheel being arranged to engage with the upper side of the piston whereby the counterclockwise rotation of the knurled wheel pushes the piston forward past the first longitudinal section against the sealing plate of the ram to move the ram forward through the center opening and the plate forward in adherence to the annular ledge, thereby pushing out the medication from the front end of the insertion nozzle.

The insertion nozzle is expelled from the front end of the apparatus by rotating the knurled wheel further to push the piston forward past at least part of the second longitudinal section whereby the collar of the piston engages the front end of the longitudinal guide to move the guide forward with sufficient force against the rear stop ledge of the nozzle to expel the nozzle from the hollow handle.

Accordingly, it is an object of the present invention to provide a medical apparatus arranged to prevent the inadvertent insertion of a nozzle into a body opening and/or cavity.

Another object of the present invention is to provide a medical apparatus arranged to expel the nozzle placed thereon by continuing the operation required to release the medication through the nozzle into a body opening and/or cavity.

A further object of the present invention is to provide a medical apparatus nozzle having a screening disk which requires no additional packing volume than that required for the nozzle alone.

Other objects, features and advantages of the invention will be readily apparent from the following description of the preferred embodiments thereof, taken in conjunction with the accompanying drawings, although variations and modifications may be effected without departing from the spirit and scope of the novel concepts of the disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a longitudinal view, in section, of the expulsion mechanism of a medical apparatus according to the present invention;

FIG. 2 is a cross sectional view along line 2—2 of FIG. 1;

FIG. 3 is a perspective view of the longitudinal guide of the expulsion mechanism illustrated in FIG. 1;

FIG. 4 is a longitudinal sectional view of an embodiment of the insertion nozzle according to the present invention;

FIG. 5 is a longitudinal sectional view of a second embodiment of the invention nozzle designed for inserting a suppository;

FIG. 6 is a longitudinal sectional view of a third embodiment of the insertion nozzle designed for inserting a tampon;

FIG. 7 is a longitudinal sectional view of an insertion nozzle with a spreadable screening disk placed on the hollow handle of the expulsion mechanism;

FIG. 8 is a longitudinal sectional view of the insertion nozzle shown in FIG. 7, illustrating the screening disk spread apart; and

FIGS. 9a and 9b are each half-side section views along line 9 — 9 of FIG. 8, illustrating respectively, a different design of the spreadable screening disk.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

FIG. 1 shows an expulsion mechanism of a medical apparatus for the insertion of medications and/or hygienic preparations into body openings and cavities according to the present invention. The mechanism is arranged in a hollow cylindrical body 1 used as a handle. As shown, the hollow handle 1 has a first longitudinal section LA1 positioned toward its front end and an adjacent second longitudinal section LA2 positioned toward its back end. The expulsion mechanism includes a piston 2 designed on its upper side as a rack 3, and a knurled wheel 4 engaged with the upper side of the piston and having a corresponding serrated profile. The knurled wheel 4 is rotatably mounted in the handle 1 with a portion of it extending outside of the handle. The piston 2 is slidably mounted in a longitudinal guide 5 which in turn is longitudinally displaceable in the cylindrical cavity of the handle 1.

The longitudinal guide 5, as shown in FIG. 3, comprises two bars 7 extending parallel to the piston 2, a disk 9 mounted on its front side and which is provided with a hole 8 for the passage of the piston, and a corresponding semi-disk 10 mounted on its rear side. The piston 2 mounted in the guide 5, has a flaring collar or knob 6 on its bottom side. The piston is arranged in the guide 5 so that the collar remains between the disk 9 and the semi-disk 10. Due to the engagement of the collar 6 with both the disks 9 and 10, the longitudinal displacement of the piston relative to the guide 5 is limited in its opposite directions of movement.

As shown in FIG. 2, the guide 5 is constructed to move freely through the hollow body of the handle 1, in the same manner as the piston moves within the longitudinal guide 5.

In order to move or slide the piston 2 in the guide 5, the knurled wheel 4 is turned in either direction with the aid of a finger, preferably the thumb, and thus the piston is displaced due to the engagement of the knurled wheel 4 with the rack 3. As indicated in FIG. 1, the piston is shifted forward by the counterclockwise rotation of the knurled wheel 4, and shifted backward by the clockwise rotation of the knurled wheel. After moving the piston 2 forward past the first longitudinal section LA1, the collar 6 impacts against the front disk 9 of the guide 5, so that the guide 5 is pushed forward along with the piston 2 during continued counterclockwise rotation of the knurled wheel past the second longitudinal section LA2. Accordingly, in order to move the piston backward past the longitudinal sections LA1 and LA2, the knurled wheel is turned clockwise.

FIG. 4 shows an embodiment of a tubular insertion nozzle 12 to be placed on the front end of the hollow handle 1. The insertion nozzle 12 has a stop ledge arranged on its rear side. In its central area, the nozzle has a central opening surrounded by an annular ledge 14 having a sealing lip 15. Positioned within the rear portion of the nozzle is a ram 16 whose shaft is held with its front end in the center opening and adhering to the sealing lip 15 under a slight deformation with a certain amount of tension against the shaft of the ram 16. The ram has a length corresponding to that of the first longitudinal section LA1 of the handle 1. A sealing

plate 17 is provided at the rear end of the ram 16. The plate has a dual purpose, one being a guide for the ram in the insertion nozzle, and the second as an impact surface for the piston 2, when it is moved forward toward the nozzle.

As shown in FIGS. 4-8, the insertion nozzle is provided with an annular groove 18 which has an inner diameter which corresponds with the outer diameter of an annular bead 11 arranged on the front edge of the cylindrical hollow body of the handle 1. The groove 18 is positioned approximately in the outer area of the nozzle 12 corresponding to the annular ledge 14. When the insertion nozzle 12 is placed with its rearward part into the handle 1, the annular bead 11 engages with the annular groove 18 and keeps the insertion nozzle firmly in the handle. A spreadable screening disk 19 positioned on the front of the insertion nozzle 12 prevents contact of the body with the handle 1 during the insertion of a medication with the apparatus into a body opening.

In the use of the apparatus described above, the insertion nozzle 12 into which a medication, e.g., a suppository, has been placed, is pushed with its rear end into the handle 1 until the annular bead 11 firmly engages with the annular groove 18. The suppository inserted into the anterior end of the insertion nozzle is pushed out of the insertion nozzle by the ram 16 which is pushed forward when the knurled wheel 4 is rotated counterclockwise to move the piston 2 forward past the first longitudinal section LA1 with a sufficient impact against the sealing plate 17 to push the ram 16 forward, and the sealing plate forward in adherence with the annular ledge 14. By the further counterclockwise rotation of the knurled wheel, the piston is pushed past the second longitudinal section LA 2 with the guide 5 also being pushed forward by the collar 6 of the piston 2 which engages with the disk 9 of guide 5 with a sufficient impact to move the guide 5 against the rear stop ledge 13 of the insertion nozzle 12 with sufficient force to expel the nozzle from the hollow handle 1. In this expulsion operation of the nozzle, a noticeably larger force must be exerted to disengage the annular bead 11 of the handle 1 from the annular groove 18 of the nozzle, then to expel the medication from the nozzle into a body cavity. This increased resistance at the start of expulsion operation of the insertion nozzle is of particular advantage so that the operator of the apparatus can easily determine during the operation of the described medical apparatus when the insertion process for the medication is completed and when further rotation of the knurled wheel 4 is required to start the expulsion of the insertion nozzle.

As a result of the adherence of the sealing lip 15 to the shaft of the ram 16 it is assured that the area of the insertion nozzle accommodating the medication is sufficiently sealed from the other parts of the nozzle. This feature of the nozzle is particularly important when the insertion nozzle is used in the form of a disposable package and at the same time as a package for the medication.

In a second embodiment of the insertion nozzle 12, illustrated in FIG. 5, the ram 16 is eliminated and the area intended for the medication to be placed is provided with a sealing part in the form of a thin membrane 20. Instead of the thin membrane 20, a sector check valve can also be used which is produced by ripping the thin sealing part completely or partly after the

fabrication. With the partly ripped sector check valve the individual sectors are torn apart from each other by the piston 2 when it is pushed through. The sector parts adhering to the piston 2 pushing the medication out of the insertion nozzle also provide a cleaning effect during the withdrawal of the portion 2 in the event that there are portions of the medication adhering to the piston 2.

In FIG. 6 there is illustrated an insertion nozzle 12 particularly useful for a tampon. The nozzle 12 is provided on its rear side with a stop ledge 13 for the expulsion of the nozzle. The tampon (not shown) extends over the entire inner cavity of the insertion nozzle. Because the annular groove 18 is arranged at a relatively short distance from the stop ledge 13, the piston 2 must be pushed forward past the first longitudinal section LA1 and a substantial part of the second longitudinal section LA2 for the insertion of the tampon. The guide 5, only in the second longitudinal section adheres with its front disk 9 to the stop ledge 13, so that only a relatively short displacement of the guide 5 is needed for the expulsion of the insertion nozzle. Apertures 26 are provided in the tubular part of the insertion nozzle 12 so that by immersion into a liquid medication the latter is aspirated through the apertures and can be administered with the tampon.

FIGS. 7, 8, 9a and 9b illustrate an insertion nozzle 12 having connected thereto a screen-like hingeable screening disk 21 made of one piece with the nozzle. The insertion nozzle is connected to the screening disk by means of a film joint 22 arranged immediately adjacent the annular groove 18 on the outside of the insertion nozzle. The screening disk 21 comprises reinforcement ribs 23 connected along the film joint 22 with each other relatively elastically, and a foldable membrane 24 (FIG. 9a) or a folding bellows 25 (FIG. 9b) extending therebetween.

In the arrangement shown in FIG. 7 of the screen disk 21, the membrane 24 or the folding bellows 25 is folded between the reinforcement ribs 23. In this hinged-in position of the screen disk, it only requires a slightly larger packing volume than the insertion nozzle itself.

FIG. 8 illustrates the position of the screening disk 21 when the insertion nozzle 12 is pushed into the front part of the hollow handle 1. As the insertion nozzle is pushed into the handle, the annular bead 11 engages the annular groove 18 and grips below the reinforcement ribs 23 of the screening disk 21 and spreads it as the insertion continues until the screening disk is held firmly in its final position in an almost vertically protruding position.

In FIGS. 9a and 9b, two different types of screen-like disks are illustrated. In FIG. 9a, there is shown a screening disk 21 having foldable membranes 24 extended inbetween reinforcement ribs 23, whereas in FIG. 9b, the disk 21 has folding bellows 25 extended inbetween the reinforcement ribs 23.

It is apparent from the above description that the present invention provides a medical apparatus for inserting medications into body openings which is advantageously designed to expel the medication from a nozzle into a body opening and to expel the nozzle from the apparatus with the same sanitary operation thereof and without the use of any additional devices or an additional hand. The apparatus is also designed to have a nozzle firmly secured to its front end to prevent the inadvertent insertion of a nozzle in a body opening.

Although minor modifications might be suggested by those versed in the art, it should be understood that we wish to embody within the scope of the patent warranted herein all such modifications as reasonably and properly come within the scope of our contribution to the art.

I claim as my invention:

1. A medical apparatus for inserting medications and/or hygienic preparations into body openings and/or cavities without the use of an additional hand or fingers, said apparatus comprising:
 - a. a hollow cylindrical handle having a first longitudinal section positioned toward its front end and a second longitudinal section adjacent to said first section and positioned toward its back end;
 - b. a replaceable tubular insertion nozzle inserted in the front end of said hollow handle, said nozzle being adapted to have medications placed in its front end, said tubular nozzle having a stop ledge at its rear end and a central opening surrounded by an annular stop ledge and a ram positioned in its rear portion with the front end of the ram in the central opening and adhering to the annular ledge, said ram having a sealing plate on its rear end;
 - c. a piston slidably mounted within a longitudinal guide within said hollow cylindrical handle in which said guide is longitudinally displaced, the upper side of said piston being formed as a rack and said piston having a collar engaging with the opposite ends of said guide to limit the movement of said piston relative to said guide; and
 - d. a knurled wheel rotatably mounted in said hollow handle with a portion thereof extended outside of said hollow handle, said wheel engaging with the upper side of said piston whereby the counterclockwise rotation of the knurled wheel pushes the piston forward past the first longitudinal section against the sealing plate of the ram to move the ram forward through the center opening and the plate forward in adherence to the annular ledge, thereby pushing out the medication from the front end of the insertion nozzle.
2. A medical apparatus according to claim 1, wherein the knurled wheel is rotated further to push the piston forward past at least part of the second longitudinal section whereby the collar of the piston engages the front end of said longitudinal guide to move the guide forward with sufficient force against the rear stop ledge of said nozzle to expel the nozzle from the hollow handle.
3. A medical apparatus according to claim 1, wherein the ram of said nozzle has a length corresponding to that of said first longitudinal section of said hollow handle.
4. A medical apparatus according to claim 1, wherein the longitudinal guide comprises two bars extending parallel to the piston, a disk mounted on its front end having a hole for the passage of said piston, and a corresponding semi-disk mounted on its rear end.
5. A medical apparatus according to claim 4, wherein the collar on said piston is arranged on the bottom side thereof in the form of a knob coacting with the disk and semi-disk of said longitudinal guide.
6. A medical apparatus according to claim 5, wherein the annular stop ledge comprises a sealing lip adhering to the ram.

7

7. A medical apparatus according to claim 1, wherein the insertion nozzle on its outer surface has an annular groove engaging therein an annular bead positioned on the front end of the hollow handle and the longitudinal guide is arranged to move only in the second position.

8. A medical apparatus according to claim 7, wherein a screening disk is positioned on said nozzle in front of said annular groove, said disk comprising reinforcement ribs and a foldable skin extending between the reinforcement ribs, said ribs being arranged on said nozzle such that when the insertion nozzle is placed on the hollow handle the ribs are spread apart by the annular ledge to form with the skin a screen-like structure.

8

9. A medical apparatus according to claim 8, wherein the screen-like disk can be placed separately on the insertion nozzle.

10. A medical apparatus according to claim 7, wherein the insertion nozzle is provided with an inner annular lip in the area corresponding with said outer annular groove, whereby the lip slides on the piston as the nozzle is being expelled from the apparatus.

11. A medical apparatus according to claim 1, whereby the tubular insertion nozzle has apertures spaced in the side of its tubular part.

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