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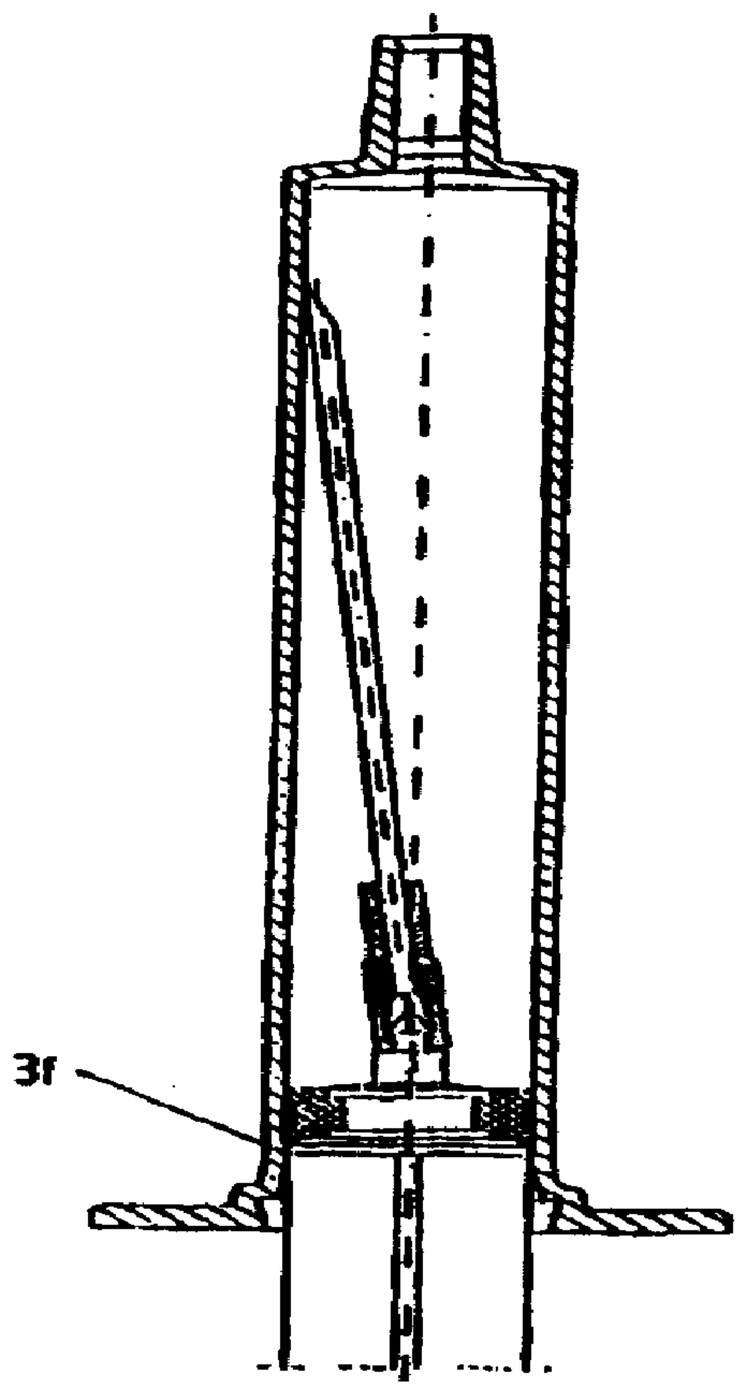
(54) **SERINGUE DE SECURITE UNIVERSELLE**
(54) **UNIVERSAL SAFETY SYRINGE**



(57) Seringue de sécurité universelle comprenant une coiffe protectrice, un cylindre, un piston et une canule montée sur une embase, caractérisée en ce que l'embase de la canule est insérée dans la coiffe protectrice, rigidement à l'encontre d'une butée, la coiffe est montée coulissante sur la partie externe conique du cylindre correspondant à un cône Luer et présente un rétrécissement limitant le siège d'ajustage, prévu sur sa partie interne, à l'avant d'une cavité destinée au logement de l'embase de la canule, ladite cavité pour le logement de l'embase présentant une contre-dépouille empêchant que l'embase soit retirée vers l'avant, ainsi

(57) The invention relates to a universal safety syringe with a protecting cap (1), a cylinder (3), a plunger (4) and a hollow needle lodged on a hollow needle base. The hollow needle base (2) is stored in the protecting cap (1) in such a way as to be resistant to knocks, and designed so as to be able to be pushed in. The protecting cap (1) can be pushed onto the outside of a cone of the cylinder (3) corresponding to a luer-cone, and is provided with a narrowing on its inner side, in front of a recess designed to accommodate the hollow needle base (2), for limiting the push-up path. A recess accommodating a hollow needle base is provided with an undercut (3b) to prevent

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qu'une contre-dépouille pouvant être soulevée de l'intérieur par un élargissement du cône et destinée à empêcher que l'embase soit poussée involontairement vers l'intérieur pendant la piqûre, et en ce que le piston présente en outre une section élargissant cylindriquement le cône, ainsi qu'une tête de piston en forme générale de champignon entrant en contact, par sollicitation à la traction, avec l'embase de la canule. Selon une forme d'exécution préférée, des moyens de sécurité sont prévus pour empêcher un enfoncement involontaire trop précoce et trop prononcé du piston.

forward removal of the hollow needle base, and with an undercut (3c), which can be compensated by broadening the cone from inside, intended to protect the hollow needle stop from unintentional pushing in during plunging. Furthermore, the plunger (4) has a section which broadens the cone cylindrically, and a mushroom-shaped plunger head (4b) which enters into pull contact enters with the needle stop. A preferred design includes a safety device for preventing the plunger from being unintensionally pushed in too early and too far.

Abstract

Universal safety syringe having a protective cap, a cylinder, a plunger and a cannula mounted on a cannula base, it being the case that the cannula base is designed such that it can be pushed firmly against a stop in the protective cap, that the protective cap, which can be pushed externally onto a cone, corresponding to a Luer cone, of the cylinder, is provided with a narrowed section, which is provided on the inside of the cap, in front of a recess designed for receiving the cannula base, and delimits the push-on travel, that a recess which receives a cannula base is provided with an undercut which prevents the cannula base from being removed in the forward direction, and with an undercut of which the effect can be overcome by the cone being widened from the inside and which is provided for safeguarding the cannula stop from being pushed in unintentionally during insertion of the syringe, and it also being the case that the plunger is designed with a section which widens the cone cylindrically and with a mushroom-shaped plunger head, which comes into pulling contact with the needle stop. A preferred embodiment provides a safeguard against the plunger being unintentionally pushed in too early and too far.

Universal safety syringe

The invention relates to a universal safety syringe according to the preamble of the main claim.

In the case of a number of safety syringes, as are disclosed, for example, in German Patent Specification 43 40 082, the injection cannulas are moved back into the cylinder, after use, in order to remain there permanently and safely, without there being any risk of injury, during further handling of the syringe. However, as in the abovementioned document, a new material is also usually proposed, in this case an elastomeric material for example, or it is no longer possible to use the conventional needles with Luer cone.

In other embodiments, for example the version described in US Patent 5 336 198, even separate means are proposed for the purpose of tilting the cannula laterally in the cylinder in order that it cannot be pushed out again. Unfortunately, all these proposals have in common a not inconsiderable degree of complexity, which makes these safety syringes appear expensive and suitable only for special applications.

Unfortunately, however, there is such a great demand for safety syringes within the medical profession today that safety syringes really have to be in constant use. Up until now, the complex geometries with which the cannulas and/or syringes have been provided has meant that this has not been possible.

In order, however, for it to be possible for safety syringes with a retractable cannula to be established for general usage, a necessary precondition is so-called "downward" compatibility with material which has been used up until now, so that it is also possible to fit the wide variety of cannulas which have been available up until now. Otherwise, it would be necessary for novel cannulas of all sizes to be provided immediately for all conceivable purposes and

at all use locations, in order to avoid the two systems coexisting over a transition period - with myriad possibilities of confusion, and problems with storage of double stocks and differing handling methods at the same time.

However, since hitherto known safety syringes require their own cannulas and cannula bases in each case, although it has frequently not been possible to provide or reproach [sic] the desired variety of these, it is essential for it to be possible to continue using the cannulas which have been used up until now.

If, however, use is made of a universal safety syringe with retractable cannula, careless handling of the plunger may cause the latter to be pushed forwards in the cylinder, where it comes into contact with the cannula base before the syringe is actually used. This can take place, for example, as the cannula is pushed on. It goes without saying, however, that it is absolutely essential for this to be avoided because, even during further filling of the syringe, the cannula base is drawn back (too early) into the cylinder - and it is precisely in emergency situations that this may initially go unnoticed.

In the case of hitherto known safety syringes, for example those in DE 38 44 150, this has been avoided by safety elements which were removed prior to injection, in order for it to be possible for the plunger to be pushed right in. For universal usage, however, separate safety elements are highly undesirable since they not only increase the costs of the syringes, but also render handling of the syringes for hitherto conventional usage more complex.

According to the invention, then, the disadvantages of the prior art are eliminated by a universal safety syringe having the features of the main claim. Advantageous embodiments of the invention can be gathered from the subclaims.

It is advantageous, in particular, that, in contrast to conventional syringes, the safety syringe does not have any additional part, and it is thus not only the case that the novel safety syringe constitutes the most cost-effective safety syringe solution, but also that the movements involved in handling it are exactly the same as those for handling the conventional syringe. All conventional cannulas can be fitted by way of the outer Luer standard cone provided. Since the principle does not require a prefitted cannula, it is also possible, however, for appropriate (safety) cannulas on their cannula bases to be selected and inserted just prior to use.

The safety syringe described thus corresponds both to DIN 13098 and to ISO 7886. It is advantageous, in particular, that, in a preferred embodiment, a premature pushing-down action, which could render the syringe unusable, is not possible. In the case of an eccentric cone arrangement, a guide groove or, as proposed, two guide grooves located opposite one another can make it possible to use, for this case as well, the principle according to the invention, which, moreover, is suitable not only for all syringe sizes, but also for two-part and three-part syringes with an additional elastic plunger seal at the end of the plunger.

The universal safety syringe according to the invention is distinguished by a cannula base which is pushed firmly against a stop in the protective cap, and also [lacuna] a protective cap which can be pushed externally onto a cone, corresponding to a Luer cone, of the cylinder, there being provided on the inside of the cap, in front of a recess designed for receiving the cannula base, a narrowed section which delimits the push-on travel.

The recess which receives the cannula base [lacuna] provided with an undercut which prevents the cannula base from being removed in the forward

direction, and with an undercut of which the effect can be overcome by the cone being widened from the inside and which is provided for safeguarding the cannula base against being pushed in unintentionally during insertion of the syringe, this latter undercut being widened by a cylindrical end of the plunger during the final advancement stage, while a preferably mushroom-shaped plunger head is pushed into an essentially cylindrical cavity with border elements engaging behind the mushroom-shaped head.

A further advantageous configuration is distinguished by lugs which are provided at the actuating end of the plunger, are prestressed outwards and, prior to the filling operation, are retained, by corresponding lug supports on the plunger, in a position in which they are aligned essentially along the syringe axis, in order thus to prevent the plunger from being pushed into the cylinder.

Said lugs are designed, for example, as two spreader lugs which are located essentially opposite one another, are fastened at the actuating end of the plunger by film hinges, are oriented towards the cylinder and are initially clamped in a recess, provided at the introduction opening for the plunger, in the cylinder opening for the introduction of the plunger.

Even in the case of an eccentric arrangement of the cone and of the plunger head which grips the cannula holder, the invention can be applied in that the plunger is additionally guided by way of projecting edges in corresponding guide grooves on the inside of the plunger [sic].

Further features and advantages of the invention can be gathered from the following description of a preferred exemplary embodiment with reference to the attached drawing, in which:

Figure 1 shows, in a two-part syringe, the inventive combination of the cannula base in the tip of the cylinder with the protective cap having been pushed on and without the plunger head having been pushed in,

Figure 2 shows an illustration corresponding to Figure 1 with the plunger head having been pushed in and without the protective cap,

Figure 3 shows a three-part syringe in an illustration corresponding to Figure 1,

Figure 4 shows a three-part syringe in an illustration corresponding to Figure 2,

Figure 5 shows a further preferred exemplary embodiment of the syringe according to the invention with the clamping lugs still mounted in the cylinder,

Figure 6 shows the illustration of Figure 5 with the plunger having been pushed in and the clamping lugs having been displaced outwards, and

Figure 7 shows the closed position with the plunger having been drawn out again,

Figure 8 shows an illustration of an eccentric cone arrangement, and

Figure 9 shows a cross section through the plunger, in which it is possible to see the guide grooves.

The syringe illustrated in Figure 1 is provided with a protective cap 1, which is clamped on a cannula base 2 and, by way of a collar 1a (Figure 3), fits on a cone on the cylinder which corresponds to the

Luer standard. This collar 1a serves, at the same time, as a guide for the introduction of the cannula base 2 when the latter is introduced into the cylinder 3. It protects the cannula base against damage and contamination prior to the introduction.

The cannula base 2 is provided with a stop 2a, which strikes against a corresponding stop of the protective cap 1 when the cannula for the universal safety syringe is fitted. As a result, the protective cap 1 additionally serves as a stop when the cannula base is introduced into the cylinder, in that the position of the cannula base 2 in the cylinder 3 is determined by the protective cap striking against the cylinder at a further stop 3a.

The cylinder 3 is advantageously provided with an undercut 3b which, at the preselected push-in depth, engages behind a corresponding reduction in diameter of the cannula base 2 and thus safeguards against the cannula being drawn out in a forward direction once it has been pushed in. On the other hand, however, a further undercut 3c is also provided as a base in the opposite direction and prevents the base from being pushed in further when the cannula is inserted. However, this base is not as wide as the abovementioned base, but rather is dimensioned precisely such that when an end piece of the plunger, which widens the cylinder slightly at this location, is pushed in, it makes it possible for the cannula base 2 to be drawn inwards, through the widened opening, into the plunger.

There may be additionally provided between the cannula base and cylinder one or more sealing lips 3d, which seal the base at this location.

In Figure 4, 4c designates the cylindrical part of the plunger which expands the cylinder beneath the seat of the cannula base in order to make it possible to overcome the effect of the undercut 3c when, once a medicament has been discharged, the

syringe is to be rendered unusable by the cannula being drawn in. A small amount of play is left between the undercut 2b provided in the cannula base and the plunger head which is introduced here, but this play is sufficient to allow the cannula, in the drawn-back state, to drop to the side under the action of gravity, and thus to be prevented from being able to be pushed out through the same opening again.

Additionally proposed in a preferred embodiment of the invention illustrated in Figures 5 and 6 are two lugs 4a which are provided at the actuating end of the plunger by a film hinge and are latched in a corresponding, for example annular, recess at the open grip-plate end of the cylinder. Provided that the plunger 4 is not moved out, the lugs will remain in a state in which they are stressed outwards, by virtue of their film-hinge prestressing, in the annular recess. If, however, the plunger is drawn back, they will be reliably displaced further outwards, with the result that, when the plunger is pushed in again, they rest flatly on the grip plate, on the outside of the cylinder, rather than returning into the recess again. As a result, the plunger can be pushed in right to the base of the cylinder in order to penetrate into the cannula base by way of the plunger head and to carry said base along with it during a subsequent rearward movement. Prior to a first rearward movement of the plunger, however, forces of virtually any strength can be exerted on the plunger without the latter moving into the stem of the cannula.

Finally, Figure 8 illustrates an eccentric cone 3e which, nevertheless, can easily be provided with a cannula base in the same way if the plunger is designed in a rotationally fixed manner, for example, by two projecting edges which are guided in corresponding guide grooves 3e [sic] on the inside of the plunger [sic].

In conclusion, all that remains to point out is that the only difference between the embodiments of Figures 1 and 2 and those of Figures 3 and 4 is an additional elastic sealing ring, which is positioned at the end of the plunger, on the outside, around a corresponding sealing-ring support.

PATENT CLAIMS

1. Universal safety syringe having a protective cap (1), a cylinder (3), a plunger (4), a cannula base (2) and a cannula mounted on the cannula base (2), it being the case that a recess which receives the cannula base (2) is provided with a first undercut (3b) which prevents the cannula base from being pulled out, and with a second undercut (3c) which is provided for safeguarding the cannula base (2) against being pushed into the cylinder unintentionally during insertion of the syringe,
the plunger (4) is designed with a mushroom-shaped plunger head (4b), which comes into pulling contact with the cannula base (2),
characterized in that
- the cannula base (2) is designed such that it can be pushed firmly against a stop in the protective cap (1),
- a cone is formed on the cylinder (3), onto which the protective cap (1) can be pushed externally and which corresponds, in terms of shape, to a Luer cone,
- the protective cap (1) is provided, on its inside, with a narrowed section, which delimits the push-on travel of the cannula base (2) in the cone, in front of a recess designed for receiving the cannula base (2),
- it being the case that the second undercut (3c), which is provided for safeguarding the cannula base against being pushed into the cone of the cylinder, is designed such that its effect can be overcome by the cone being widened from the inside,
- the plunger (4) is designed with a section which widens the cone cylindrically.

2. Universal safety syringe according to Claim 1, characterized in that the plunger head (4b) is of

conical design, while the cannula base (2) has a bushing, which is formed with an essentially cylindrical cavity, with a border engaging behind the mushroom-shaped head.

3. Universal safety syringe according to one of the preceding claims, characterized by lugs (4a) which are provided at the actuating end of the plunger, are prestressed outwards and, prior to the filling operation, are retained, by corresponding lug supports on the plunger, in a position in which they are aligned essentially along the syringe axis.

4. Universal safety syringe according to Claim 3, characterized by two spreader lugs (4a) which are located essentially opposite one another, are fastened at the actuating end of the plunger by film hinges, are oriented towards the cylinder and are initially clamped in a recess, provided at the introduction opening for the plunger (4), in the cylinder (3).

5. Universal safety syringe according to one of the preceding claims, characterized by an eccentric arrangement of the cone and of the plunger head (4b) which grips the cannula holder (2), in the case of which the plunger (4) is additionally guided by way of projecting edges in corresponding guide grooves (3g) on the inside of the **cylinder** [sic].

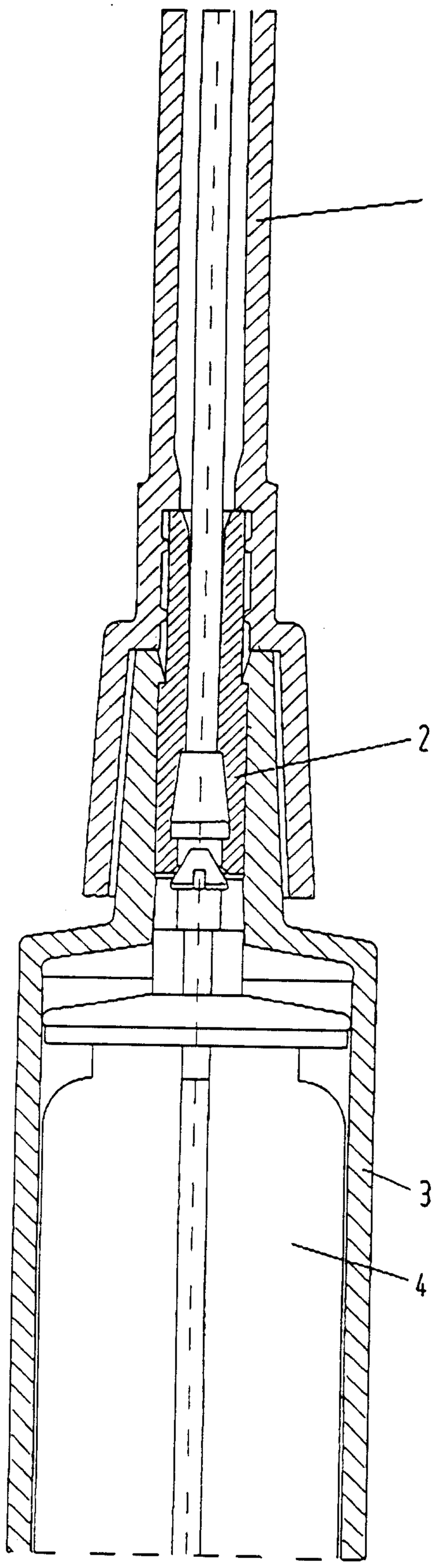

Fig. 1

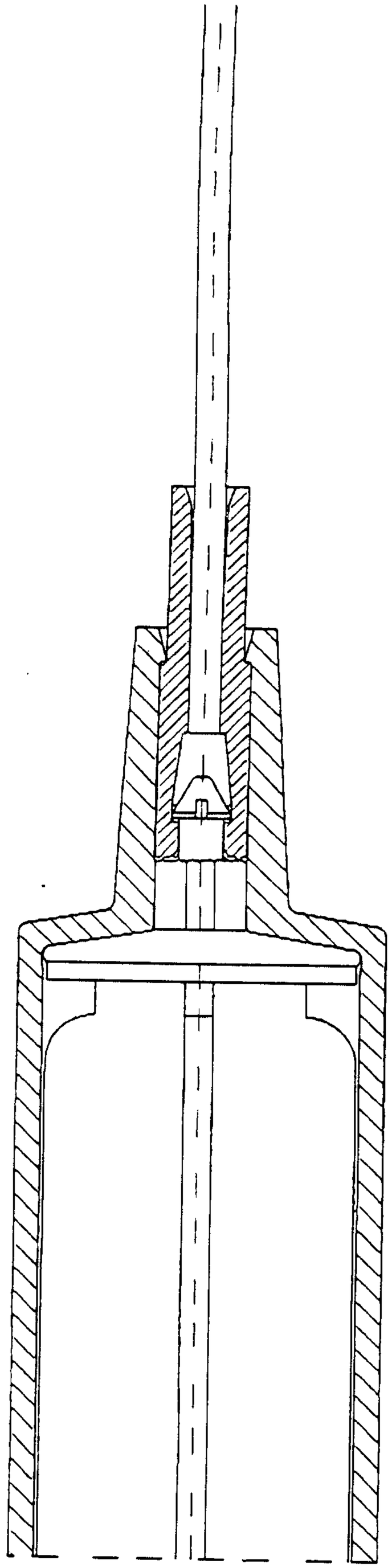

Fig. 2

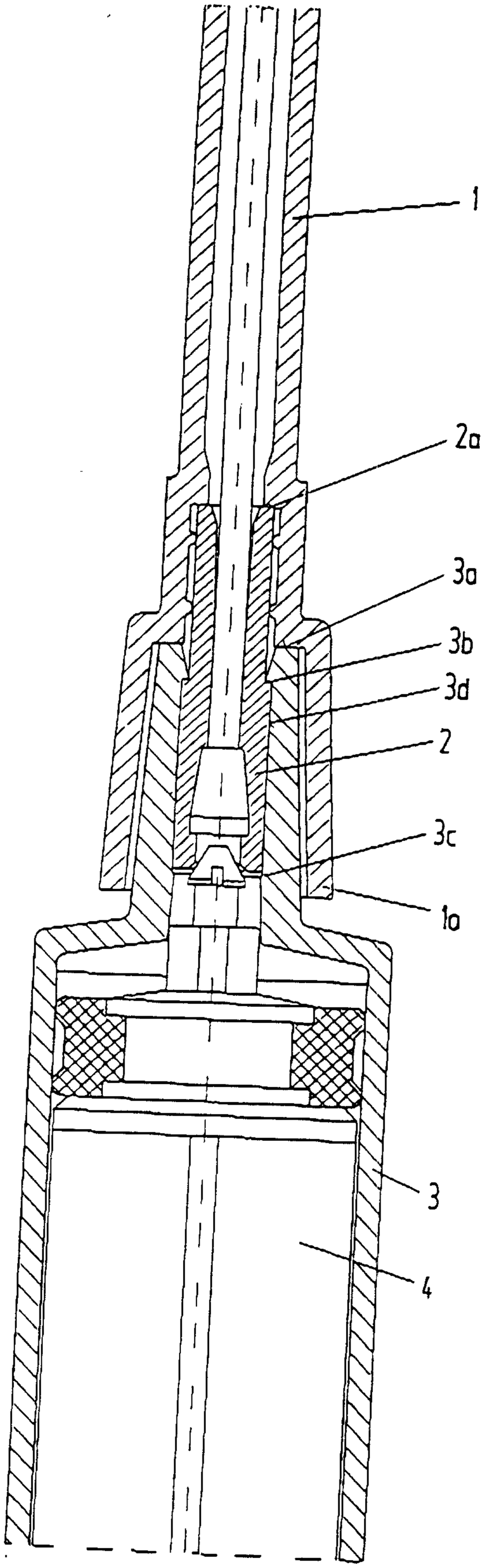

Fig. 3

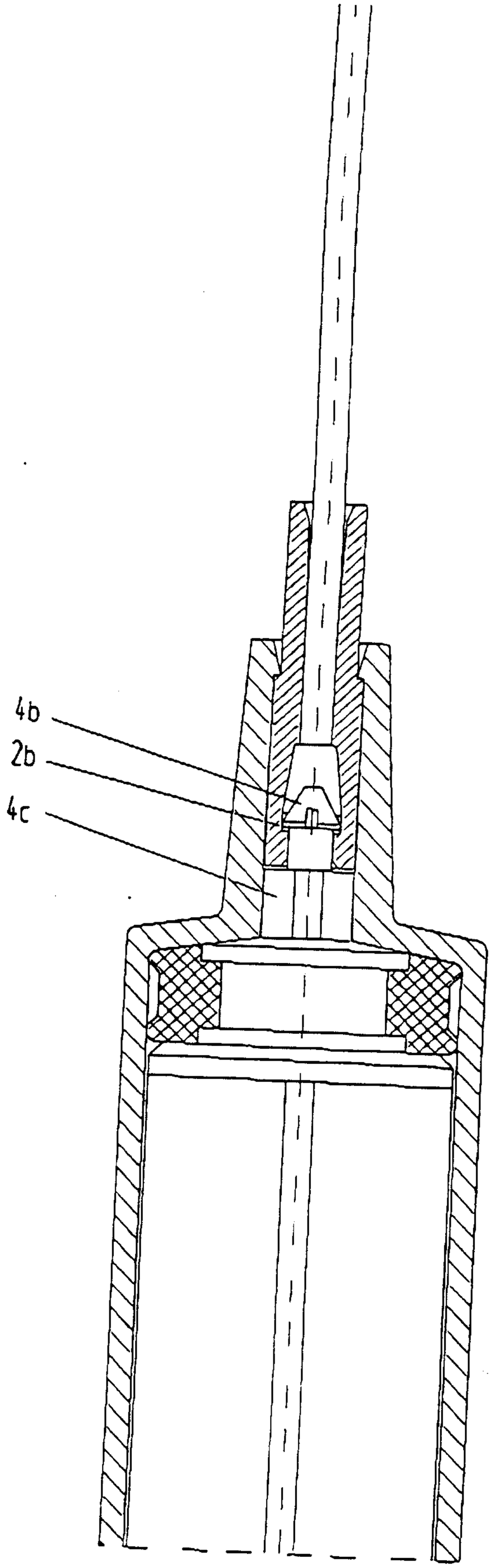

Fig. 4

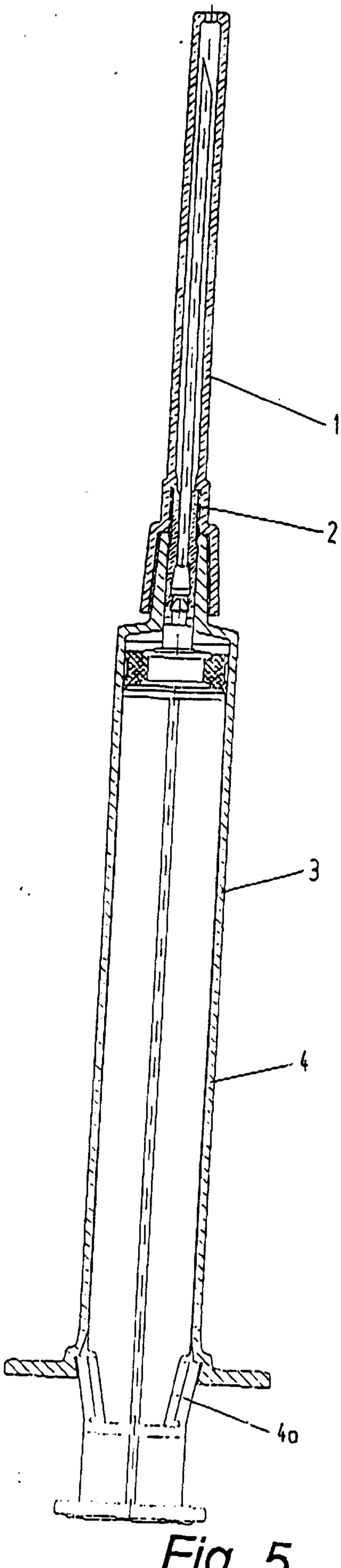

Fig. 5

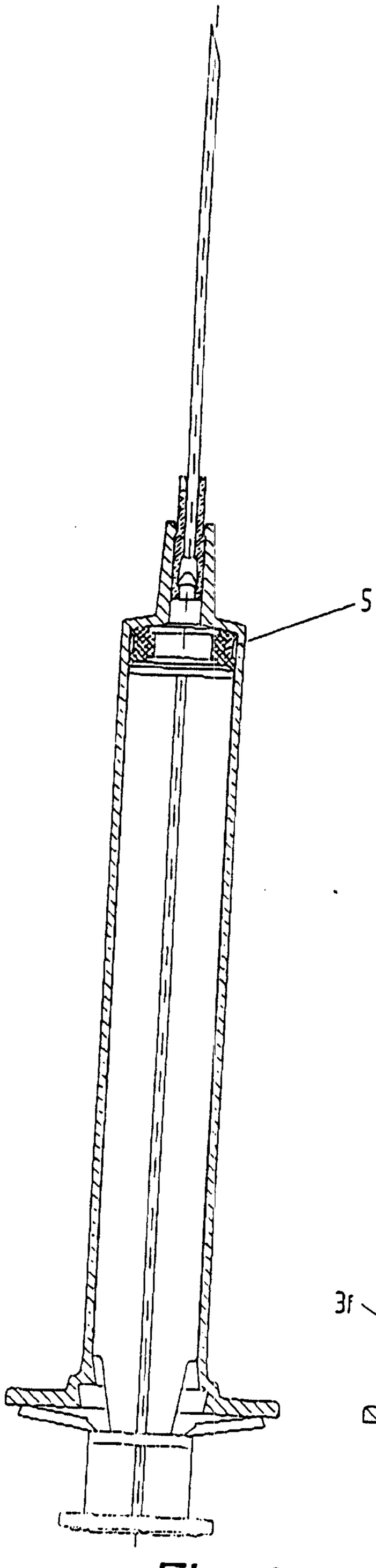

Fig. 6

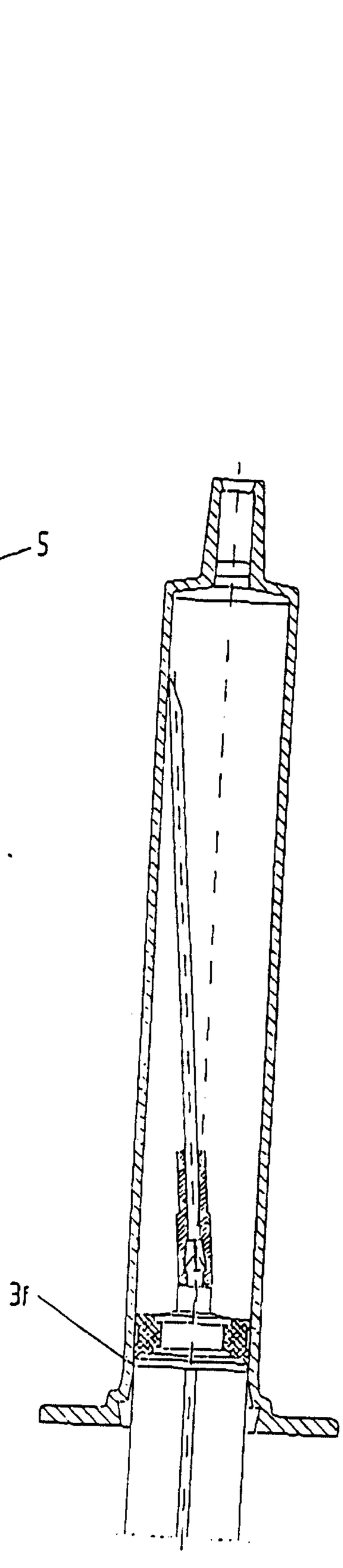

Fig. 7

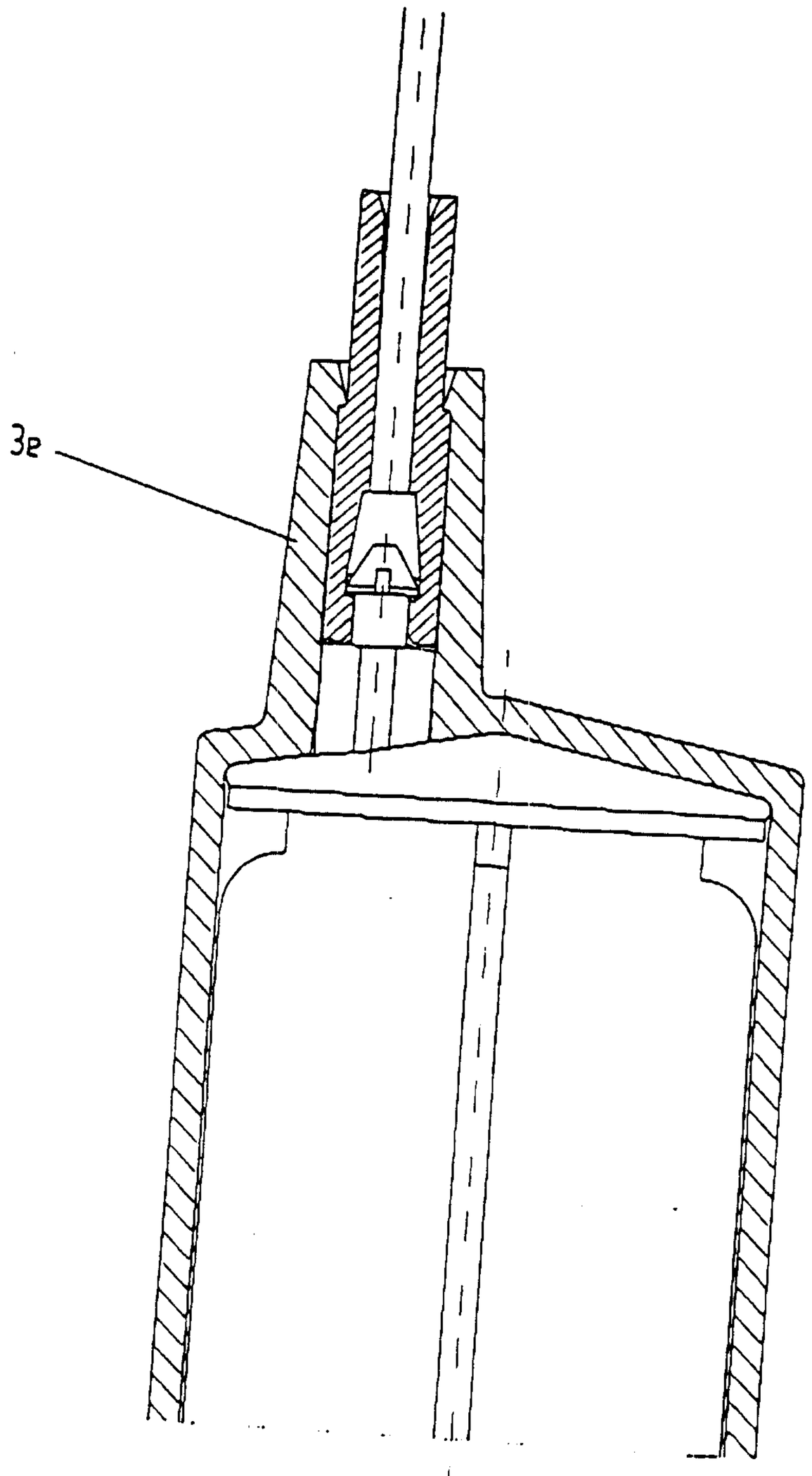

Fig. 8

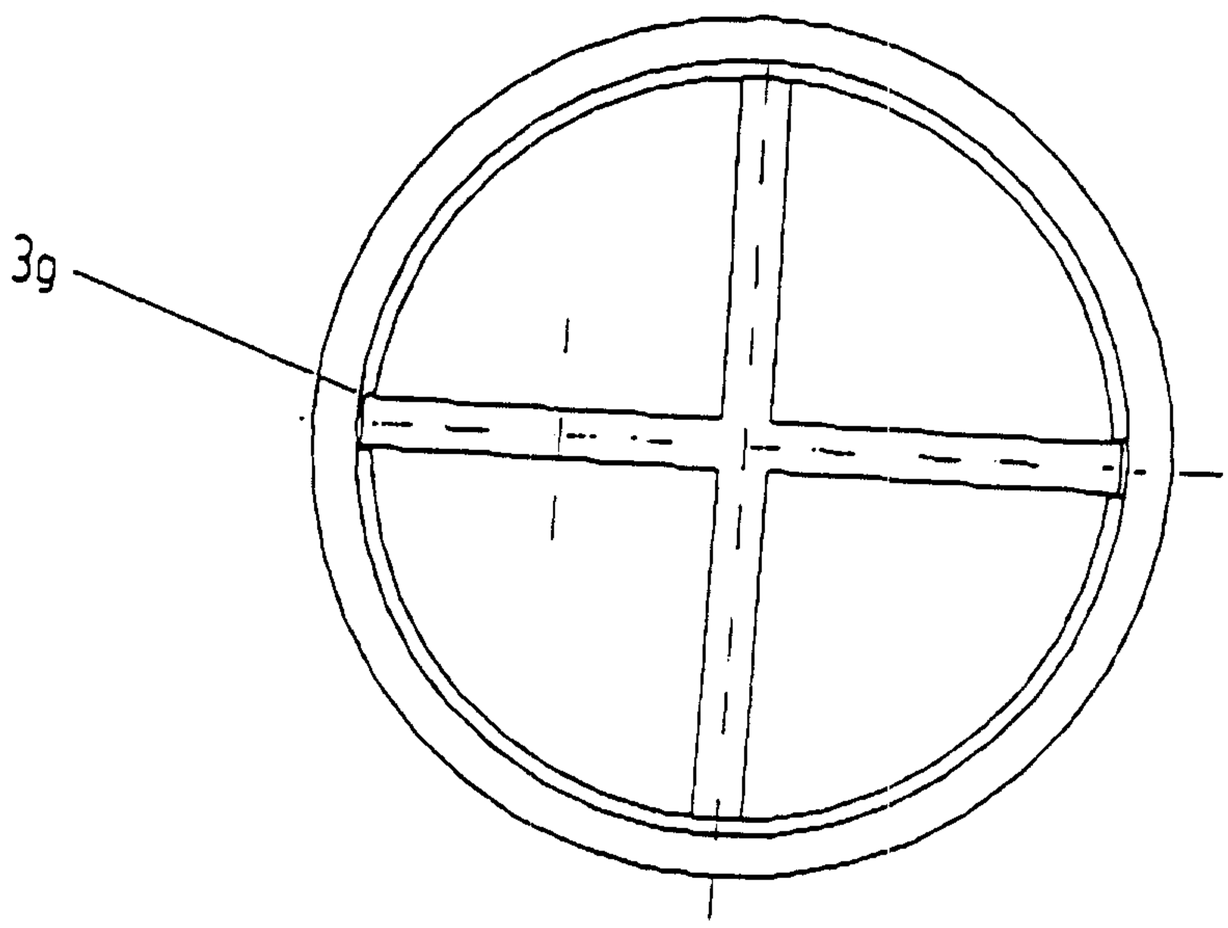

Fig. 9