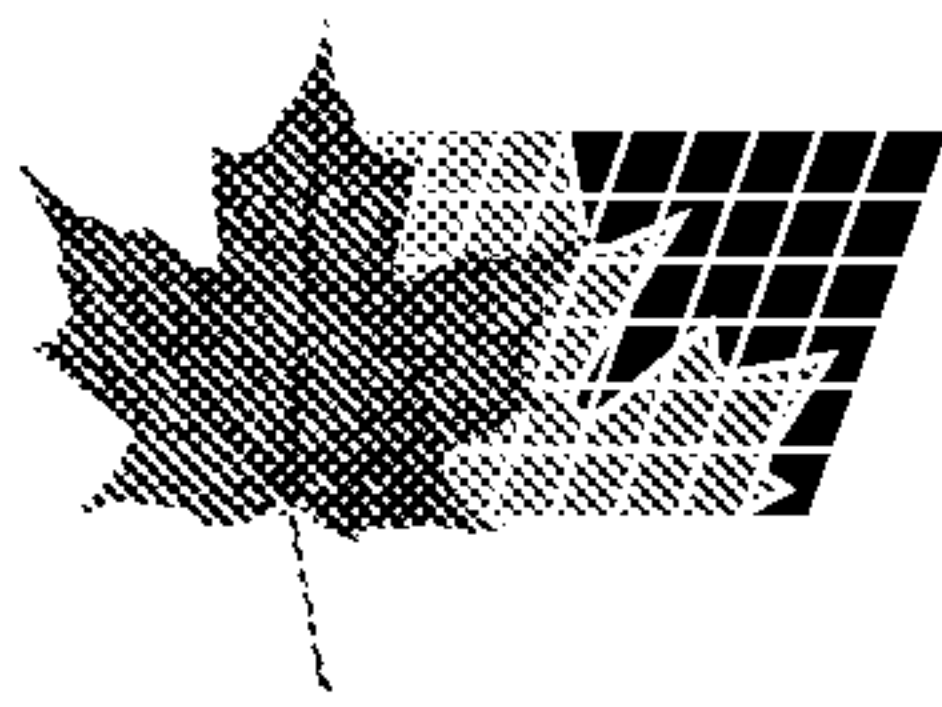
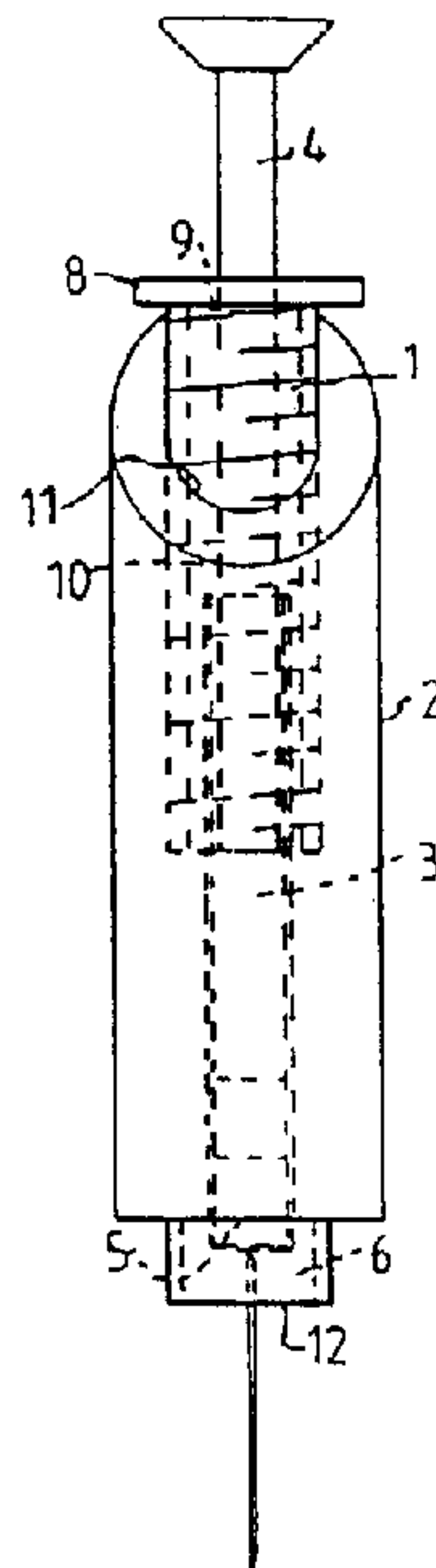




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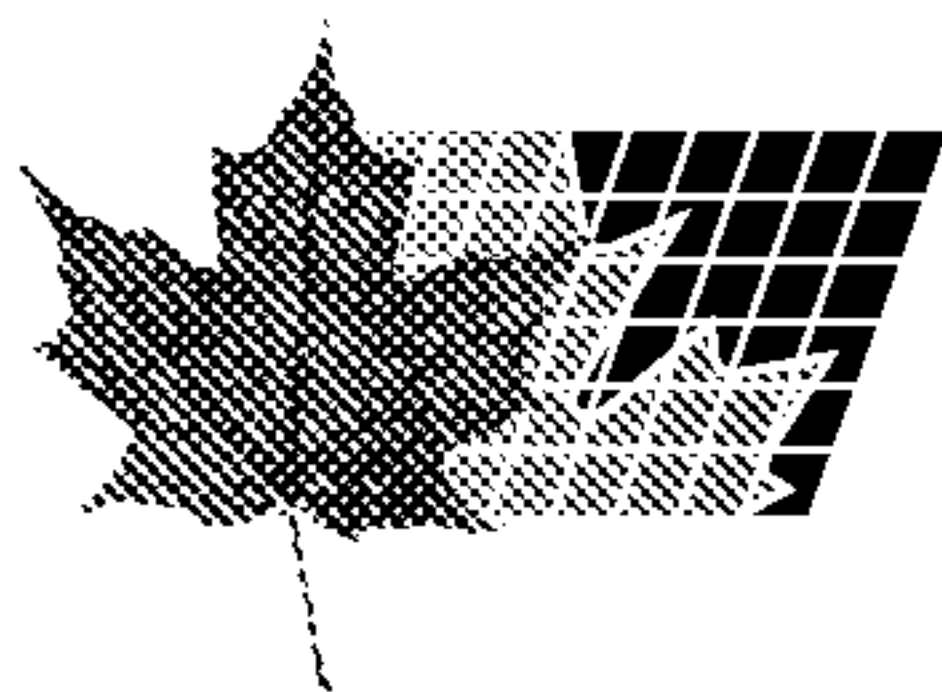
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(30) 1992/01/22 (9200172-6) SE
(54) **DISPOSITIF DE DISTRIBUTION DE MEDICAMENTS**
(54) **MEDICINE DISPENSING DEVICE**



(57) L'invention concerne un dispositif de distribution de médicament qui comprend un équipement pour régler la mesure du dosage et enlever les pièces de manière à permettre l'insertion d'une nouvelle ampoule de dosage. Le distributeur comprend principalement un corps creux

(57) The invention relates to a medicine dispensing device which includes an arrangement for resetting its dosage metering and discharging parts so as to enable a new dosage ampoule to be inserted. The dispenser is mainly comprised of a slotted and hollow housing (2) for



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et rainuré (2) conçu pour recevoir des ampoules de dosage (3). Un dispositif à vis (1) se trouve à l'extrémité arrière du corps, et il comporte un dispositif de dosage et de dégagement (4) auquel il est relié. L'ampoule est maintenue dans le corps par le dispositif à vis qui agit sur une butée (5), en vissant le dispositif à vis dans au moins une partie taraudée de l'ouverture arrière du corps. Le dispositif à vis et l'ampoule peuvent pivoter radialement par rapport au corps, grâce au fait qu'après avoir administré une dose de l'ampoule, celle-ci peut se déplacer axialement dans le corps creux, et aussi grâce au fait que la partie taraudée est positionnée de telle sorte que le dispositif à vis évite le contact avec cette partie lorsqu'il est pivoté radialement par rapport au corps et enlevé de sa position de départ, permettant l'insertion d'une nouvelle ampoule.

receiving dosage ampoules (3). Arranged at the rear end of the housing is a screw-threaded device (1) which has dosing and discharging means (4) connected thereto. The ampoule is secured in the housing by the screw-threaded device in coaction with a fitting (5), by screwing the screw-threaded device into at least one screw-threaded part of the rear opening of the housing. The screw-threaded device and the ampoule can be swung radially from the housing, by virtue of the fact that subsequent to administering a dosage from the ampoule, the ampoule is able to move axially in the hollow housing, and also by virtue of the fact that this screw-threaded part is positioned so that the screw-threaded device will pass out of engagement therewith when swung radially from the housing and withdrawn to its starting position, for the insertion of a new ampoule.



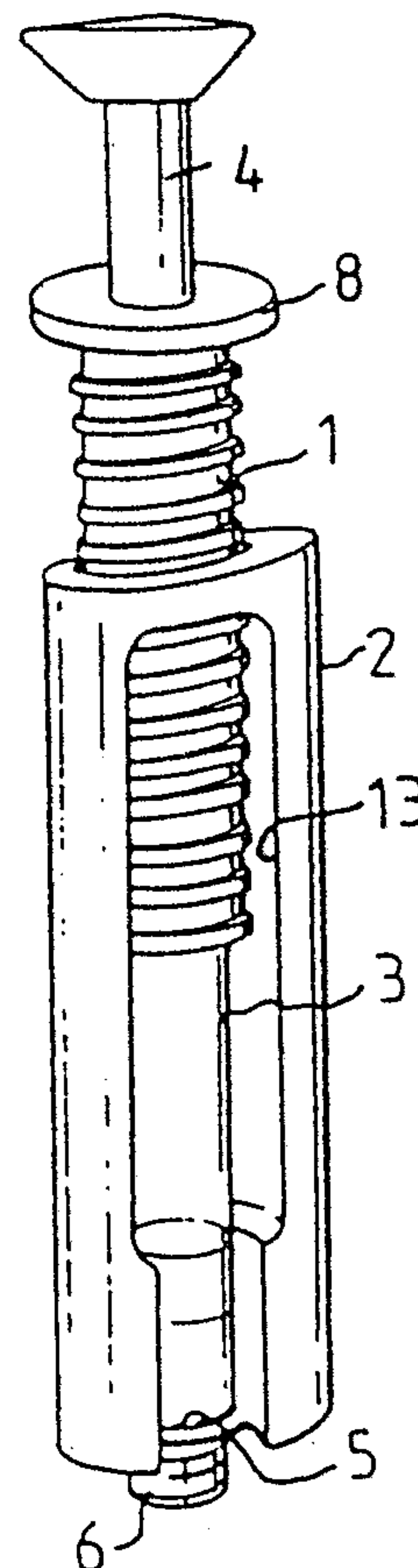


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(21) International Application Number: PCT/SE93/00015 (22) International Filing Date: 14 January 1993 (14.01.93) (30) Priority data: 9200172-6 22 January 1992 (22.01.92) SE (71) Applicant (for all designated States except US): KABI PHARMACIA AB [SE/SE]; S-751 82 Uppsala (SE). (72) Inventors; and (75) Inventors/Applicants (for US only) : LEVANDER, Gustav [SE/SE]; Järpstigen 16, S-161 28 Bromma (SE). LJUNGQUIST, Olle [SE/SE]; Havrevägen 21, S-183 67 Täby (SE). (74) Common Representative: KABI PHARMACIA AB; Patent Department, S-112 87 Stockholm (SE).		(81) Designated States: AU, CA, FI, JP, NO, NZ, RU, US, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i>

(54) Title: A MEDICINE DISPENSING DEVICE

(57) Abstract

The invention relates to a medicine dispensing device which includes an arrangement for resetting its dosage metering and discharging parts so as to enable a new dosage ampoule to be inserted. The dispenser is mainly comprised of a slotted and hollow housing (2) for receiving dosage ampoules (3). Arranged at the rear end of the housing is a screw-threaded device (1) which has dosing and discharging means (4) connected thereto. The ampoule is secured in the housing by the screw-threaded device in coaction with a fitting (5), by screwing the screw-threaded device into at least one screw-threaded part of the rear opening of the housing. The screw-threaded device and the ampoule can be swung radially from the housing, by virtue of the fact that subsequent to administering a dosage from the ampoule, the ampoule is able to move axially in the hollow housing, and also by virtue of the fact that this screw-threaded part is positioned so that the screw-threaded device will pass out of engagement therewith when swung radially from the housing and withdrawn to its starting position, for the insertion of a new ampoule.



A medicine dispensing deviceTechnical field

5 The present invention relates to a device for dispens-
ing liquid substances in metered quantities from a
container, said device including a mechanism by means
of which, after administering the contents of the
10 container, the device can be easily returned to its
original state, in which it is able to receive a
further container and to dispense measured quantities
of medicine therefrom. The invention particularly re-
lates to the dispensing of medicines from a dosage
cartridge or ampoule.

15 According to another aspect, the invention further re-
lates to an arrangement by means of which the dispens-
er can be returned to its original operative state.

20 Background of the invention

One problem with known devices used to administer
measured quantities of medicine, i.e. dosages, such as
hypodermic syringes in particular and also devices
25 used to administer medicines in a pulverulent or
viscous dosage form, is that they lack the provision
of means which will ensure that the dispensing device
can be returned quickly to its original state so that
a new dosage ampoule can be fitted into the device.

30 The concept of the present invention can be readily
applied to different known kinds of medicine dispens-
ing devices which include a screw mechanism for
reconstituting and/or metering and administering the
35 content of a prefilled ampoule. Dispensers of this
kind are well known in the art; see for instance
US, A, 4, 592, 745.

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Swedish patent specifications SE,B,465065 and SE,B,-
464797 (corresponding to EP,B,298067) describe dis-
pensers in the form of hypodermic syringes which
include a screw mechanism for displacing a plunger in
5 a prefilled cylinder.

These specifications disclose how dual-chamber am-
poules can be reconstituted by rotating the screw.
Dispensing and administering of the medicine is then
10 effected with the aid of an arrangement which is
activated by means of an operating lever.

In order to return a syringe of this kind to its
original state and therewith enable a fresh ampoule to
15 be fitted and reconstituted and its contents dispens-
ed, it is necessary to withdraw the screw mechanism
manually back to its starting position. This is a time
consuming task and may easily be neglected, which may
result in damage to the screw mechanism or in an
20 impairment in the metering accuracy of the dispenser.

Although this problem can be overcome by constructing
the dispenser, or syringe, for one-time-use only, with
the intention of discarding the dispenser after having
25 emptied the ampoule with the plunger located in its
forward position, this solution is not a desirable
solution, mainly for material handling reasons.

Consequently, there is a need for a dispenser which
30 includes a simple arrangement by means of which those
components of the dispenser which have been active in
reconstituting and/or dispensing a measured quantity
of medicine, or dose, can be quickly returned to their
respective starting positions after emptying the
35 ampoule. This applies in particular to the type of
hypodermic needles described above, such needles being
widely used within the art.

It is particularly desirable to provide an arrangement by means of which a screw-threaded actuator or like devices, such as the screw described above for instance, is returned quickly to its starting position in which the dispenser, or syringe, can be fitted with a fresh ampoule.

Swedish published specification 379089 and FR,A1, 2613789 teach a number of technical solutions to the problem of moving such screw-like devices quickly with the intention of releasing or securing the devices without coming into contact with the screw threads thereof.

None of these publications, however, gives an indication as to how a screw-threaded actuator intended for dispensing a metered quantity of medicine from an ampoule or similar container can be returned to its original position for administering a new dosage.

This problem is solved by the present invention, which provides a medicine dispensing device which includes an arrangement by means of which the screw-threaded actuator can be reset quickly and readily for renewed administration of a medicine dosage.

Disclosure of the invention

The medicine dispenser comprises generally a slotted housing which is constructed to receive a dosage ampoule and which includes at its forward end a dosage ampoule fitting and a dispensing conduit connected thereto. Mounted at the rear end of the housing is a screw-like device which functions to secure the ampoule in said fitting and which is connected to a dosage dispensing and discharging device.

According to the invention, the dispensing device is constructed so that the ampoule and the dosage

dispensing and discharging device can be swung radially out from the housing through the slotted region thereof in a given state of the dispenser. By this is meant that after dispensing and discharging the content of the ampoule, the screw device can be released from the housing by swinging the device radially about its long axis, therewith enabling the ampoule to be removed radially from the dispenser housing.

10 As the screw-threaded discharging device is screwed down it assists in securing the ampoule in the housing, and may also contribute towards reconstituting the ampoule content, for instance by including a known mechanism for reconstituting the content of a multi-chamber ampoule (see for instance EP,B,298067). The
15 dispensing and discharging device may include a plurality of mechanisms that are well known to the person skilled in this art, for instance mechanisms which are able to reconstitute the content of a multi-chamber
20 ampoule and divide the ampoule into different, adjustable dosages, and to discharge the ampoule content from the dispenser. In its simplest form, the dispensing-and-discharging device may consist of an axially movable plunger rod connected to the screw-threaded
25 device. The ampoule may consist of one or more chambers of which one may contain a reconstitutable medicine in powder form and may also include displaceable plungers which are actuable by component parts of the discharge device.

30 It lies within the general purviews of the invention to provide a number of different discharge devices and ampoules of alternative embodiments, according to the type of dispensing or metering desired.

35 The dosage ampoule is accommodated in a space provided in the housing to this end. As before mentioned, the discharge device includes a screw-threaded device which can be screwed into the rear opening of the

housing, said opening having at least one screw-threaded part. The ampoule is guided axially into a fitting provided adjacent the front opening of the housing, as the screw-threaded device is screwed into said rear opening.

The ampoule can then be reconstituted and dosages for administration prepared, with the aid of the various component parts of the discharge device, in a known manner.

The arrangement is such that the ampoule is able to move axially in the hollow holder when empty and, consequently, sufficient axial space is obtainable for the empty ampoule and the screw-threaded device to be swung away from the housing and released, this axial movement of the ampoule in the container also enabling the screw-like discharge device to be removed from the holder. To this end, the screw-threaded device is configured so that the weight of the ampoule will cause the ampoule to fall back axially within said device through a distance sufficient to enable the ampoule to be released from the securing device and to enable the screw-threaded device to be released from the holder. The loosened screw-threaded device can now be moved free from the screw-threaded part or parts of the opening, by swinging the device radially about its long axis, and is then returned to its original position for fitting and dissections charging of a new ampoule. The consumed dosage ampoule can be removed radially and replaced.

The screw-threaded device with connected dispensing and discharging devices can be released from the screw-threaded part or parts of said opening by swinging the device radially and by withdrawing said devices beyond said screw-threaded section or sections to their starting position for receiving a new dosage ampoule. The screw-threaded device and dispensing and

discharging devices are constructed to this end in a manner described herebelow with reference to a preferred embodiment of the invention.

5 Brief description of the drawings

So that the invention will be more readily understood and further features thereof made apparent, the invention will now be described with reference to an exemplifying embodiment thereof and also with reference to
10 the accompanying drawings, in which
Figure 1 illustrates a suitable exemplifying embodiment of the inventive medicine dispensing device;
Figure 2 is a sectional view of the device shown in
15 Figure 1;
Figure 3A is a principle sectional view of a screw-threaded device and slotted housing having two screw-threaded parts, and shows the screw-threaded device in its starting position;
20 Figure 3B is a principle, sectional view corresponding to the view shown in Figure 3A, with the screw-threaded device in its bottom position;
Figure 3C is a principle, sectional view corresponding to the views of Figure 3A and 3B, and shows the screw-
25 threaded device swung radially out of the housing through a slotted region thereof, and withdrawn beyond the screw-threaded parts, back to its starting position; and
Figures 4A and 4B are principle, sectional views which
30 show that the slotted housing may be provided with only one screw-threaded part and effect the return illustrated in Figures 3A to 3C.

According to one particularly preferred embodiment
35 (see Figures 1 and 2) the screw-threaded device with connected dispensing and discharging devices is comprised of a screw 1 and a dispensing piston rod 4 connected thereto. When inserting a dosage ampoule 3, the screw is screwed into the hollow and slotted

housing 2, which is provided in its rear opening 11 with at least one screw-threaded part 7 (see Figure 3A), wherein the ampoule is guided into a fitting in the forward end 12 of the housing as the screw is

5 turned in the screw thread, said fitting having the form of an ampoule securing recess 5. As will be seen from the drawings, the housing is slotted so as to enable the ampoule and the screw-threaded device to be swung outwardly therefrom.

10

In other embodiments of the invention, the screw may be caused to coact with a plunger rod of known construction (not shown) in a manner to result in reconstitution of the content of a multi-chamber ampoule

15 and to dispense metered dosages of said ampoule content.

20

The dosage ampoule is preferably cylindrical and may be configured in a number of different ways. For instance, the ampoule may include one or several chambers and may optionally include displaceable plungers capable of being activated by means of the inventive discharging mechanism.

25

When the screw 1 has been screwed down to its limit, the ampoule contents may be discharged through a cannula or injection needle attached to the attachment device 6, by moving the plunger rod 4.

30

The screw is returned to its starting position by tipping the whole of the dispensing device backwards, whereupon the ampoule is able to fall back axially through a hollow space 10 provided in the screw, so as to loosen the ampoule from the recess 5 and also from

35 the housing. The plunger rod returns to its starting position under its own weight, and the screw is loosened from the screw-threaded parts 7 by rotating the screw radially out of contact with said parts(s) 7 and returning the screw to its starting position in the

aforedescribed manner (see Figure 3C).

5 After emptying the ampoule, the plunger rod can be moved rearwardly in an axial direction through a distance corresponding to the last dosage dispensed from the ampoule, such as to further assist the am-
10 poule in its axial movement. Rearward movement of the plunger rod is limited by a shoulder 9. This enables the ampoule to be released from the housing through
15 said groove and removed radially therefrom and a further ampoule to be inserted through an opening 13 in the housing periphery.

15 Release of the screw from the screw-threaded parts of the housing is made possible because they have been placed at a given axial distance apart, such that the distance between said parts is greater than the diame-
20 ter of the screw-threaded device when said device is swung radially through the slotted region of the housing. As a result of this positioning of the screw-
25 threaded parts, the screw-threaded device will pass free from the screw threads when said device is swung radially and drawn back to its starting position for administering a new dosage (see Figures 3A-3C). This
30 return of the discharge device to its starting position can be further facilitated by bevelling the upper opening of the housing in a manner to form a space adapted for the discharge device when said device is swung radially and drawn to its starting position. The
35 housing may also be provided with only one screw-threaded part. This screw-threaded part should then be placed at a suitable axial distance from the rear opening of the housing, so that the discharge device will pass free from engagement with said opening when rotated radially (see Figures 4A and 4B).

The position of respective screw-threaded parts and their configuration are adapted to each manner of construction of the holder and screw-threaded device.

Such constructional embodiments are well known to the person skilled in this art and may lead to a large number of embodiments, all of which lie within the scope of the present invention.

5

It will be understood that the invention is not restricted to the aforescribed and illustrated exemplifying embodiments thereof. For instance the aforescribed dispensing device and mechanism can be used for rapidly returning the discharge devices of injection needles to their original positions and for replacing empty ampoules with fresh ampoules, and with other medicine dispensing devices which include a screw mechanism.

10

15

The medicine dispensing device and mechanism can be adapted for use with essentially all types of medicine dispensing processes effected with the aid of different types of containers or dosage ampoules, such as parenteral, oral, nasal, rectal and ocular administration of metered dosages of medicine.

20

CLAIMS

1. A medicine dispensing device, comprising:
 - a hollow cylindrical housing adapted to receive a dosage ampoule, the
 - 5 housing having a longitudinal slot, and having at a first end a fitting for holding the ampoule during dispensing, and a discharge conduit for connection to the ampoule, and at a second end a screw thread on its interior surface;
 - a hollow screw threaded device adapted to receive the ampoule, the screw
 - 10 threaded device being adapted to be received by the second end of the housing, and having a screw thread engaging the screw thread on the interior surface of the housing;
 - a plunger for discharging and metering the medicine, the plunger being adapted to be received within the hollow screw threaded device;
 - 15 wherein, when it is desired to remove a dosage ampoule, the plunger permits the ampoule to move longitudinally within the housing to release the ampoule from the fitting, whereupon the ampoule, the screw-threaded device and the plunger may be swung out of the housing through the longitudinal slot, and the ampoule may be removed, and the screw threaded
 - 20 device returned to a starting position.
2. A medicine dispensing device according to claim 1, further comprising:
 - a plurality of threaded portions formed on an inside surface of the housing
 - in the vicinity of the second end, wherein the threaded portions are spaced
 - 25 apart longitudinally one from the other by a distance which is sufficient such that the screw threaded device can be disengaged from the threaded portions by exerting radial pressure on the plunger operator end.
3. A medicine dispensing device according to claim 2, wherein the second
- 30 end is bevelled, providing a space for the screw-threaded device to move

into when the screw-threaded device is swung radially away from the housing and returned to the starting position.

4. A medicine dispensing device according to claim 1, 2 or 3, wherein the
5 plunger is able to return to the starting position under influence of its own weight subsequent to dispensing, and wherein the fitting includes a recess substantially complementarily shaped to an end of the ampoule.
5. A medicine dispensing device according to any one of claims 1 to 4,
10 wherein the longitudinal movement of the ampoule results from the ability of said plunger to move freely through a distance corresponding to a volume within said ampoule of a desired dosage subsequent to administration of the desired dosage from the ampoule.
- 15 6. A medicine dispensing device according to any one of claims 1 to 5, further comprising:
a cylindrical dosage ampoule including one or more chambers; and means in the vicinity of the first end of the housing for attaching a cannula or an injection needle to the discharge conduit, the cannula or injection
20 needle enabling the device to be used for parenteral injection.
7. A medicine dispensing device according to claim 1, wherein the housing includes a second threaded portion positioned at a distance from the second end of the housing so as to allow the screw-threaded device to move freely
25 within the second end and to return to the starting position when the screw-threaded device is swung radially out from the housing.
8. A medicine dispensing device according to claim 7, wherein the second end is bevelled, providing a space for the screw-threaded device to move

into when the screw-threaded device is swung radially away from the housing and returned to the starting position.

5 9. A medicine dispensing device according to claim 7, wherein the plunger is able to return to the starting position under influence of its own weight subsequent to dispensing, and wherein the fitting includes a recess substantially complementarily shaped to an end of the ampoule.

10 10. A medicine dispensing device according to claim 9, wherein the longitudinal movement of the ampoule results from the ability of said plunger to move freely through a distance corresponding to a volume within said ampoule of a desired dosage subsequent to administration of the desired dosage from the ampoule.

15 11. A medicine dispensing device according to claim 7, further comprising: a cylindrical dosage ampoule including one or more chambers; and means in the vicinity of the first end of the housing for attaching a cannula or an injection needle to the discharge conduit, the cannula or injection needle enabling the device to be used for parenteral injection.

20

12. A medicine dispensing device according to claim 1, wherein the second end is bevelled, providing a space for the screw-threaded device to move into when the screw-threaded device is swung radially away from the housing and returned to the starting position.

25

13. A medicine dispensing device according to claim 12, wherein the plunger is able to return to the starting position under influence of its own weight subsequent to dispensing, and wherein the fitting includes a recess substantially complementarily shaped to an end of the ampoule.

14. A medicine dispensing device according to claim 13, wherein the longitudinal movement of the ampoule results from the ability of said plunger to move freely through a distance corresponding to a volume within said ampoule of a desired dosage subsequent to administration of the desired dosage from the ampoule.

15. A medicine dispensing device according to claim 12, further comprising: a cylindrical dosage ampoule including one or more chambers; and means in the vicinity of the first end of the housing for attaching a cannula or an injection needle to the discharge conduit, the cannula or injection needle enabling the device to be used for parenteral injection.

16. A medicine dispensing device according to claim 1, wherein the plunger is able to return to the starting position under influence of its own weight subsequent to dispensing, and wherein the fitting includes a recess substantially complementarily shaped to an end of the ampoule.

17. A medicine dispensing device according to claim 16, wherein the longitudinal movement of the ampoule results from the ability of said plunger to move freely through a distance corresponding to a volume within said ampoule of a desired dosage subsequent to administration of the desired dosage from the ampoule.

18. A medicine dispensing device according to claim 17, further comprising: a cylindrical dosage ampoule including one or more chambers; and means in the vicinity of the first end of the housing for attaching a cannula or an injection needle to the discharge conduit, the cannula or injection needle enabling the device to be used for parenteral injection.

19. A medicine dispensing device according to claim 16, further comprising: a cylindrical dosage ampoule including one or more chambers; and means in the vicinity of the first end of the housing for attaching a cannula or an injection needle to the discharge conduit, the cannula or
5 injection needle enabling the device to be used for parenteral injection.

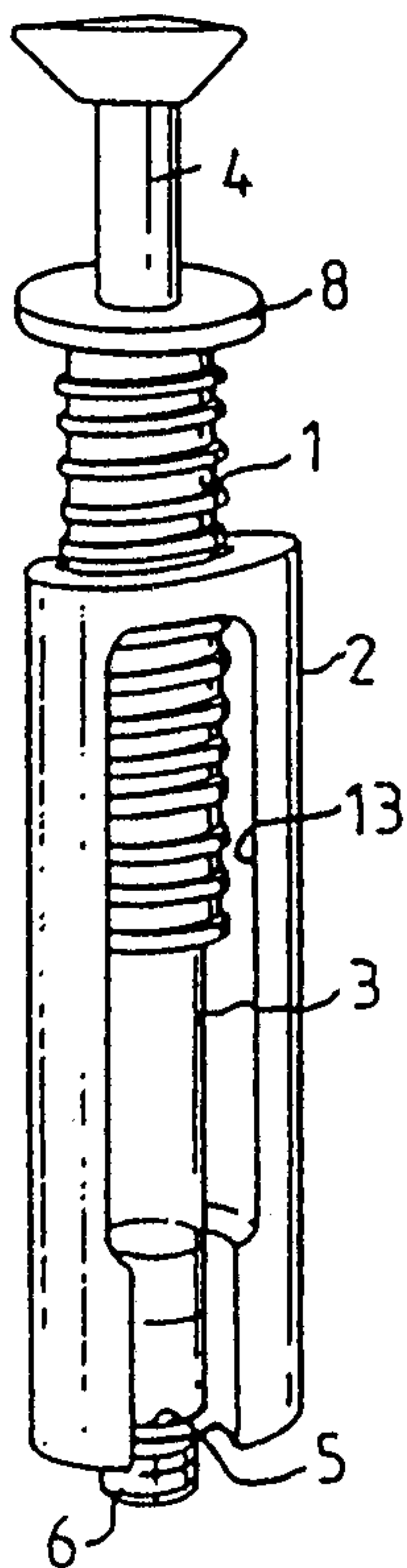


FIG.1

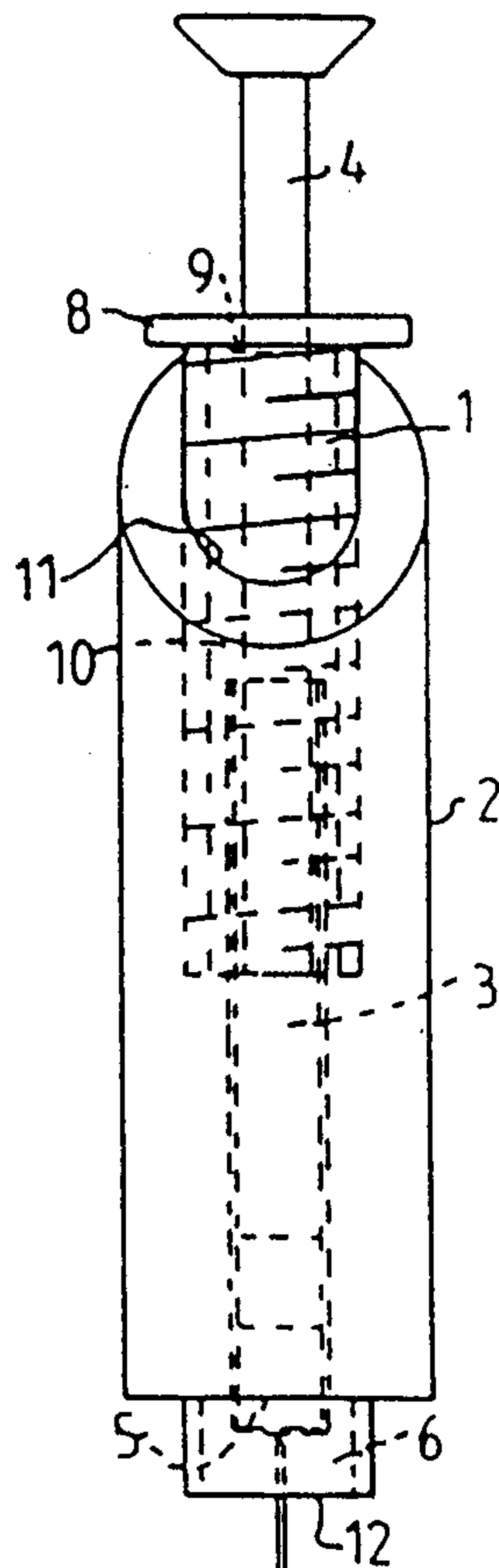


FIG.2

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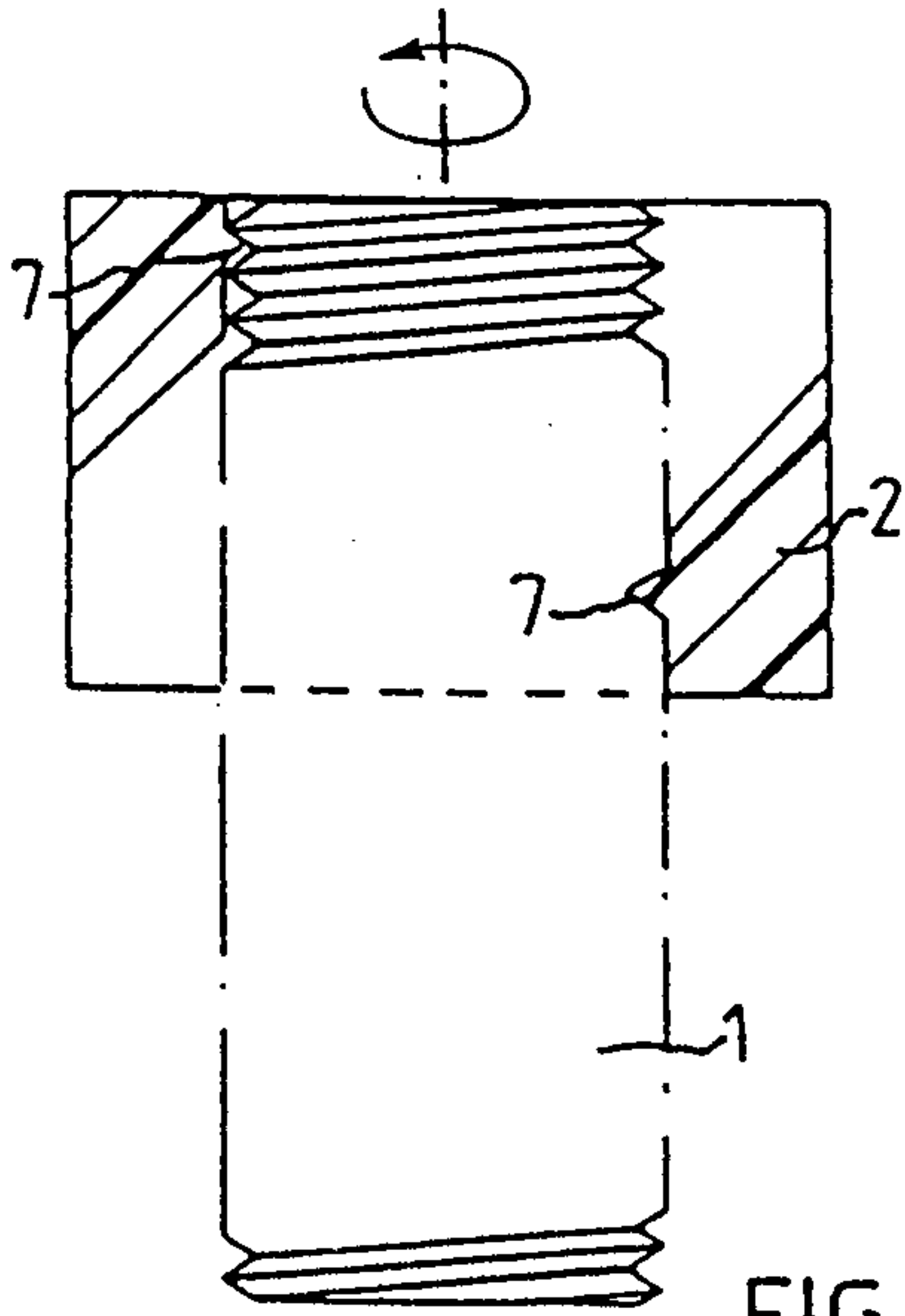


FIG. 3A

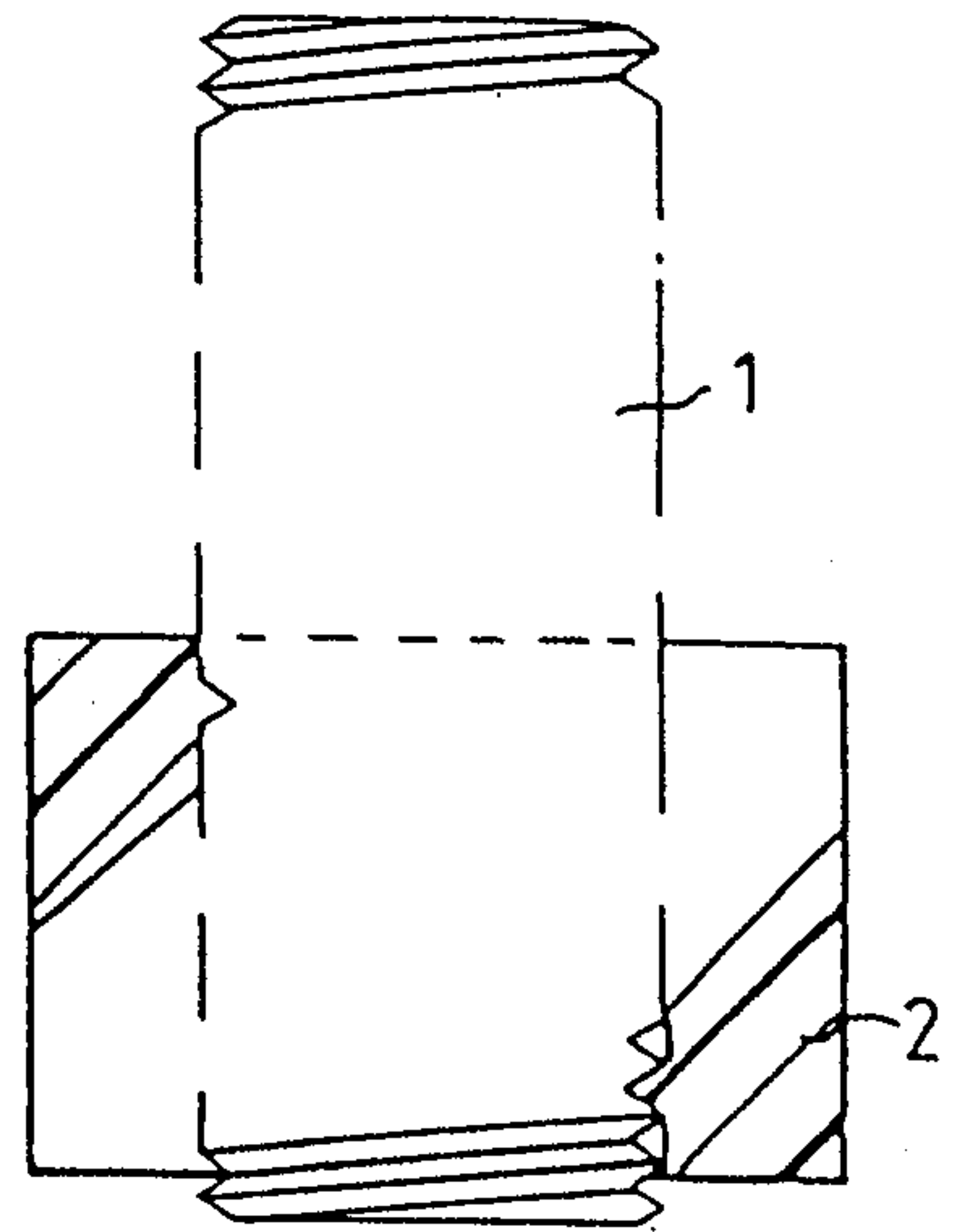


FIG. 3B

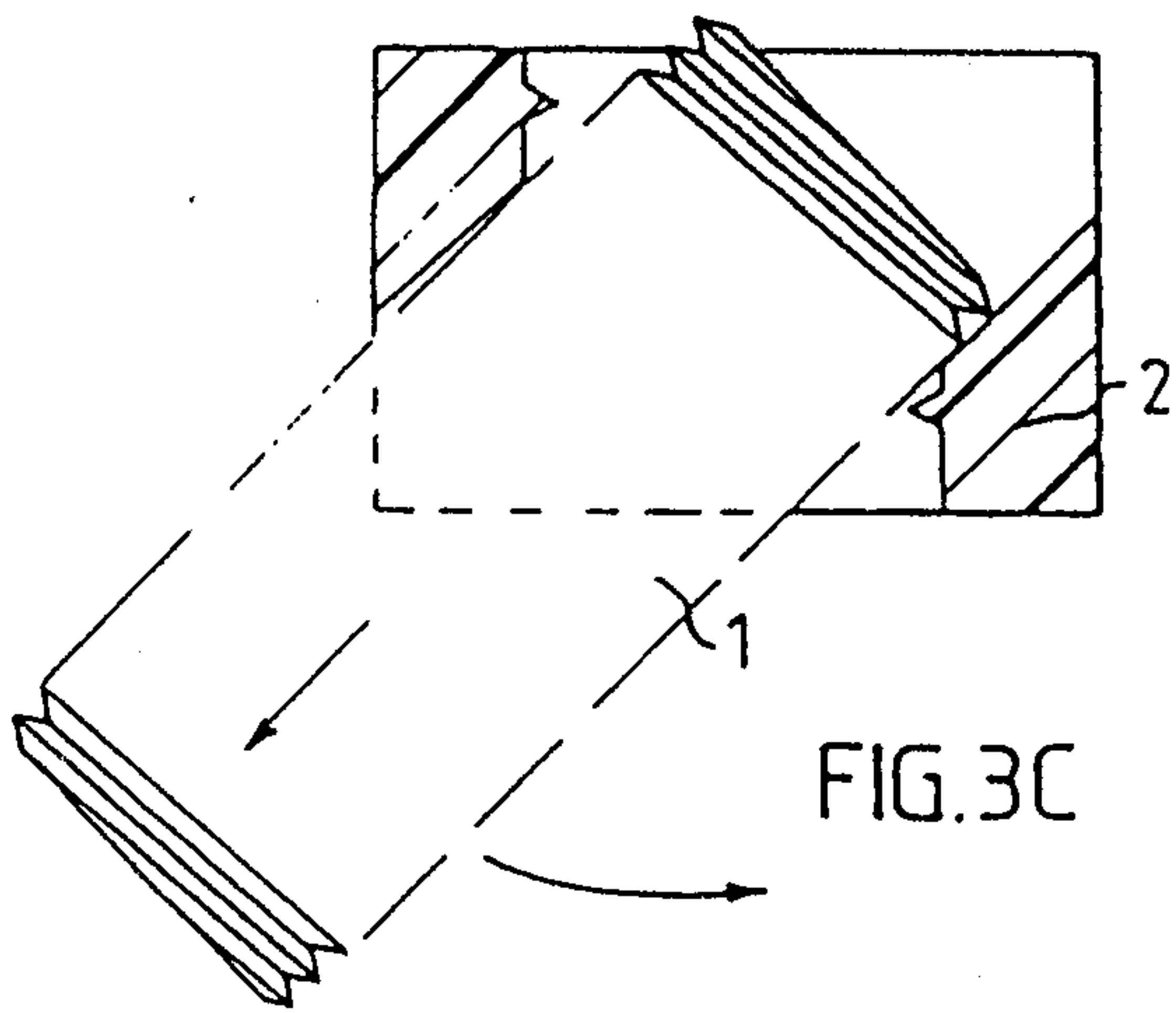


FIG. 3C

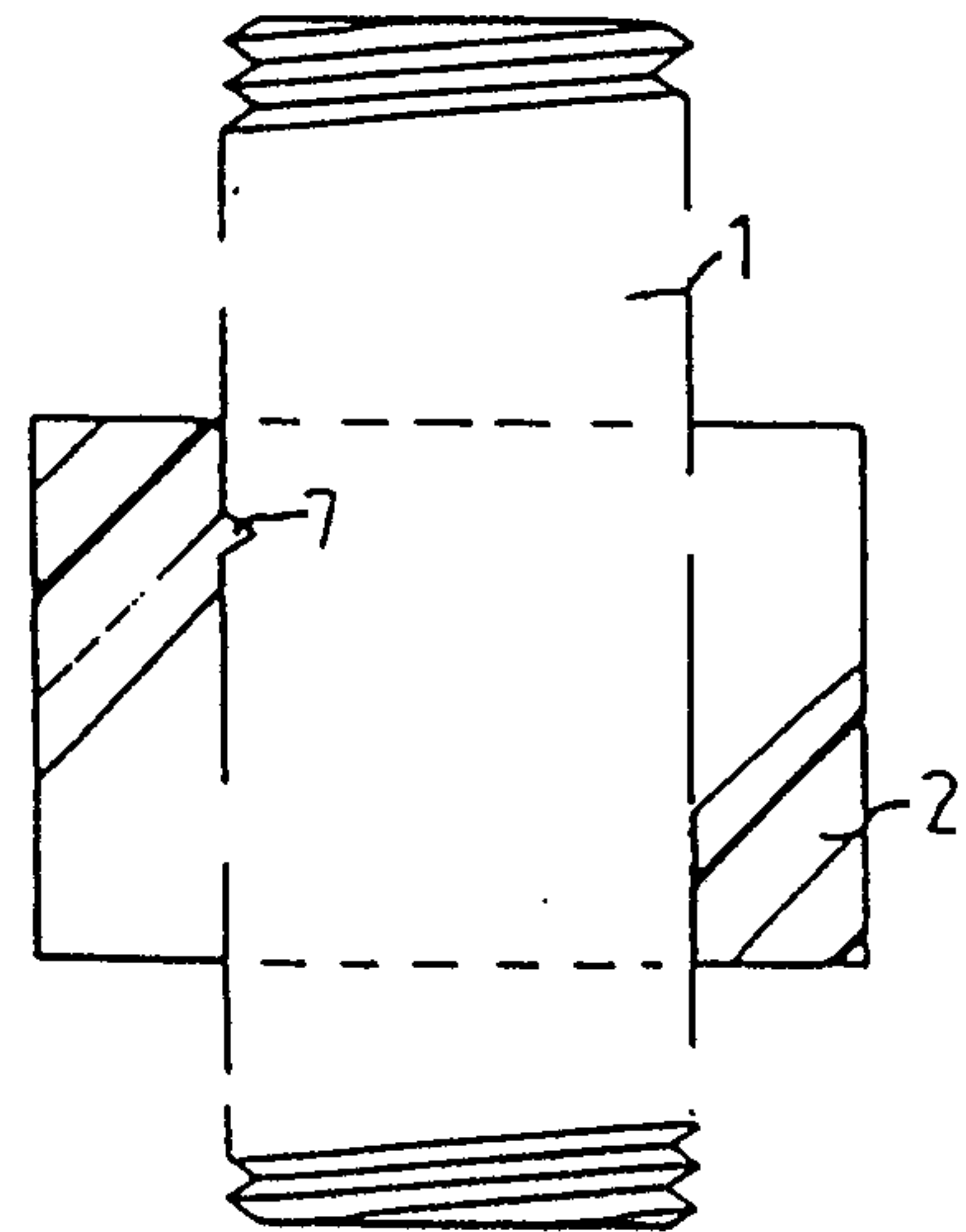


FIG. 4A

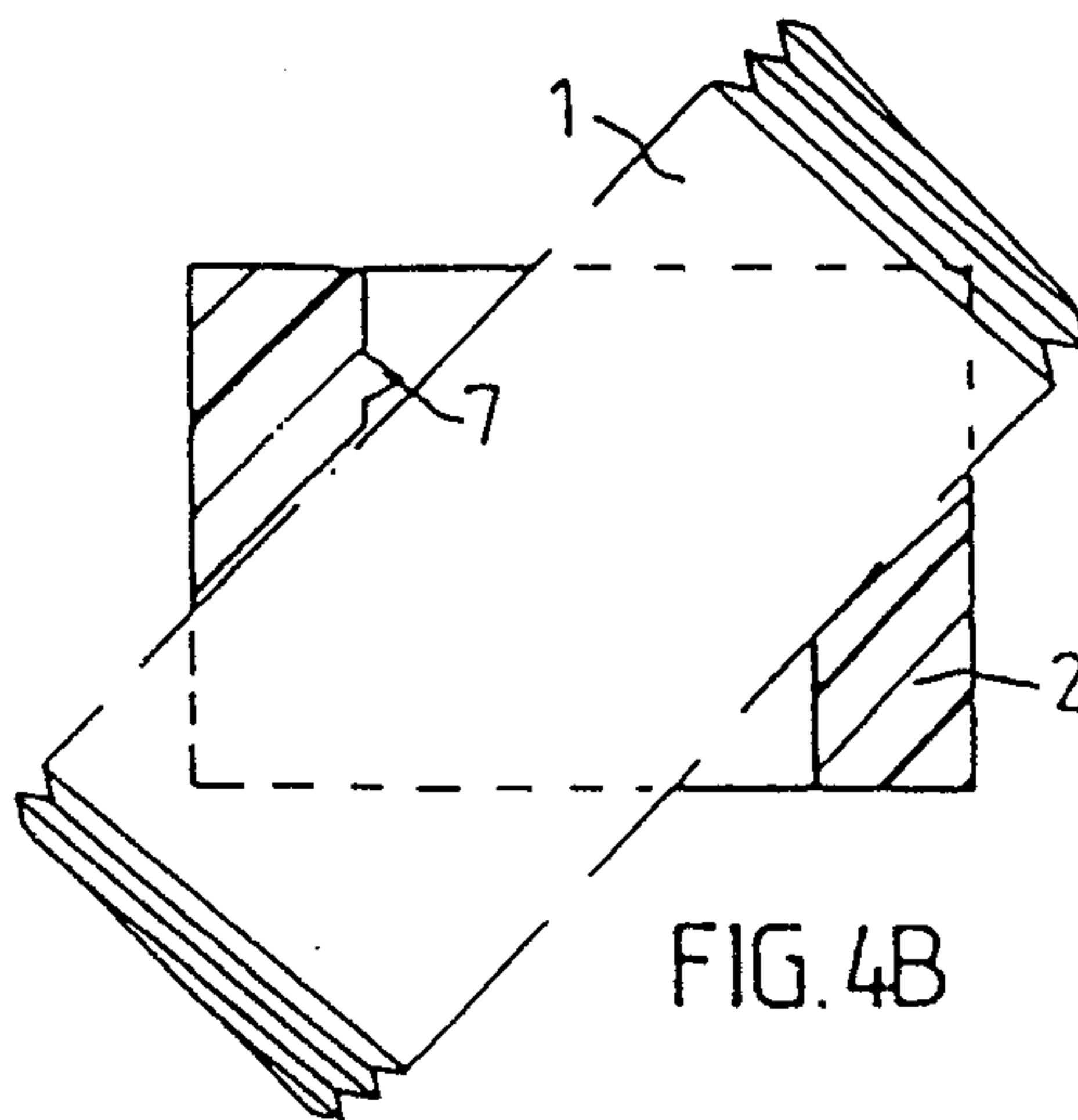


FIG. 4B

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