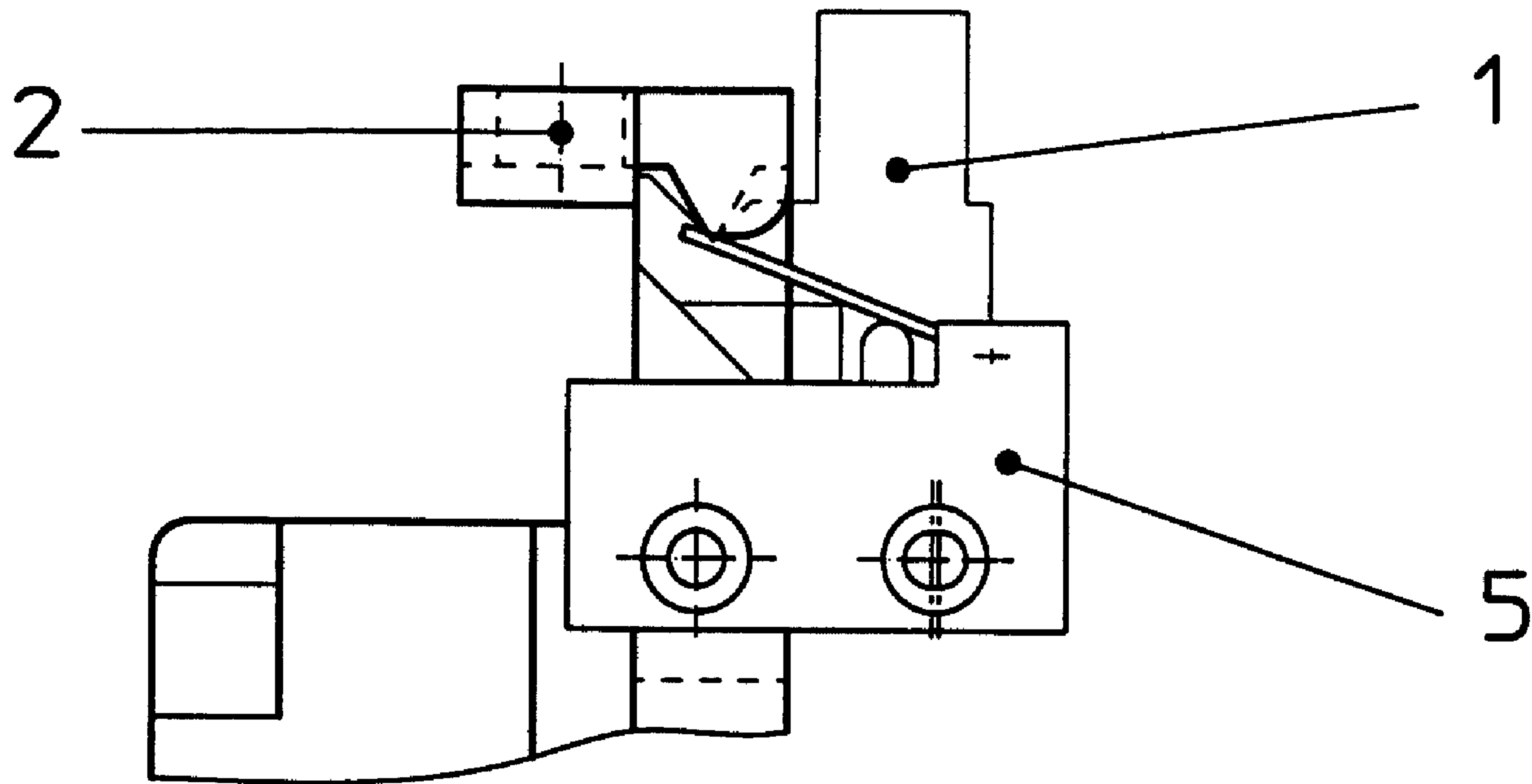




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(54) Titre : AIGUILLE DE PIPETTE OSCILLANTE INTERCHANGEABLE
 (54) Title: EXCHANGEABLE OSCILLATING PIPETTE NEEDLE



(57) Abrégé/Abstract:

An exchangeable oscillating pipette needle for an automatic analyzer for examining biological body fluids is described, in which the analyzer has a holder which is provided with a tension spring and with which the oscillating arm, carrying the pipette needle and resting on a knife-edge bearing, is fixed in a stationary position and is releasably connected.

Dade Behring Marburg GmbH

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Dr. Pfe/Mi

Abstract

An exchangeable oscillating pipette needle for an automatic analyzer for examining biological body fluids is described, in which the analyzer has a holder which is provided with a tension spring and with which the oscillating arm, carrying the pipette needle and resting on a knife-edge bearing, is fixed in a stationary position and is releasably connected.

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Exchangeable oscillating pipette needle

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The invention relates to an exchangeable oscillating pipette needle for an automatic analyzer for examining biological body fluids.

10 It is known that in automatic analyzers which are used for examining biological body fluids, the required reagents are introduced into a measurement cell by means of an oscillating pipette needle. The pipette
15 needle also has the role of ensuring that the body fluid to be examined is thoroughly mixed with the reagents. For this purpose, it is necessary for the pipette needle to be moved in oscillations. When
20 introducing the reagents, and during the subsequent oscillations, there is a risk of the sensitive pipette needle colliding with the measurement cell or other apparatus parts, being damaged as a result, and having to be replaced because it is no longer fit for use. To date, exchanging the pipette needle has been associated with considerable technical effort, which can only be
25 provided by a suitably trained service engineer. Not only do the pipette needle and other mechanical parts need to be exchanged, but also the motor and the means of heating the pipette needle. The associated lost time and the costs involved led to the need to develop a new
30 construction for an oscillating pipette needle which allows the personnel operating the analyzer to exchange a damaged pipette needle quickly and in a straightforward way without having to call on the services of a specially trained engineer.

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It has now been found that this object is solved by an oscillating pipette needle for an automatic analyzer for examining biological body fluids, in which, for the

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purpose of introducing the pipette needle into the analyzer and withdrawing it from the latter, a holder 1 is provided which is equipped with a tension spring 3 and with which the oscillating arm, carrying the pipette needle 4 and resting on a knife-edge bearing, is fixed in a stationary position and is releasably connected.

The construction of the exchangeable oscillating pipette needle according to the invention is illustrated by appended Figures 1 through 4.

Fig. 1 shows the mutual engagement of holder 1 and oscillating arm 2 in a view from the right-hand side.

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Fig. 2 shows the mutual engagement of holder 1 and oscillating arm 2 in a view from the left-hand side.

Fig. 3 shows the holder 1 with the oscillating arm 2 from the front.

20

Fig. 4 shows a front view of the exchangeable oscillating pipette needle according to the invention, with eccentric motor attached.

25

Fig. 5 shows a side view of the exchangeable oscillating pipette needle from the side.

Fig. 6 shows a front view of the oscillating pipette needle, with a section of the prism.

30

Fig. 1 shows in detail that the oscillating arm 2 bearing on the holder 1 is in contact with a sensor 5. If the pipette needle secured on the oscillating arm 2 strikes against a solid object, then the oscillating arm 2 lifts and the flow of electrical current is interrupted by the sensor 5 secured on the plate 10.

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Fig. 2 shows the knife edge of the oscillating arm 2 in a prism bearing of the holder 1.

From Fig. 3 it will be seen that the oscillating arm 2 is mounted upstream of the holder 1 and a sensor 5 is arranged on a plate 10 and switches off the analyzer when the pipette needle strikes against a solid object.

Fig. 4 shows a front view of the exchangeable oscillating pipette needle illustrating the drive motor with the eccentrically rotating shaft 6 and a drive fork 7 in which the eccentric engages for the purpose of generating oscillations.

Fig. 5 shows a side view of the exchangeable oscillating pipette needle with the holder 1, the oscillating arm 2, the tension spring 3, the pipette needle 4, the grips 8 for exchanging the pipette needle, and the connection piece 9 which is provided for the admission of reagents.

These illustrations show that the exchangeable oscillating pipette needle consists of two subsidiary groups, namely the oscillating arm 2 with the pipette needle 4, and a rigidly secured holder 1. A tension spring 3, connected to the holder 1 in a non-releasable manner, can engage in an insert opening of the ribs 11 of the oscillating arm 2 and can thus press the latter against the holder 1. In this way, a restoring force acts on the oscillating arm 2 and ensures that it does not leave its defined position during oscillation.

To avoid damaging the pipette needle, it is of the utmost importance that it retains its predetermined positions during the entire examination and that collisions with solid parts of the analyzer or of the measurement cell can be avoided. According to the invention, this is ensured by a secure and reproducible positioning of the oscillating arm by means of prism

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and knife edge, the knife-edge bearing being secured on ribs 11 which ensure lateral fixing of the oscillating arm 2.

Although the main object of the present invention is to
5 make it possible to replace a damaged oscillating
pipette needle in a simple way, the need for such
replacement should of course be reduced by the fact
that damage to the pipette needle 4 is largely ruled
out. This is made possible by the flexible mounting,
10 afforded by the tension spring 3, of the oscillating
arm 2, which permits a vertical movement of the
oscillating arm 2. If the pipette needle 4 strikes
against a solid object, then it slides out of the prism
mounting of the holder 1, moves upward and in so doing
15 interrupts the current flow by triggering the sensor 5.
The analyzer is in this way immediately switched off
and destruction of the pipette needle is avoided.
However, if replacement of the pipette needle is
required, then the oscillating arm 2 can be pushed
20 upward from the knife-edge bearing, released from the
tension spring 3 and removed in a single maneuver. To
do this, the grip 8 need simply be held with two
fingers and pushed upward.

25 When using the oscillating pipette needle according to
the invention, it is advantageous for it to be able to
be heated. The oscillations needed for thoroughly
mixing the reagents with the body fluid to be examined
are generated by the eccentric motor equipped with an
30 eccentrically rotating shaft 6, or else by an
eccentrically mounted roller.

Whereas the oscillating pipette needles used to date
are incorporated rigidly and in a fixed manner in the
35 analyzer, according to the invention this applies only
to the mounting of the oscillating arm. Thus, according
to the invention, it is no longer necessary to unscrew
the entire pipette system and change it completely. It
is now enough to replace only the oscillating arm

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carrying the pipette needle. This is such a simple procedure that the personnel operating the analyzer can perform this repair by means of a single maneuver in which the damaged oscillating pipette needle is
5 exchanged for a corresponding replacement part. Thus, according to the invention, a solution is provided which permits rapid and inexpensive repair of a damaged oscillating pipette needle.

10 List of reference symbols:

- 1 Holder
- 2 Oscillating arm
- 3 Tension spring
- 15 4 Heatable pipette needle
- 5 Sensor
- 6 Drive motor with eccentric
- 7 Drive fork for eccentric
- 8 Grip for exchanging
- 20 9 Admission for reagents
- 10 Plate
- 11 Ribs

Claims

1. An oscillating pipette needle for an automatic analyzer for examining biological body fluids, wherein, for the purpose of introducing the pipette needle into the analyzer and withdrawing it from the latter, a holder (1) is provided which is equipped with a tension spring (3) and with which an oscillating arm (2), carrying the pipette needle (4) and resting on a knife-edge bearing, is fixed in a stationary position and is releasably connected.
2. The oscillating pipette needle as claimed in claim 1, wherein the knife-edge bearing is secured on ribs (11) which ensure a lateral fixing of the oscillating arm (2).
3. The oscillating pipette needle as claimed in claim 2, wherein the tension spring (3) can engage in an insert opening of the ribs (11) of the oscillating arm (2) and can press the latter against the holder (1).
4. The oscillating pipette needle as claimed in claims 1 through 3, wherein the pipette needle (4) can be heated.
5. The oscillating pipette needle as claimed in claims 1 through 4, wherein the oscillating arm (2) has a drive fork (7) in which an eccentric rotating shaft (6) engages for the purpose of generating oscillations.
6. The oscillating pipette needle as claimed in claims 1 through 5, wherein a connection piece (9) for admission of reagents is provided on the oscillating arm (2).

7. The oscillating pipette needle as claimed in claims 1 through 6, wherein the oscillating arm (2) can be moved in the vertical direction upon assembly, and a sensor (5) arranged on a plate (10) then switches the
5 analyzer off.

8. The oscillating pipette needle as claimed in claims 1 through 7, wherein the oscillating arm (2) has grips (8) for exchanging the pipette needle.

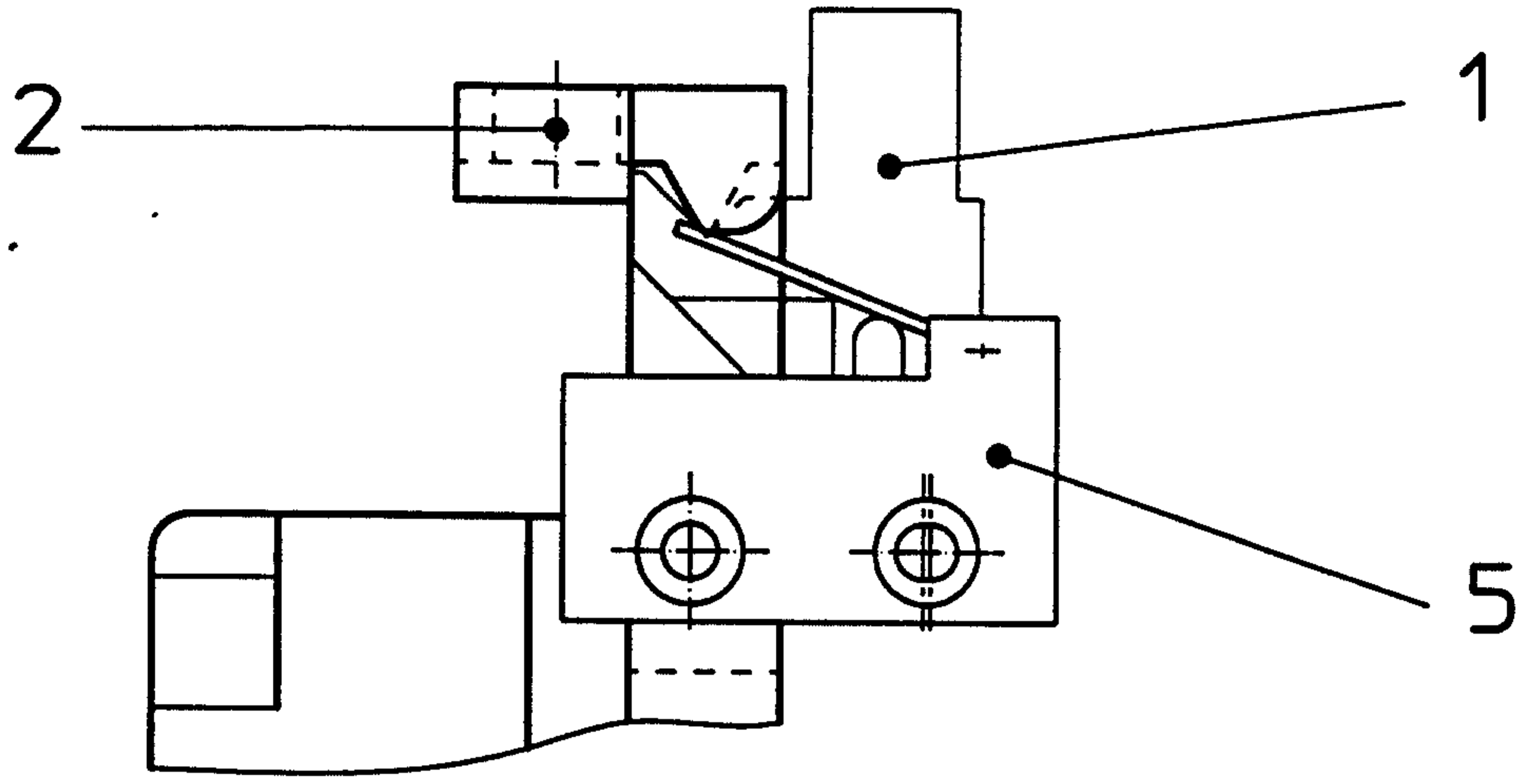


Fig. 1

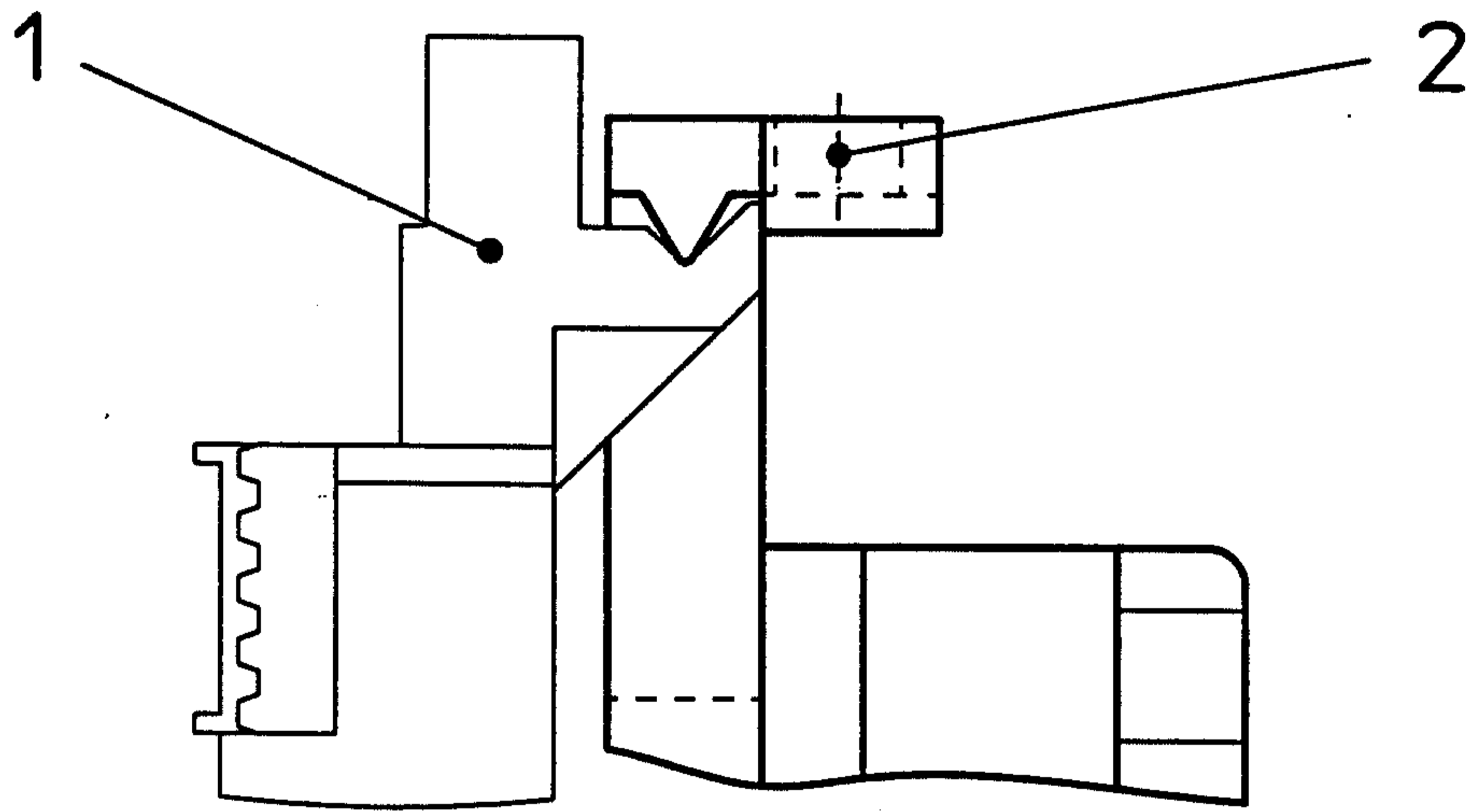


Fig. 2

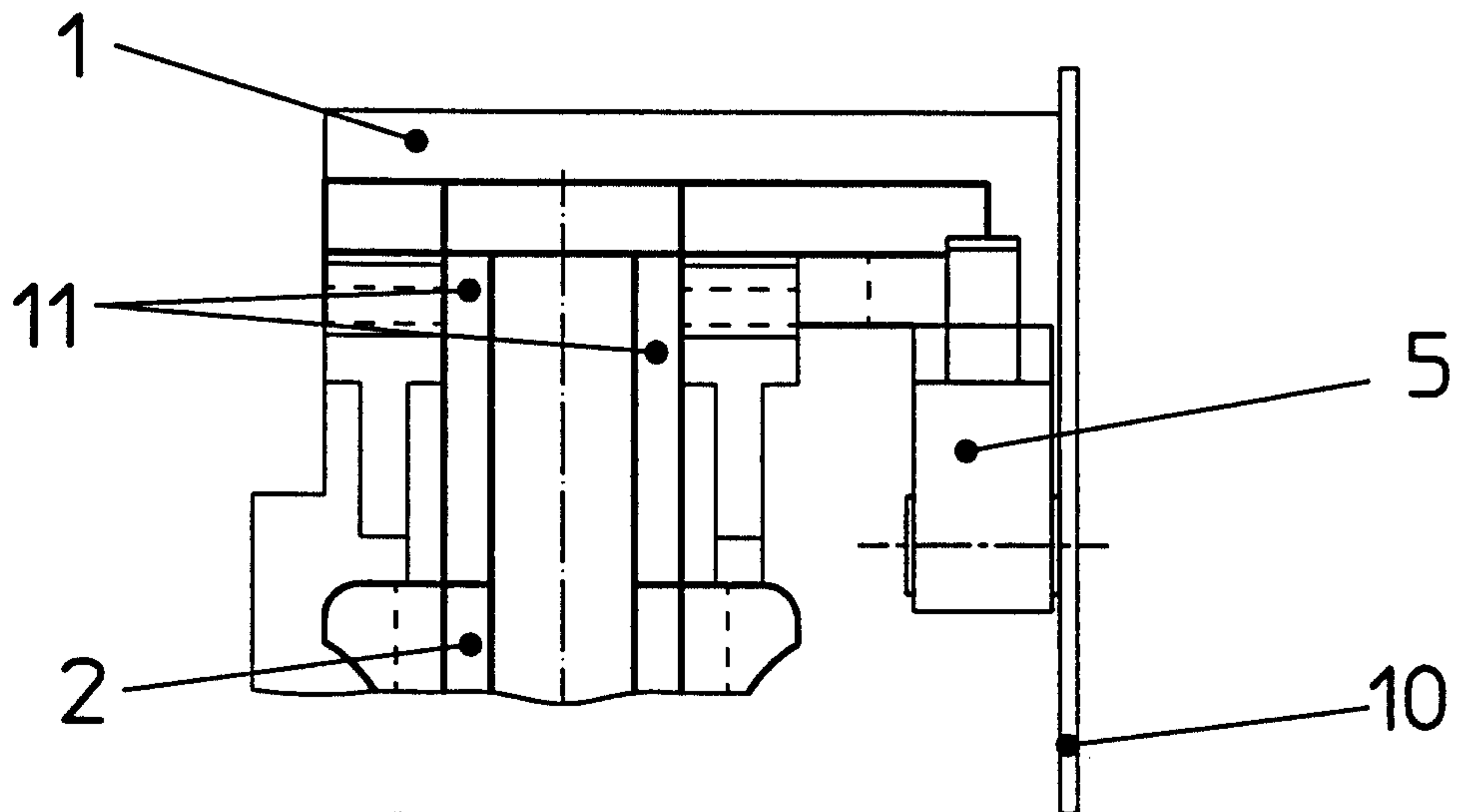


Fig. 3

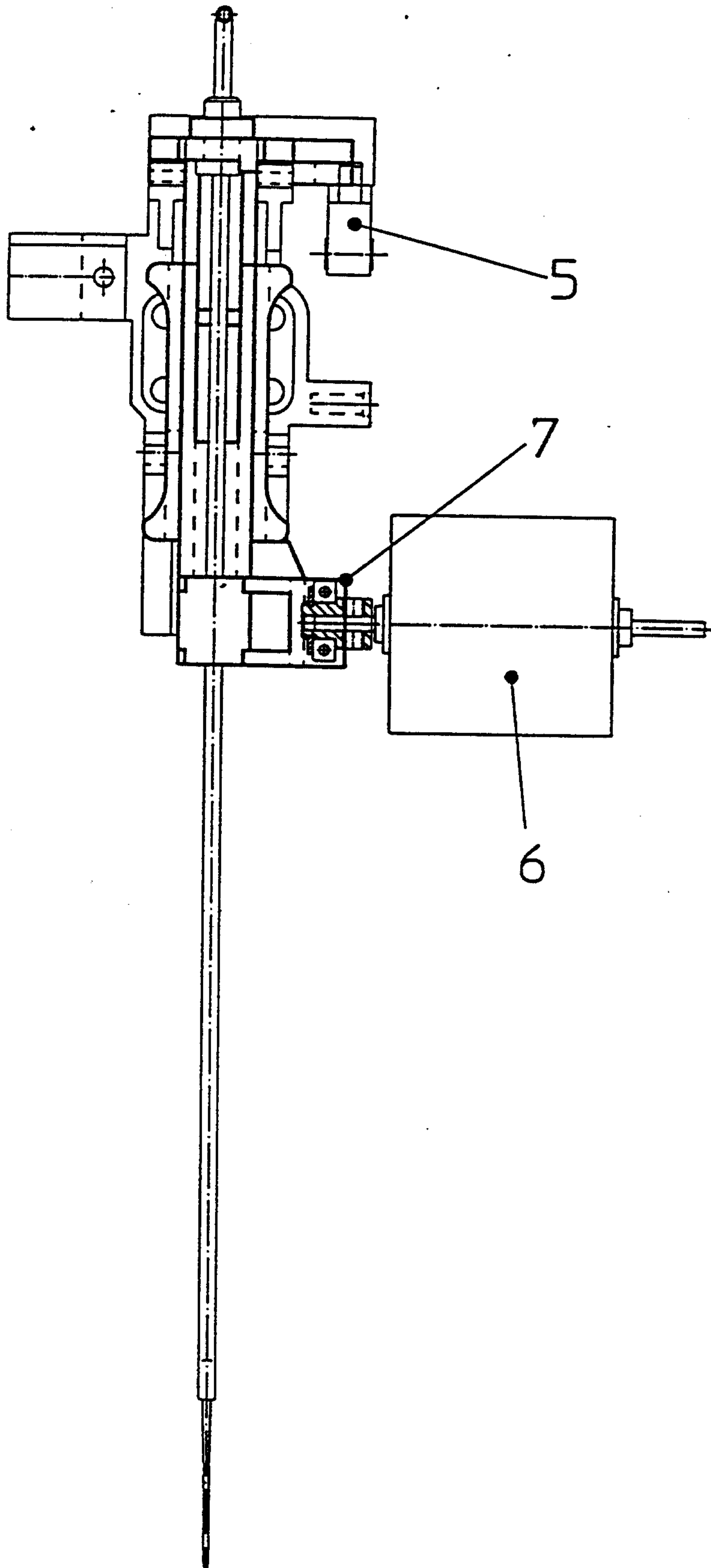


Fig. 4

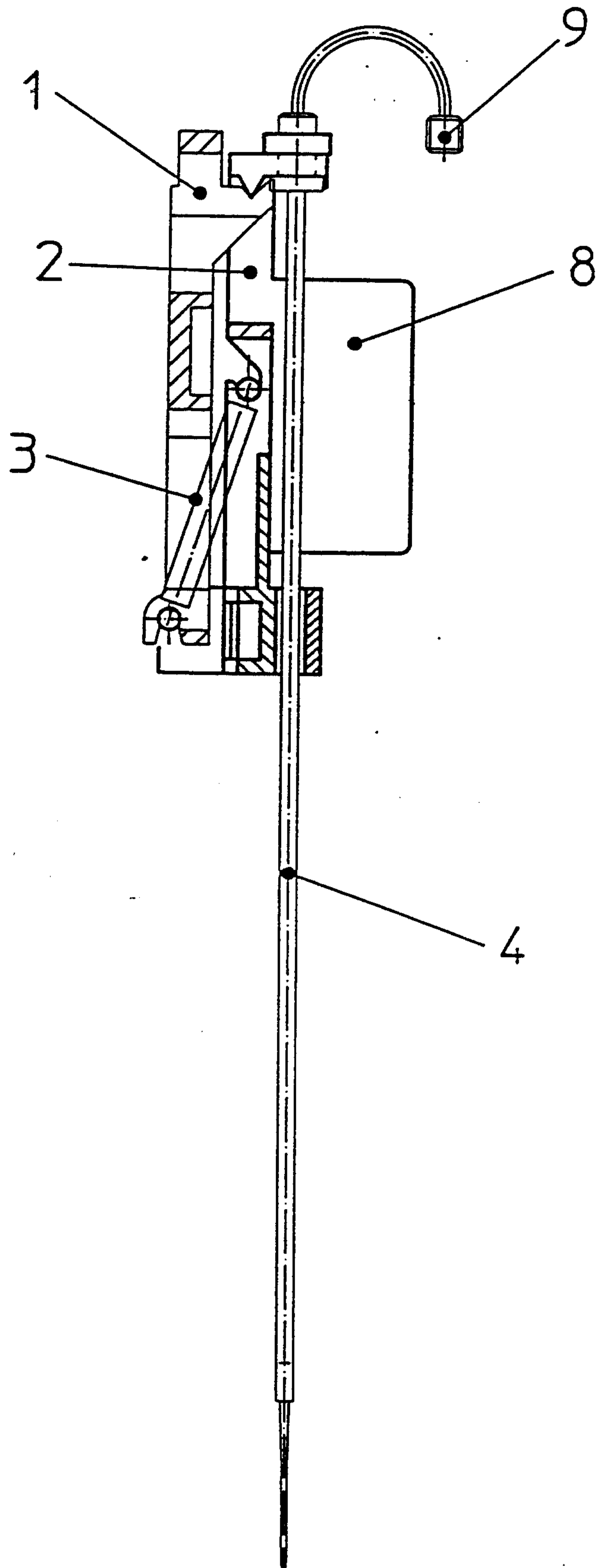


Fig. 5

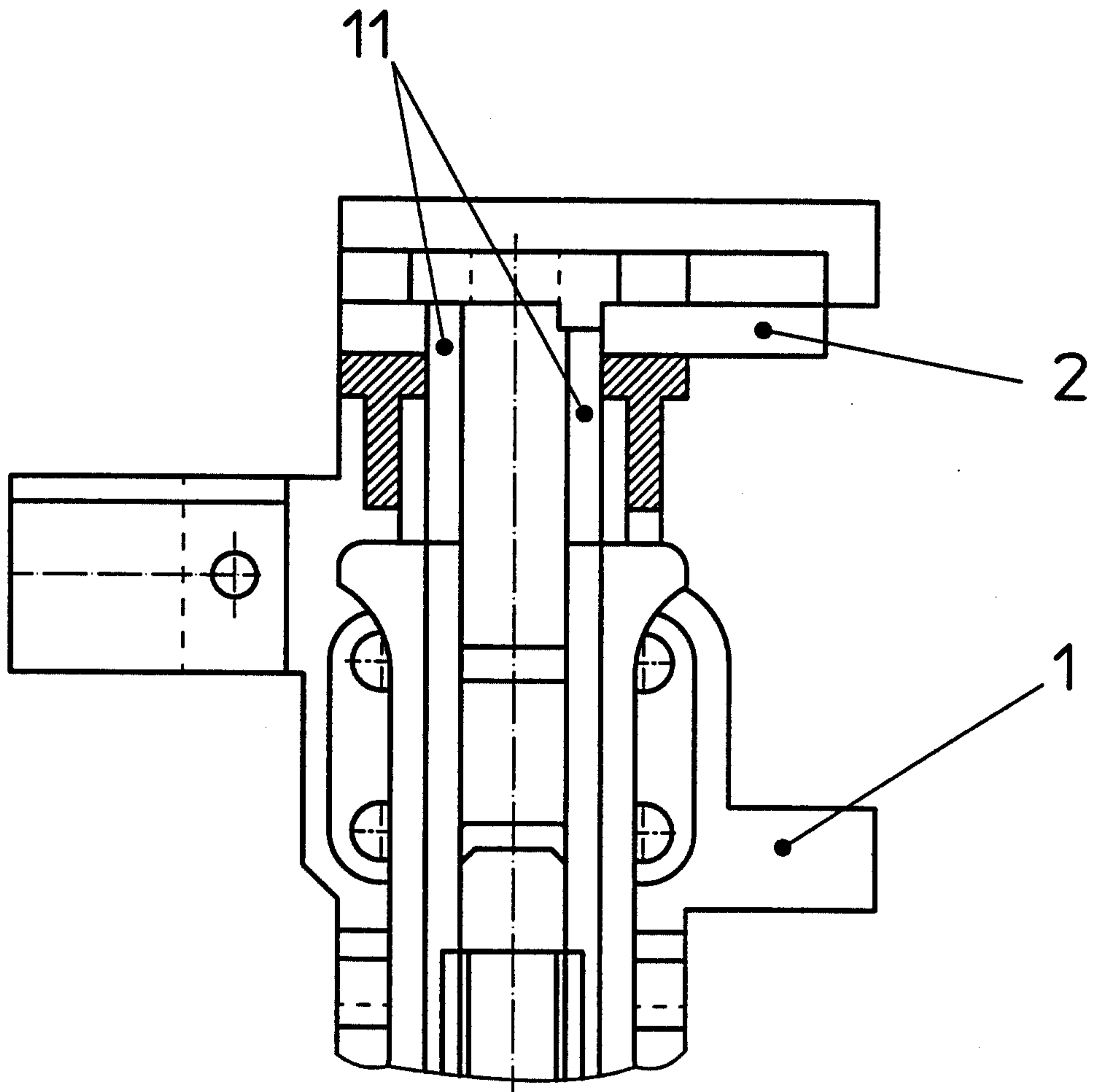


Fig. 6

