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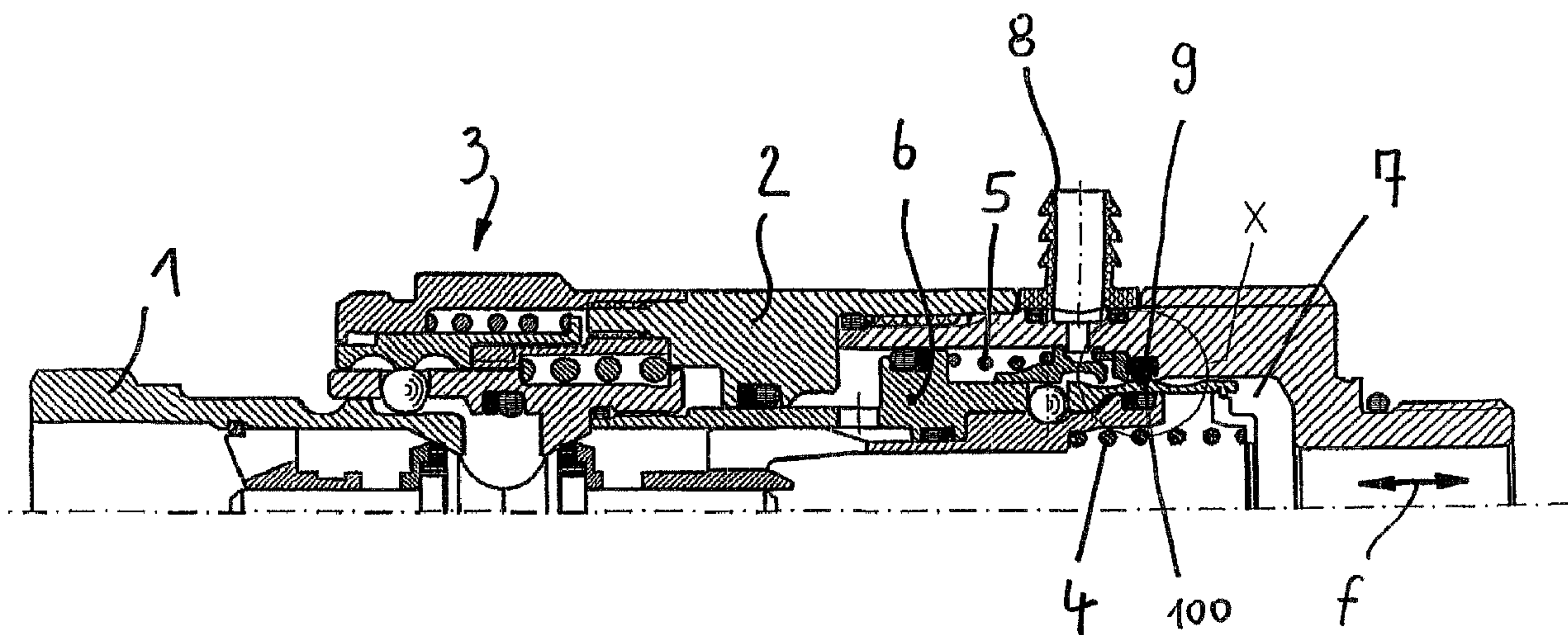
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(54) Titre : RACCORDEMENT RAPIDE PAR CAPACITE DE CONNEXION OU DE DEGAGEMENT EN PRESENCE D'UN LIQUIDE HYDRAULIQUE SOUS PRESSION

(54) Title: QUICK COUPLING WITH A CONNECTING, RESPECTIVELY A RELEASING, CAPABILITY IN THE PRESENCE OF A PRESSURIZED HYDRAULIC FLUID



(57) Abrégé/Abstract:

A quick coupling with a connecting, respectively a releasing, capability in the presence of a pressurized hydraulic fluid comprises a tubular body slidably supported in a tubular element and having a sealing circumferential and continuous surface cooperating with an annular gasket, near the sealing surface of the slidable body at least a hydraulic fluid outlet channel coupled with a bleeding fitting being provided.

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ABSTRACT

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BACKGROUND OF THE INVENTION

The present invention relates to a quick
coupling with a connecting, respectively a releasing,
capability in the presence of a pressurized hydraulic
10 fluid.

Quick couplings or fittings, in particular
of a so-called "push-pull" type for coupling
resilient pipes conveying a pressurized fluid are
already commercially available.

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Said fittings comprise a tubular element
and a rod like-element, which can be coupled to one
another under a pushing force, or can be disengaged
from one another by applying on the fitting elements
a pulling force.

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In a particular advantageous manner, the
above mentioned connecting and releasing operations
can be also carried out as pressurized fluid are
present in the pipes and in the quick coupling
constructional elements.

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To perform the mentioned connecting and
releasing operations as a high pressure is present in
said pipes or hydraulic devices, the coupling tubular
element comprises in inner bleeding means allowing to
drain a comparatively high fluid amount, to reduce or
30 release the pressure in said quick tubular coupling,
thereby facilitating the connecting and releasing
operations.

In prior quick couplings, the hydraulic fluid draining or bleeding is performed by complex bleeding valves arranged in the tubular element, which bleeding valves, in particular, comprise
5 sealing means, valve seats and urging springs urging the valve stems of rods toward a closure position thereof.

Thus, in assembling the quick coupling elements, the bleeding valves are urged by a pushing
10 force, to be disengaged from their seats, for allowing the pressurized hydraulic fluid to partially flow.

However, as it should be apparent, the provision of a bleeding valve would allow a coupling
15 or releasing operation to occur also when the quick coupling is subjected to hydraulic pressure; accordingly, in this case, the quick coupling would have a very complex construction including a plurality of mechanical elements to form said
20 bleeding valve to be installed in the coupling body, which bleeding valve, moreover, will occupy a comparatively large space and, consequently, also the quick coupling will disadvantageously have a large size.

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SUMMARY OF THE INVENTION

Accordingly, the aim of the present invention is to provide a quick coupling the tubular
30 element and a rod element of which can be easily and safely coupled and released under pressure, while omitting complex bleeding valves and achieving this

object by a simple modification of the conventional components of the quick coupling, in particular of a push-pull type.

According to one aspect of the present invention, the above aim is achieved by a quick coupling with a connecting, respectively releasing, capability in the presence of a pressurized hydraulic fluid, characterized in that said quick coupling comprises a tubular body slidably supported inside a tubular element and having a circumferential and continuous sealing surface, cooperating with an annular gasket and that, near the sealing surface of said slidable body, at least a hydraulic fluid outlet channel coupled with a bleeding fitting is provided.

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BRIEF DESCRIPTION OF THE DRAWINGS

The subject matter of the present invention will be disclosed in a more detailed manner hereinafter, with reference to the accompanying drawings, where:

Figure 1 shows a half of a quick coupling comprising a tubular device and a rod device, during the assembling thereof;

Figure 2 shows the detail (X) of figure 1 in a perfectly sealed condition;

Figure 3 shows a detail of a constructional element urged toward the inner portion of the tubular element, thereby clearing a fluid draining channel;

Figure 4 shows a detail of the tubular element being withdrawn, thereby clearing, also in this case, a fluid draining channel;

Figure 5 shows, in perspective, the rear end portion of the tubular element;

Figure 6 shows, by a cross sectional view, a portion of the tubular element and of the gasket in a sealing condition thereof;

Figure 7 shows, in perspective, the rear end portion of the tubular element;

Figure 8 shows, in cross section, the gasket in a sealing position thereof;

Figure 9 shows a further embodiment of a tubular element having draining slots;

Figure 10 shows, in cross section, the gasket in a sealing position thereof;

Figure 11 shows, by a perspective view, the end portion of the tube, with a modified embodiment of the draining channels;

Figure 12 shows, in cross section, the gasket in the sealing position thereof;

Figure 13 shows, in perspective, a further embodiment of the end portion of the tubular element; and

Figure 14 shows, in cross section, the gasket in a tightly sealed position thereof.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Figure 1 shows a half of a rod-like element 1 as it is introduced into a tubular element 2 of a prior quick coupling, generally indicated by 3.

The hydraulic fluid is axially conveyed, under a high pressure, through the coupling 3, as schematically indicated by the arrow (f).

In said tubular element 2 a tubular body, generally indicated by 6 of a type known in the prior art and counterbiased by urging springs 4 and 5 is slidably supported.

5 Because of the hydraulic fluid present herein, high pressures are generated in the zone 7 of the tubular element 2.

To prevent the hydraulic fluid from undesirably and uncontrollably exiting a conventional
10 bleeding fitting 8, in this region an annular gasket 9 tightly bearing on the outer mantle 100 of the tubular element 6 is provided, said tubular element 6 being adapted to slide against an urging spring 200.

The gasket 9, as clearly shown in figure 2,
15 is housed in a recess 10, formed on the inner circumference of the tubular element.

To hold said annular gasket 9 at its proper working position, and to prevent any variable hydraulic pressure from displacing said gasket 9 or
20 disengaging it from the tubular element 2, a locking ring 11 mounted at a fixed position inside the tubular element 2 is provided.

Between the outer perimeter of the body 6 and said tubular element 2, a circumferential
25 channel, generally indicated by 12, is moreover provided.

At a mirror-like position from the channel 12, a further channel 13 is arranged, both said channels 12, 13 extending toward the bleeding fitting
30 8.

Figure 3 generally shows the tubular body 6 engaged in the tubular element 2, as indicated by the

arrow (g).

Such a translation of the tubular body 6 in the direction of the arrow (g) will clear said channels 12, respectively 13, thereby allowing hydraulic fluid to flow from said channels 12, 13 to the bleeding fitting 8, thereby reducing the hydraulic pressure at this region, and facilitating the assembling (respectively releasing) of the rod-like element 1 and the tubular element 2.

Figure 4 schematically shows the withdrawing of the rod element 1 from the tubular element 2, so as to drive the tubular body 6 in the direction indicated in figure 4 by the arrows (i).

In this position too, the gasket 9 will clear said channels 12 and 13, thereby allowing hydraulic fluid to flow to the bleeding fitting as indicated by the arrow (h).

Figure 5 shows the tubular body 6 by a perspective view.

In particular, are herein clearly shown the channels 12 and 13 allowing, depending on the position assumed by the tubular body 6 with respect to the gasket 9, hydraulic fluid to be drained toward the bleeding fitting 8.

Figure 6, in turn, clearly shows the body 2, annular gasket 9, locking ring nut 11 and the recessed portions forming the channels 12 and 13.

Figure 7 is a further perspective view showing the tubular element 6 having a single cavity 20, thereby providing a draining effect exclusively as the rod element 1 is assembled to the tubular element 2.

From the detail shown in figure 8, it should be apparent that said draining will occur only and exclusively during the coupling of the rod and tubular elements.

5 Figure 9 shows that the tubular body 6 comprises spiral channels 21 distributed and circumferentially formed thereon.

 In the embodiment shown in figure 11, the tubular body 6 comprises channels 22 which are
10 arranged parallel to the longitudinal axis of the tubular body 6 and extend circumferentially extend of said tubular body.

 Figure 13 shows that a draining channel can also be formed by ball cup cavities 23, defined in
15 the body 6 and distributed about the circumference thereof..

 The quick coupling according to the present invention operates as follows:

 As the free end portion of the annular
20 gasket 9 tightly bears along the uninterrupted circumference of the tubular body 6, no hydraulic fluid will be bled or drained; said fluid, on the contrary, will exclusively flow in said the rod element 1 and tubular element 2, as indicated by the
25 twin arrow (f) of figure 1.

 Thus, by displacing the tubular body 6 in assembling, respectively disassembling, said elements 1 and 2, an opening will be formed at the region engaged by the gasket 9, whereas, as this sealed
30 engagement is cleared, to allow hydraulic fluid to flow through the channel 12 respectively 13, a bleeding zone will be deformed, thereby allowing said

hydraulic fluid to outflow from said fitting 8, each time an assembling, respectively a disassembling operation of the quick coupling elements is performed.

CLAIMS

What is claimed is:

1. A quick connect coupling, comprising:
 - a) a pair of couplers coupled together upon relative movement of the couplers towards each other in one direction along an axis for conveying a fluid under pressure through the couplers, and being decoupled upon relative movement of the couplers from each other in an opposite direction along the axis;
 - b) a bleed fitting for releasing the pressure of the fluid during said movement to facilitate coupling and decoupling of the couplers;
 - c) an annular gasket stationarily mounted on one of the couplers; and
 - d) a tubular body mounted for sliding movement along the axis within the other of the couplers, the tubular body having an outer wall formed with a sealing surface extending continuously and circumferentially around the axis, the outer wall also being formed with an outer channel axially adjacent the sealing surface, the sealing surface being slidably movable with the tubular body between a sealed position in which the sealing surface sealingly engages the gasket, and a bleed position in which the outer channel is spaced from the gasket to enable the fluid to bypass the gasket and pass to the bleed fitting for release of pressure in the fluid.
2. The coupling of claim 1, wherein the outer channel comprises a pair of grooves formed on the outer wall of the tubular body at opposite axial sides of the sealing surface.
3. The coupling of claim 1, wherein the outer channel comprises a plurality of spiral grooves spaced apart around the axis.
4. The coupling of claim 1, wherein the outer channel comprises a plurality of axial grooves spaced apart in mutual parallelism around the axis.
5. The coupling of claim 1, wherein the outer channel comprises a plurality of hemispherical cavities spaced apart around the axis.
6. The coupling of claim 1, and a locking ring for fixing the gasket on the one coupler.

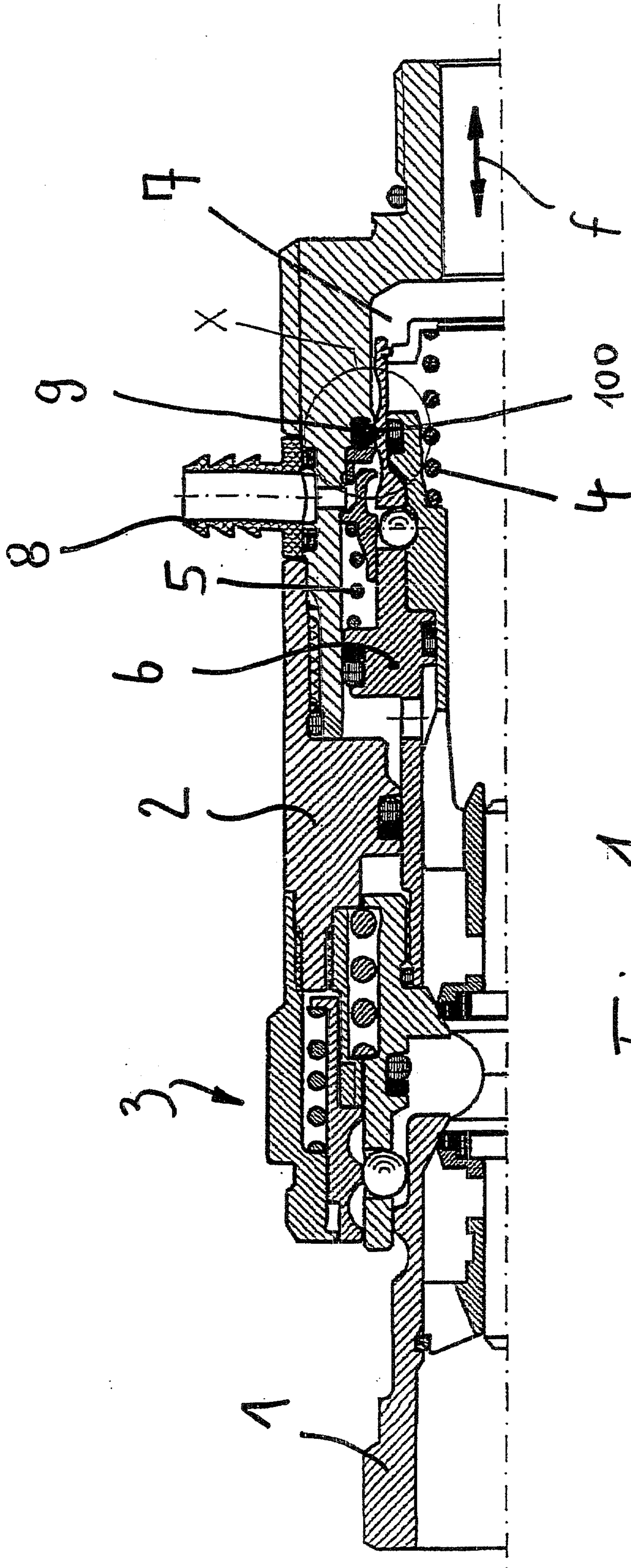


Fig. 1

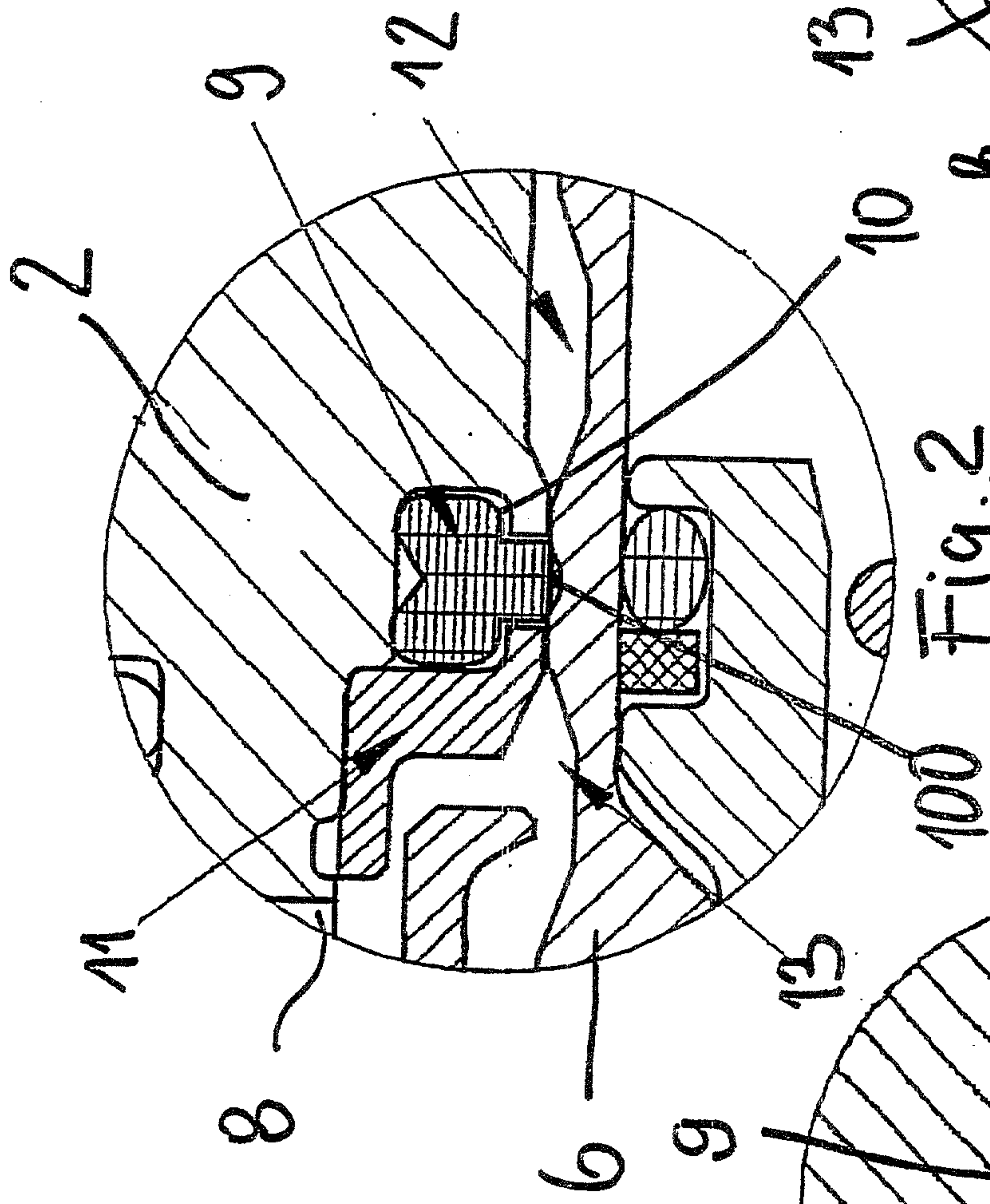


Fig. 2

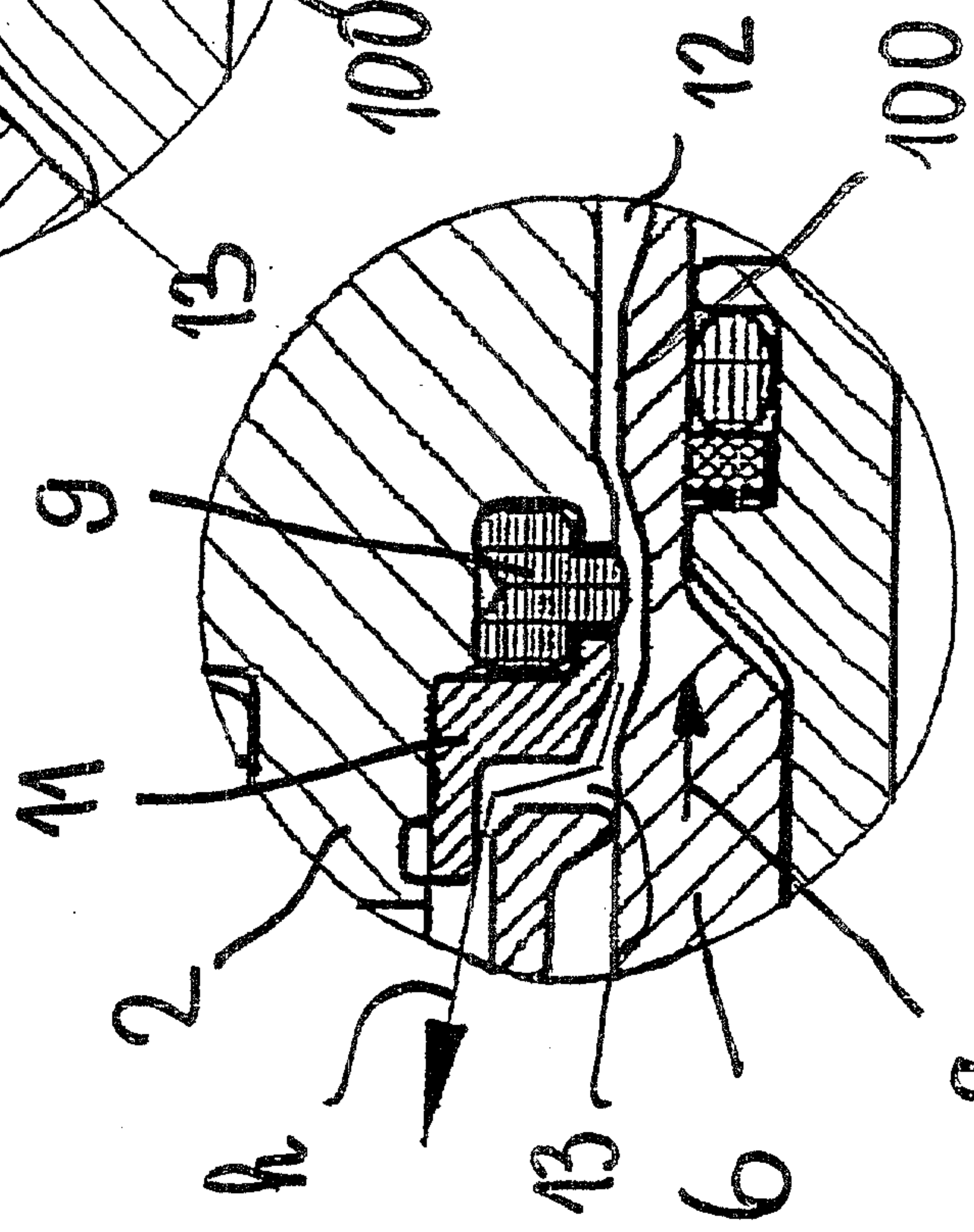


Fig. 3

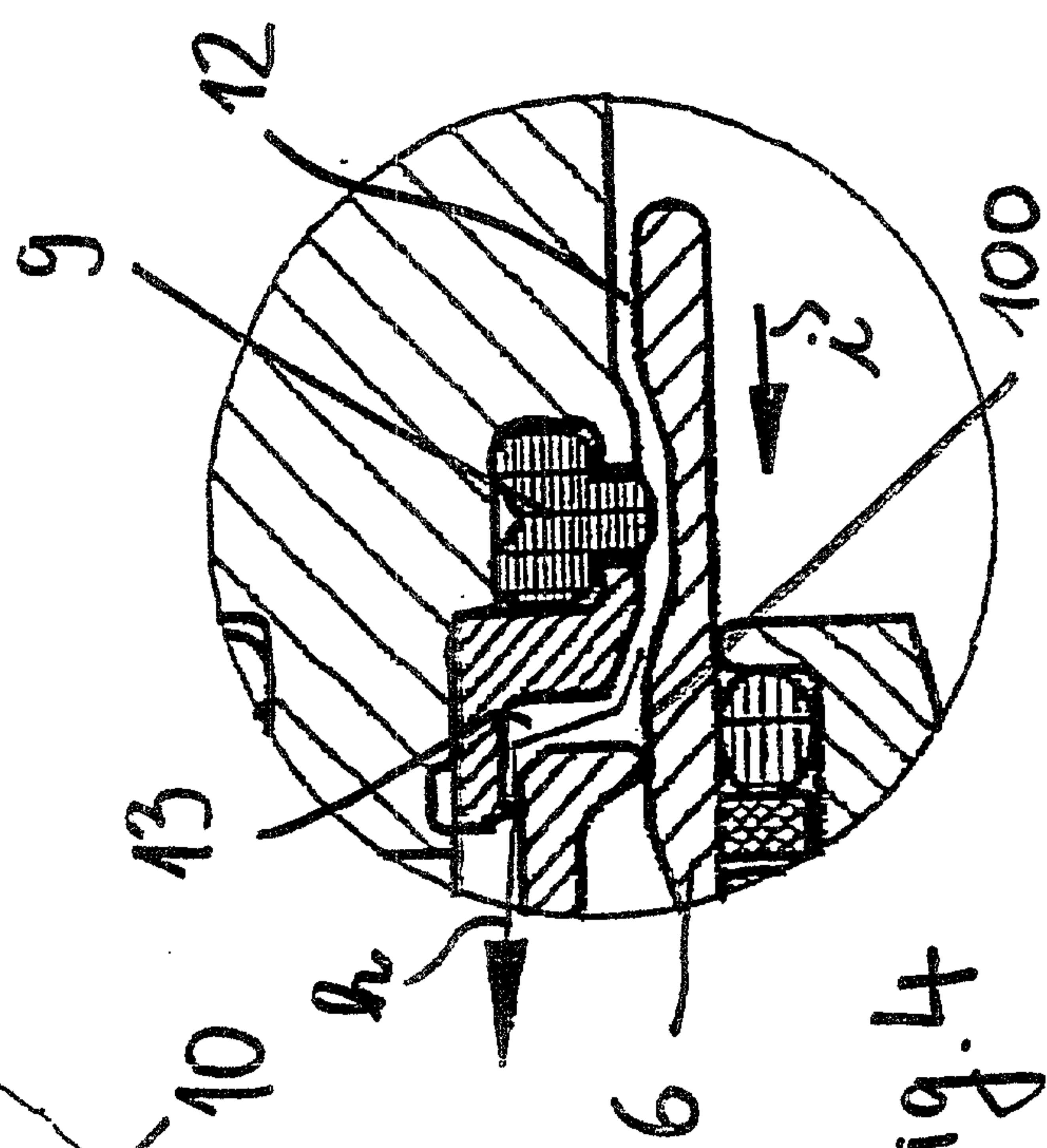


Fig. 4

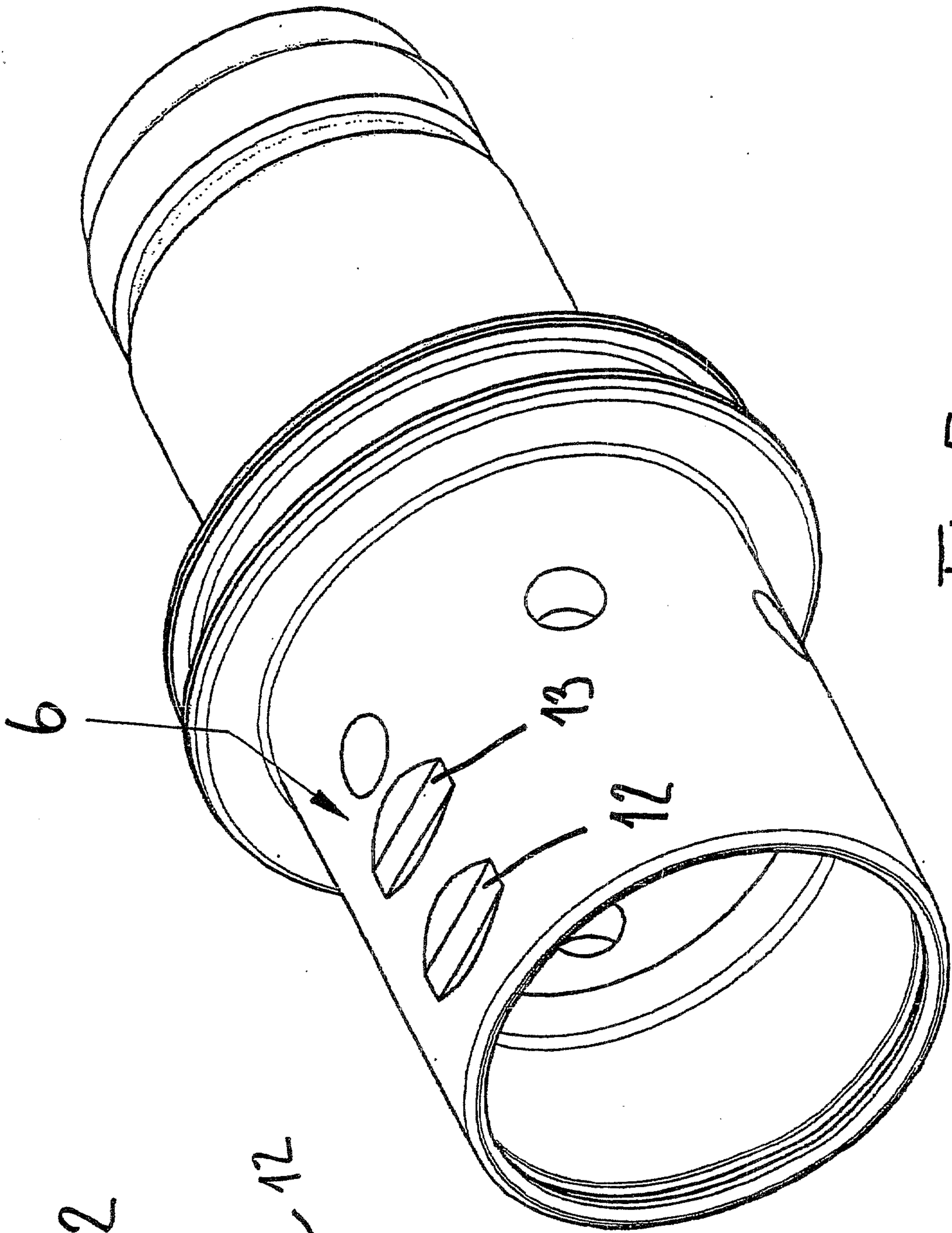


Fig. 5

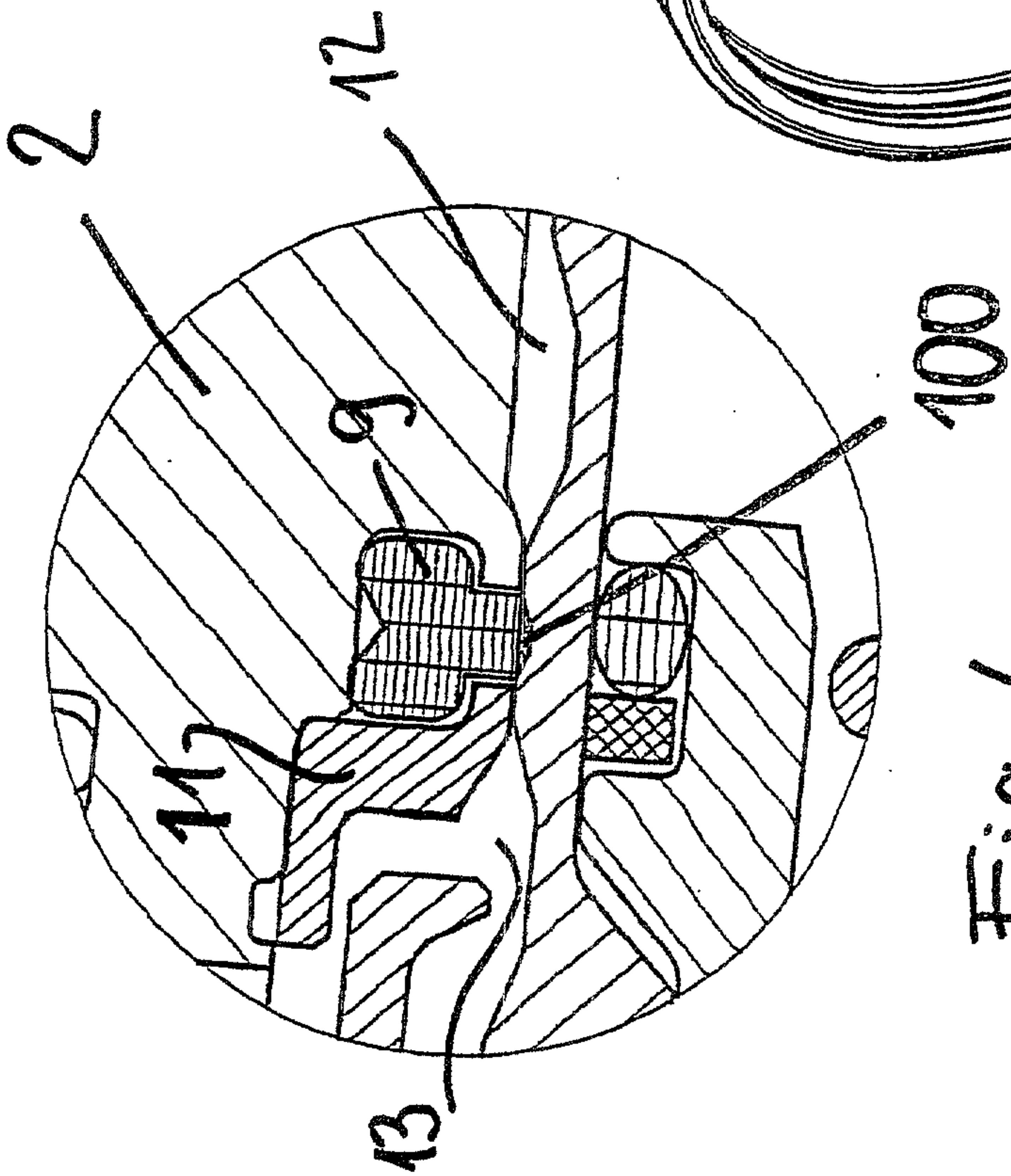


Fig. 6

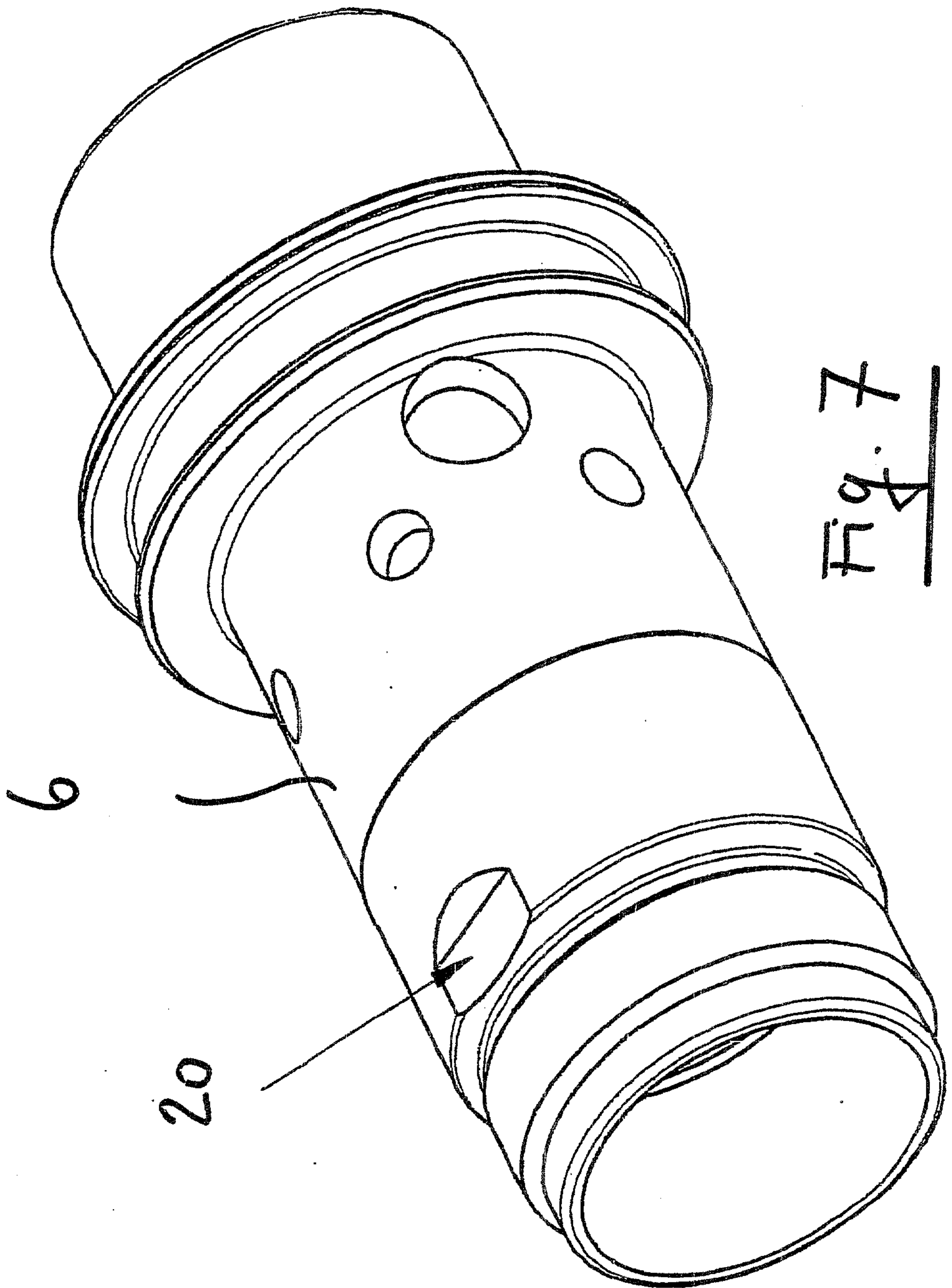


Fig. 7

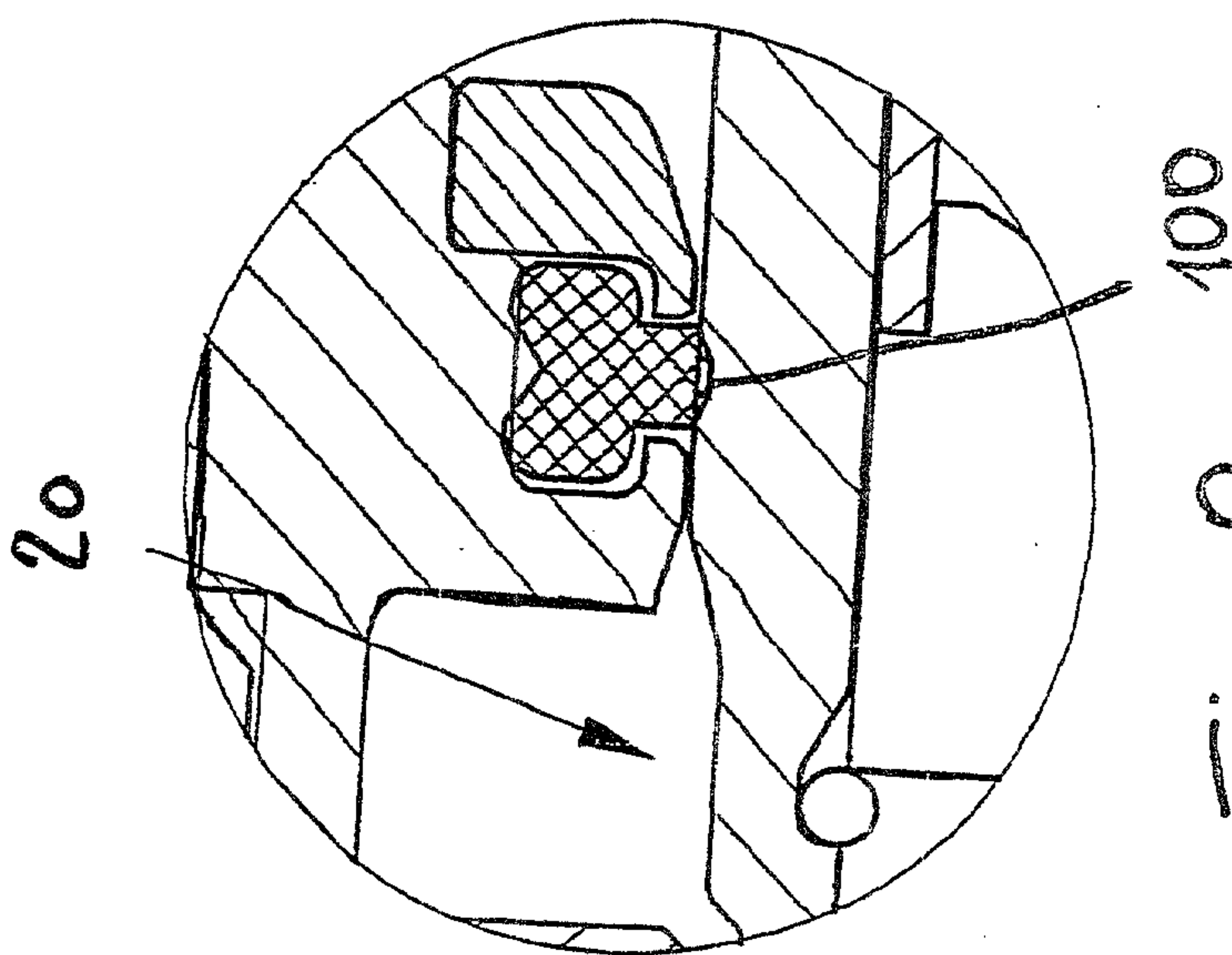


Fig. 8

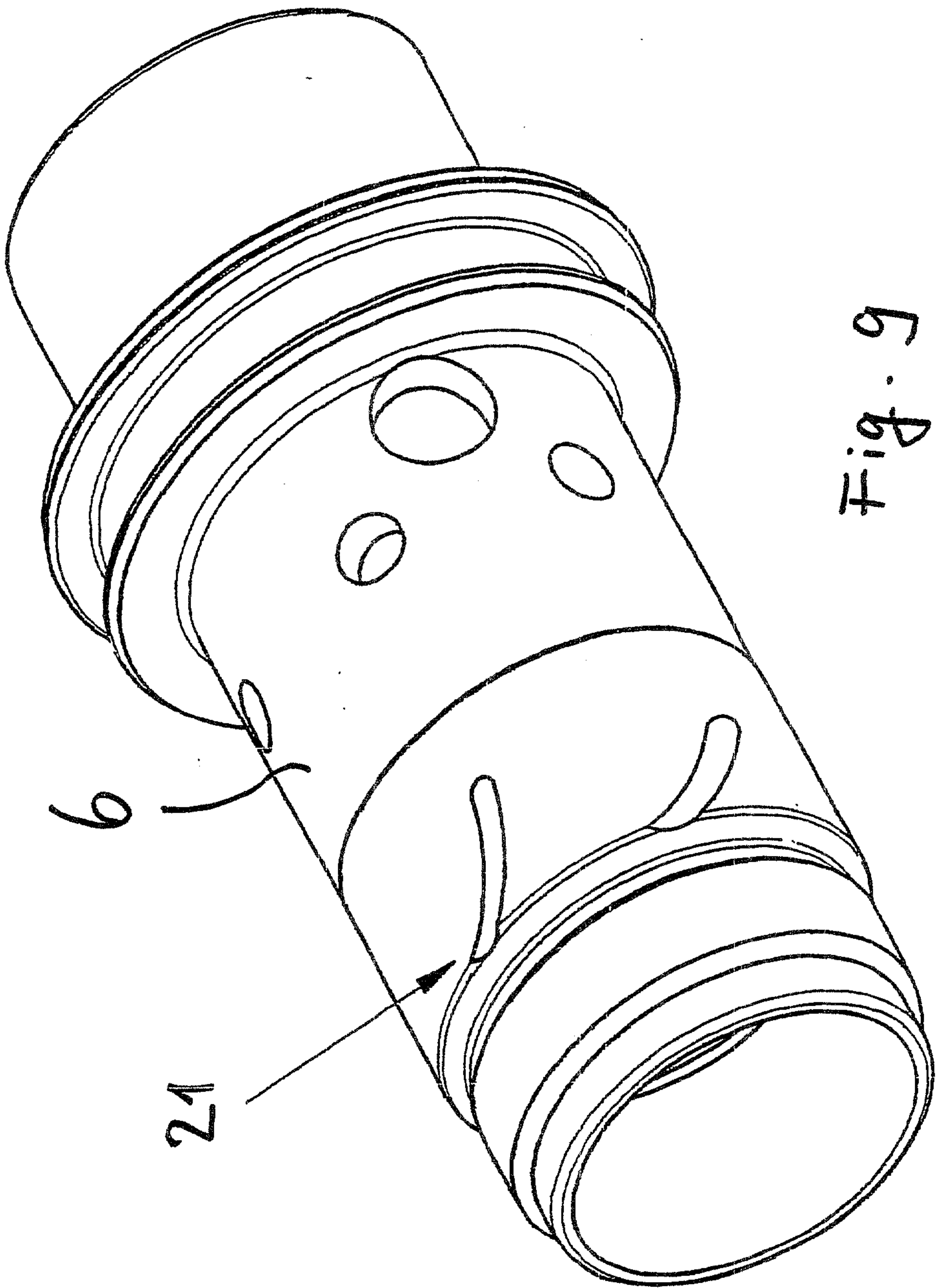


Fig. 9

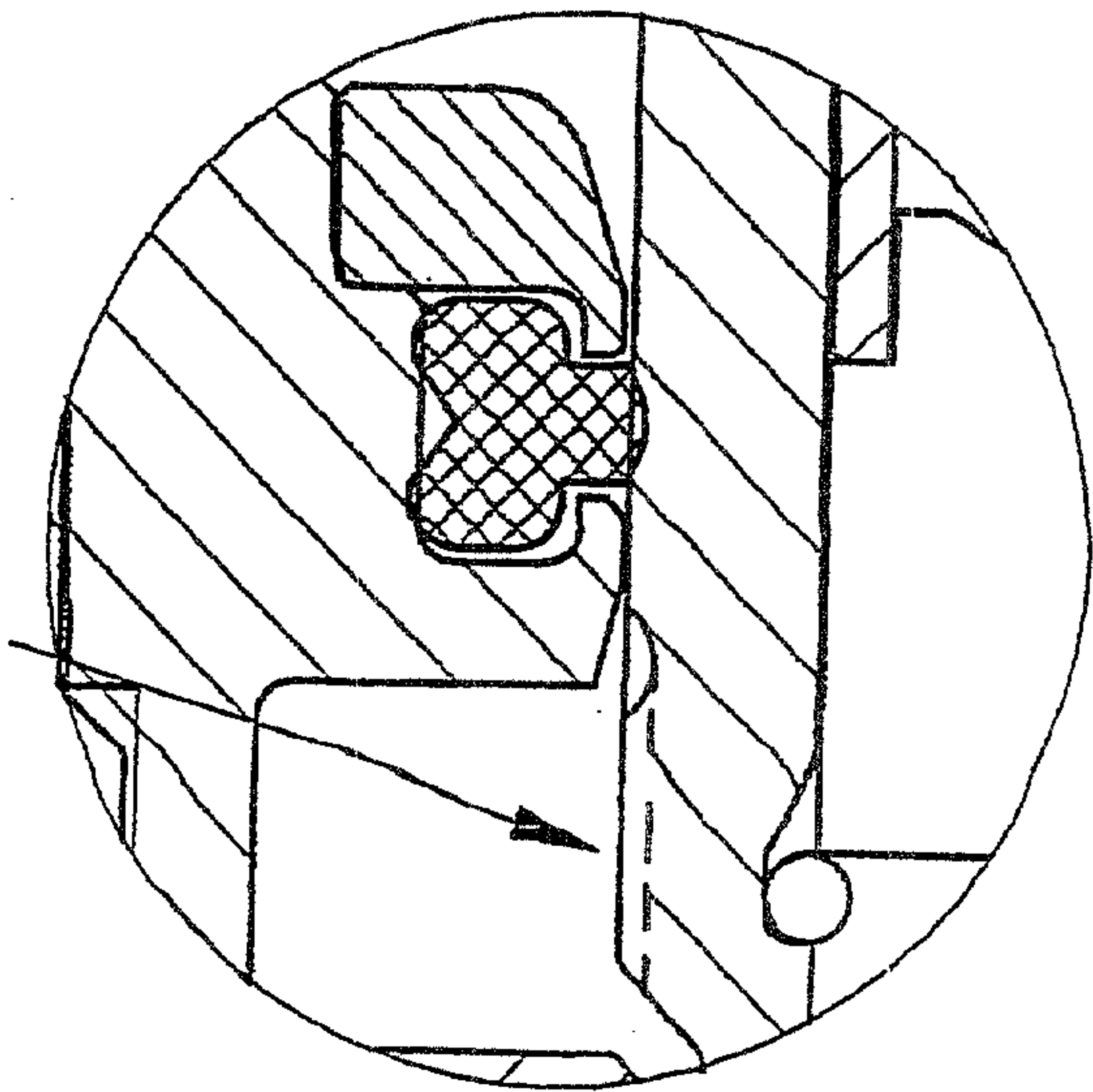


Fig. 10

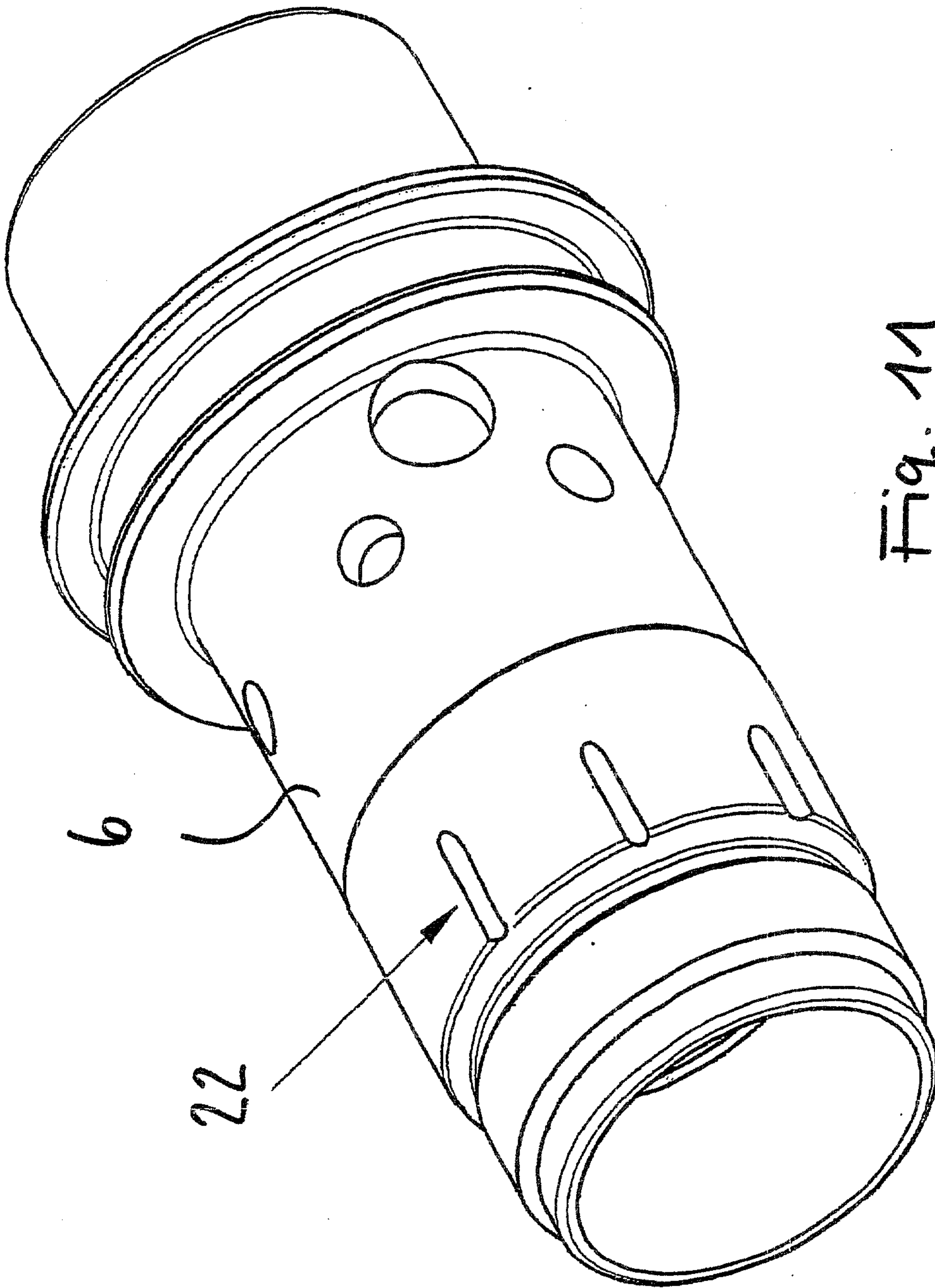


Fig. 11

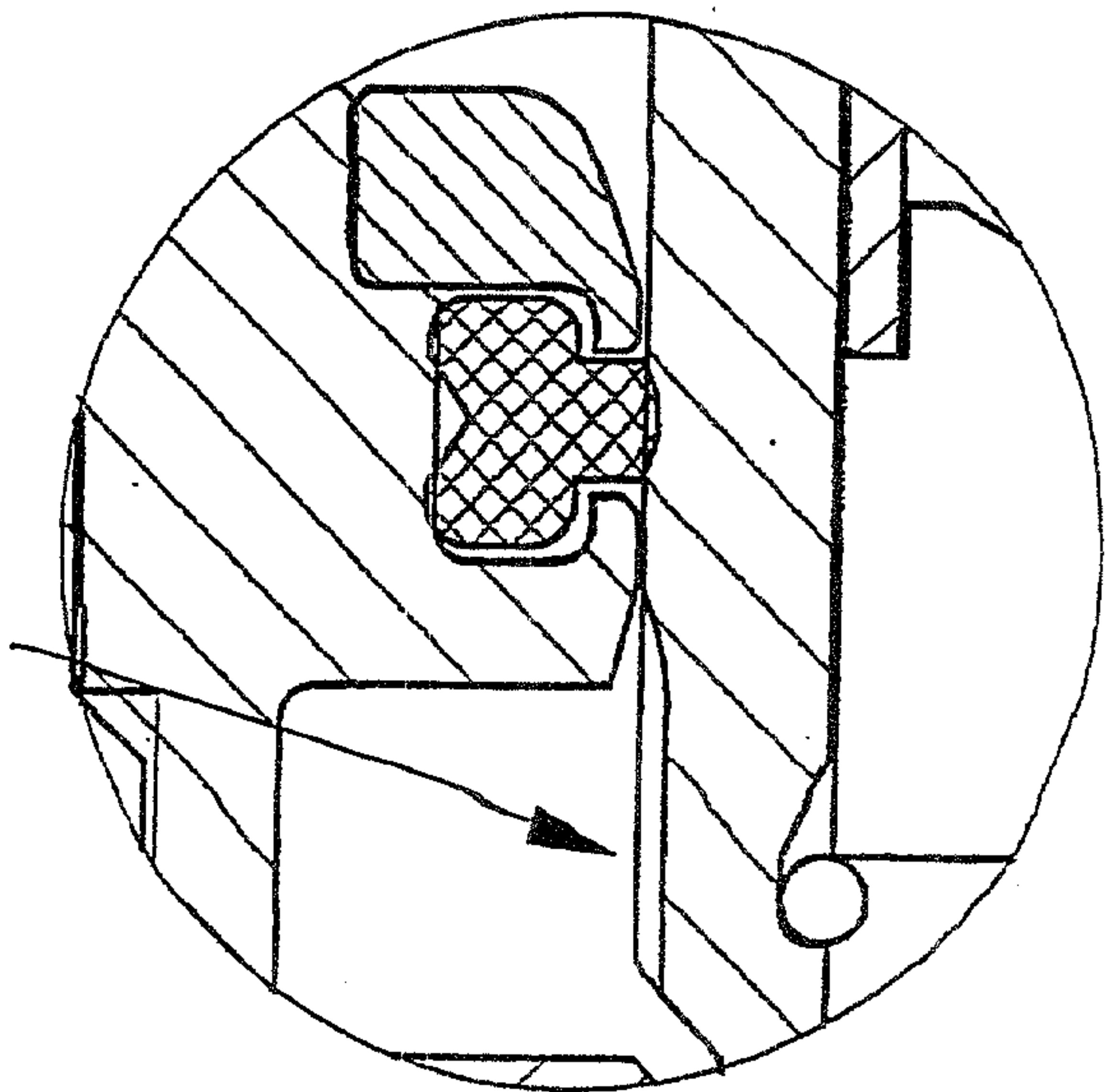


Fig. 12

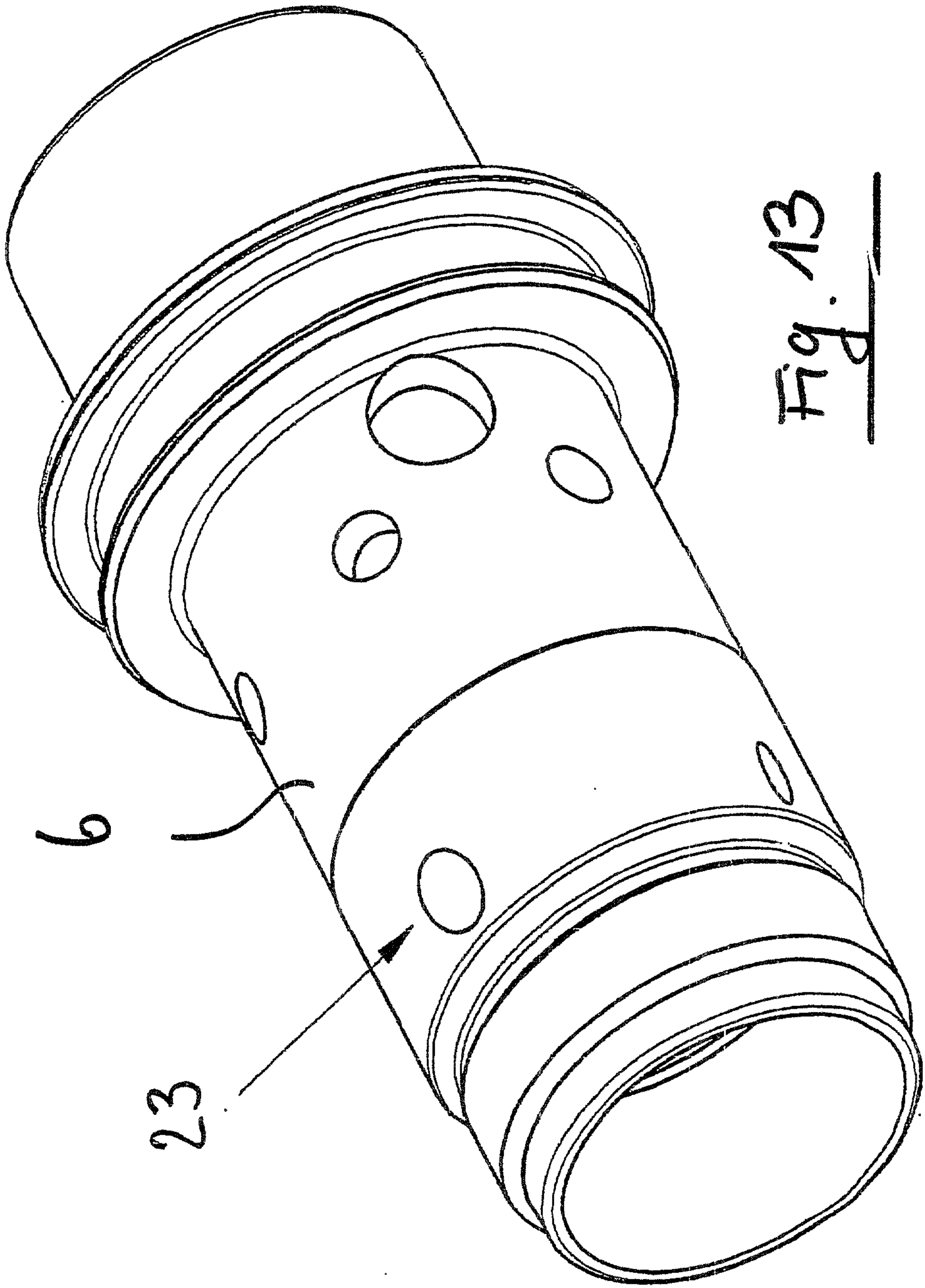


Fig. 13

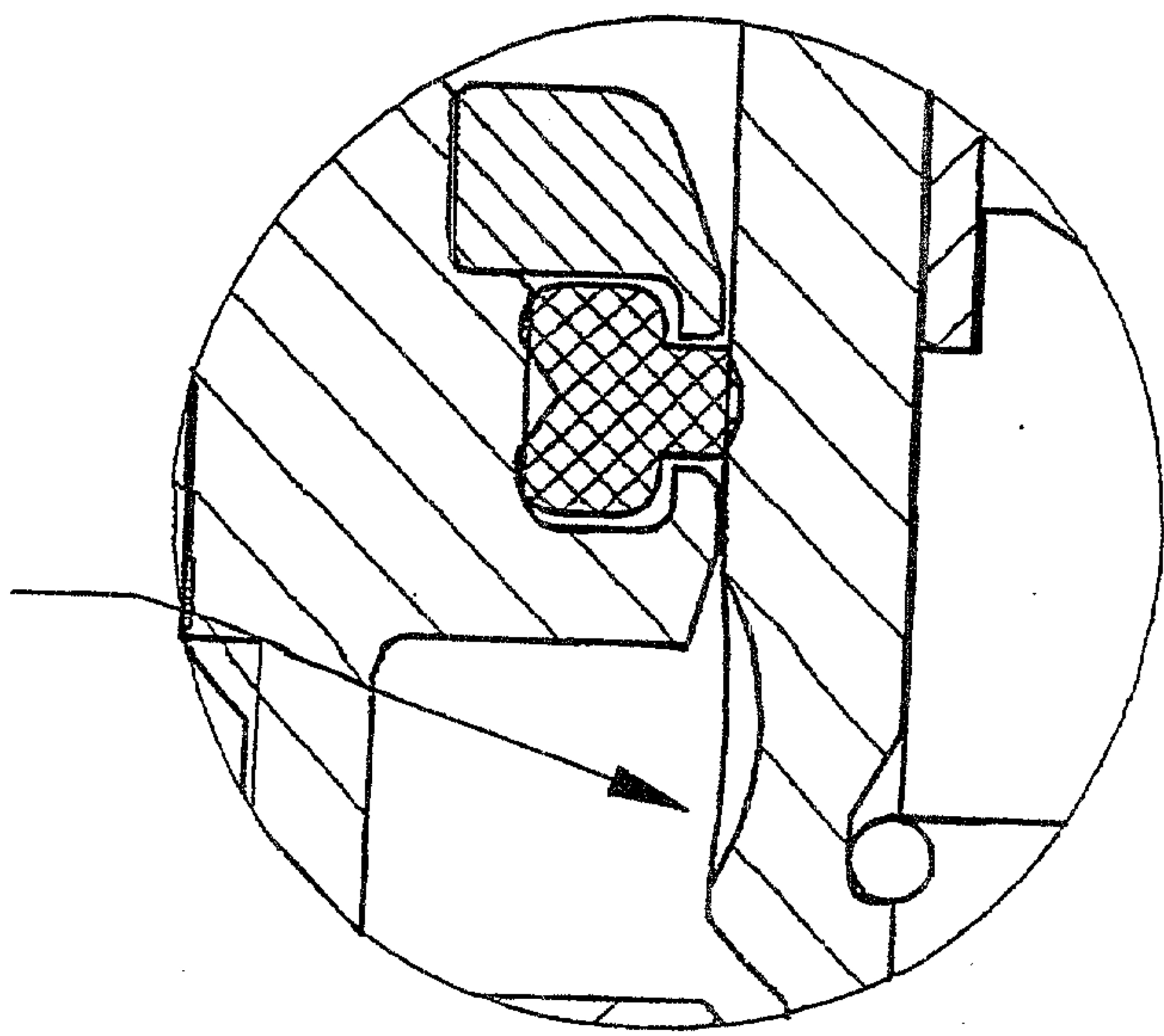


Fig. 14

