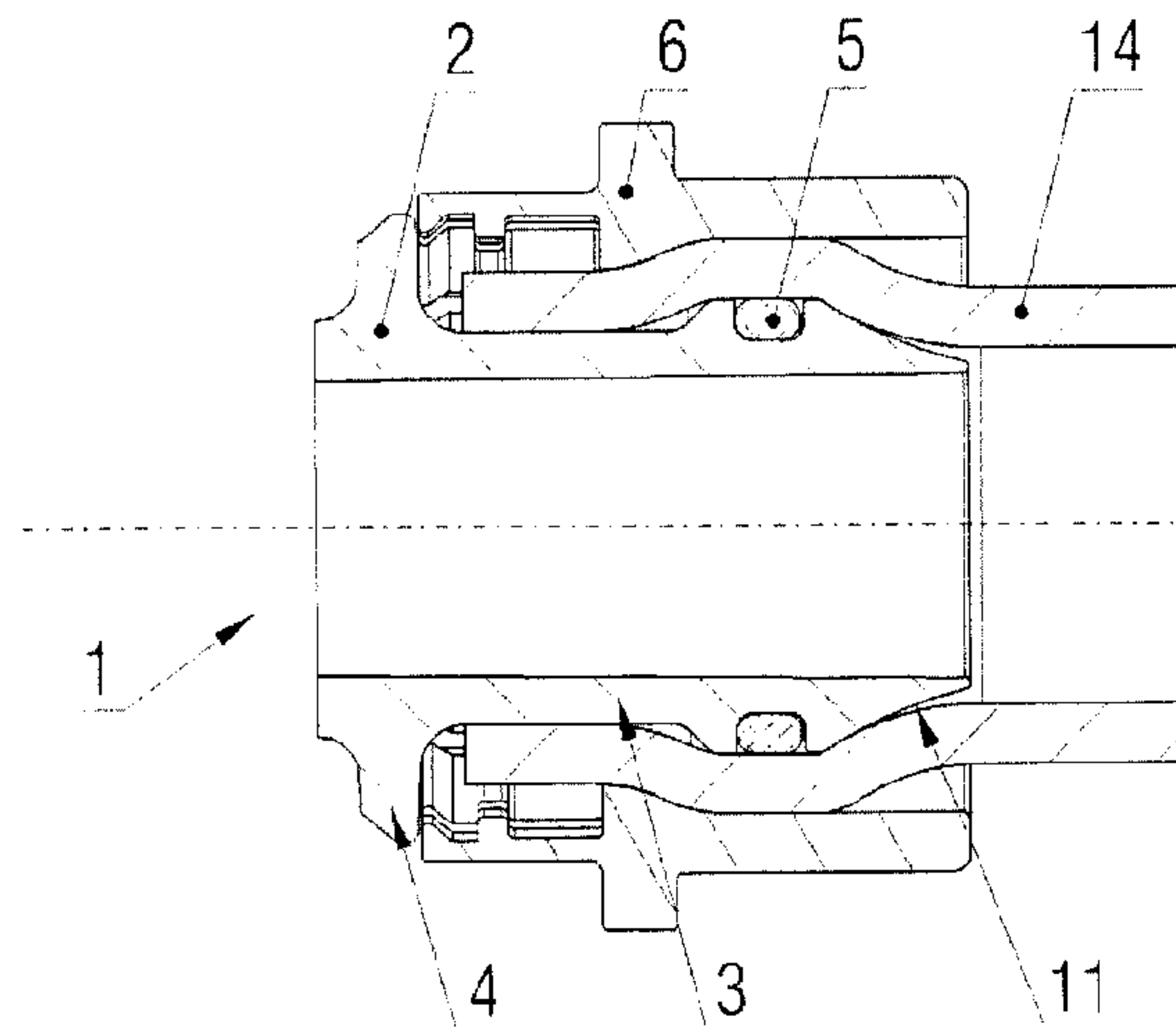




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(57) Abrégé/Abstract:

The invention relates to a clamping connection for pipes made of polymer material or made of composite materials, containing a connection piece, which has a supporting sleeve for the sliding on of a pipe to be connected and which is bounded at one end by a stop collar, wherein a sealing element is arranged on the supporting sleeve, wherein the clamping connection also comprises a clamping sleeve, which is captively connected to the stop collar of the connection piece before the pipe installation, wherein a pipe inserted onto the supporting sleeve is clamped by sliding the clamping sleeve over the pipe in a direction opposite to the insertion direction of the pipe.

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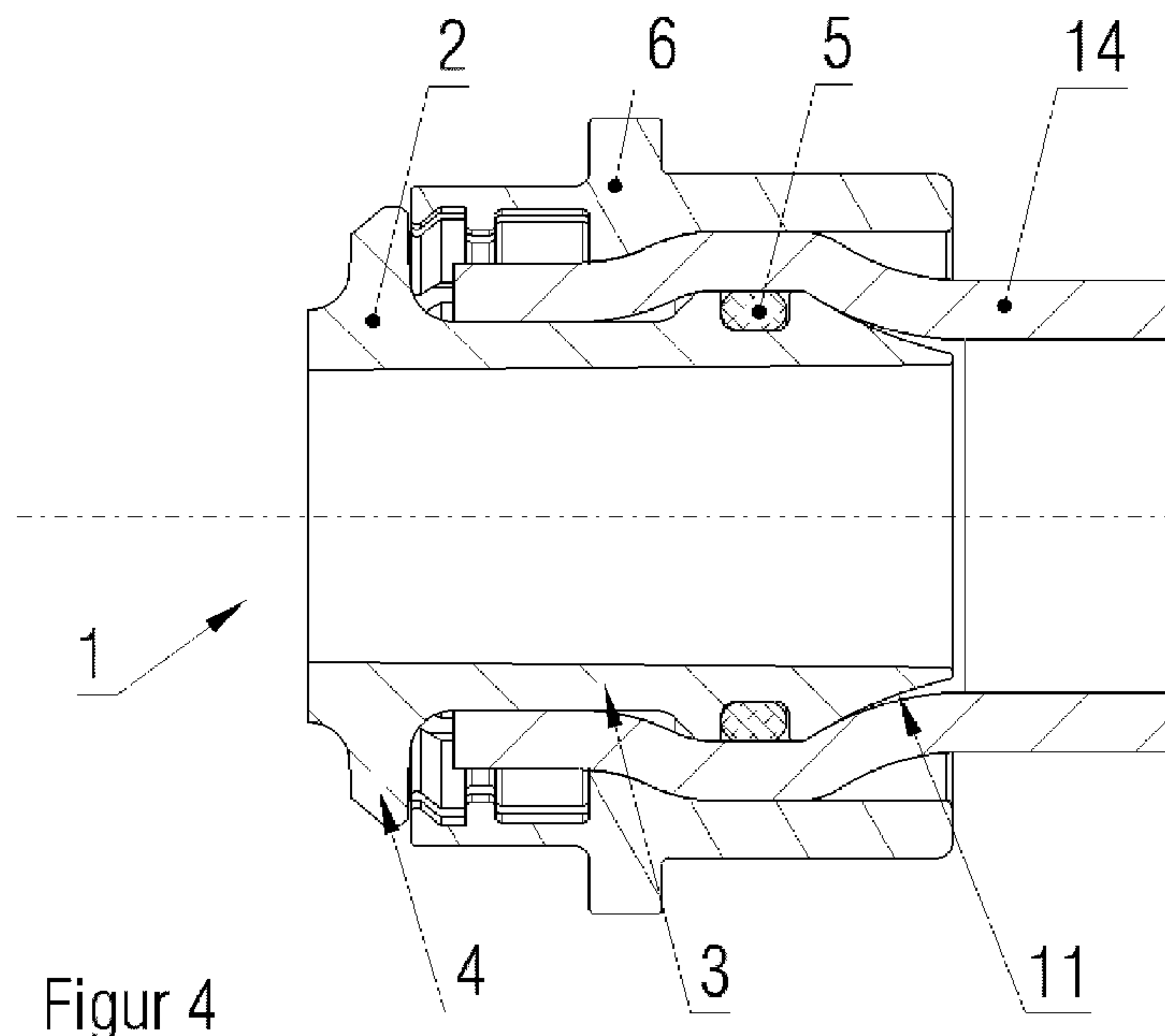
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[Fortsetzung auf der nächsten Seite]

(54) Title: CLAMPING CONNECTION FOR PIPES

(54) Bezeichnung : KLEMMVERBINDUNG FÜR ROHRE



Figur 4

(57) Abstract: The invention relates to a clamping connection for pipes made of polymer material or made of composite materials, containing a connection piece, which has a supporting sleeve for the sliding on of a pipe to be connected and which is bounded at one end by a stop collar, wherein a sealing element is arranged on the supporting sleeve, wherein the clamping connection also comprises a clamping sleeve, which is captively connected to the stop collar of the connection piece before the pipe installation, wherein a pipe inserted onto the supporting sleeve is clamped by sliding the clamping sleeve over the pipe in a direction opposite to the insertion direction of the pipe.

(57) Zusammenfassung: Klemmverbindung für Rohre aus polymerem Werkstoff oder aus Verbundwerkstoffen beinhaltend ein Anschlussstück, welches eine Stützhülse für das Aufschieben eines anzuschliessenden Rohres aufweist und die an einem Ende mit einem Anschlagbund begrenzt ist, wobei an der Stützhülse ein Dichtelement angeordnet ist, wobei die Klemmverbindung weiter eine Klemmhülse aufweist, welche bereits vor der Rohrmontage mit dem Anschlagbund des Anschlussstücks unverlierbar verbunden ist, wobei die Klemmung eines auf die Stützhülse eingeführten Rohres durch die Verschiebung der Klemmhülse über das Rohr in entgegengesetzter Richtung zur Einführrichtung des Rohres erfolgt.

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CLAMPING CONNECTION FOR PIPES**Field**

5 The invention relates to a clamping joint for pipes made of polymer material or of composite materials, said clamping joint including a connector, which has a support sleeve for fitting onto a pipe to be connected and which is defined at one end by way of a stop collar, wherein a sealing element is arranged on
10 the support sleeve, wherein the clamping joint additionally has a clamping sleeve which is already captively connected to the stop collar of the connector prior to the mounting of the pipe.

Background

15

Pipes made of polymer material such as, for example, PE-X pipes and multilayer composite pipes which, for example, have an inside and outside layer made of a polymer material such as PE-X and an intermediate layer made of aluminium, are predominantly
20 used in domestic engineering, in the supply of drinking water, for floor heating or heating unit service lines.

Clamping joints of this type are used in the majority of cases in heating and sanitation installations in order to connect
25 pipes together or to fittings. A clamping joint provides for simple and rapid assembly. In addition, permanent sealing is ensured, which is extremely important in the case of such joints as considerable damage can occur in the event of water leakage.

30 DE 42 39 705 C2 makes known a clamping joint which consists of a clamping sleeve and a basic fitting body. The clamping sleeve has an inside contour which is realized, proceeding in each case from the two sleeve ends towards the middle of the clamping sleeve, as a conically narrowing or combined conically/convexly
35 narrowing bore. The effect of said inside contour of the

clamping sleeve is that the clamping sleeve can be used regardless of how it is placed in position on the pipe.

Disadvantages here are the production of the complicated inside contour of the clamping sleeve and the subsequent control of the
5 contour.

DE 195 14 210 C2 also discloses a clamping joint for pipes and hoses of the same type. The support and clamping sleeves are realized in such a manner that they improve the sealing capacity
10 and also the longitudinal adhesion capacity, which is to be achieved by means of the ribs on the support sleeve and the inside contour of the clamping sleeve.

The disadvantage of the two clamping joints mentioned previously
15 is that the pipe to be connected has first of all to be widened prior to the connection in order to be able to push it subsequently over the support sleeve. This requires an additional operating step which makes the assembly more expensive. In addition, in the case of the connections mentioned
20 previously the fitting on of the clamping sleeve prior to the attaching of the pipe on the support sleeve can easily be forgotten, which is why the pipe then has to be removed again from the support sleeve and the clamping sleeve has subsequently to be fitted onto the pipe. The pipe can then be pushed onto the
25 support sleeve from the beginning.

DE 20 2004 000 031 U1 discloses a pipe press coupling which has a support sleeve, a press sleeve and a crimping sleeve. The individual parts are already pre-assembled prior to the mounting
30 of the pipe so that the assembly expenditure can be reduced to a minimum. In addition, the assembly itself is considerably simplified as a result of the pipe coupling not having to be assembled first of all.

35 A disadvantage of said coupling, however, is the severe cross-sectional narrowing with regard to the pipe cross section. In

addition, the disadvantage of this type of pipe connection, as with the previously mentioned connections, is that where there is strong tensile force on the pipe the clamping/pressing or clamping sleeve/press sleeve becomes detached.

5

Summary

It is the object of the invention to propose a clamping joint which is simple to mount and is able to be produced in a
10 favourable manner. In addition, if there is tensile force on the mounted pipe the joint must not become detached or the clamping joint should become stronger.

Said object is achieved according to the invention in that the
15 clamping of a pipe inserted on the support sleeve is effected by moving the clamping sleeve over the pipe in the direction opposite to the direction in which the pipe is inserted.

An advantageous development of said clamping joint is that the
20 inside diameter of the connector corresponds approximately to that of the pipe to be inserted or is slightly smaller than the inside diameter of the pipe to be inserted. As a result, cross-sectional narrowings in the line or in the connection to fittings are able to be kept small by means of the clamping
25 joint according to the invention, which is positive in terms of flow techniques.

The attaching of the clamping joint according to the invention on the pipeline or the inserting of the pipe into the clamping
30 joint does not require any prior widening of the pipe by means of an additional operating process in order to fit it onto the connector afterwards, as is known from clamping joints from the prior art. The lead-in cone on the connector or on the support sleeve enables the pipe to be inserted without having to widen
35 it first of all. The lead-in cone serves, among other things, for widening the pipe.

The stop collar of the connector additionally serves for the purpose of preventing the clamping sleeve from moving on one side in the mounted state of the clamping joint, or serves as a one-sided stop for the clamping sleeve. As a result of this such a joint is also not removable again.

An additional achievement provided by the clamping joint according to the invention is that the connection or clamping is strengthened in the event of tensile force being exerted onto the pipe. As the displacement of the clamping sleeve in the direction of the sealing element, through the tensile force on the pipe, strengthens the clamping between the sealing element or the support sleeve and the tapered inside diameter of the clamping sleeve even more.

The clamping sleeve preferably has two regions. One of these is elastic and serves for the pre-assembly as well as the assembly of the clamping joint. The second region is rigid and serves for the clamping as well as the guiding of the pipe. The clamping sleeve can obviously have even more regions.

The clamping of the pipe interacting with the sealing element or with the cross-sectional widening of the support sleeve is achieved by the tapering of the inside diameter. The tapering is effected in the rigid region of the clamping sleeve in the direction of the elastic region, the dimension of the inside diameter of the elastic region being independent of the development of the inside diameter or of the inside contour of the rigid region. The inside diameter in the elastic region is preferably greater than the outside diameter of the inserted pipe and is not tangent to the pipe even in the mounted state of the clamping joint.

The elastic region is formed by the at least two segments which are preferably distributed in a regular manner over the

circumference. The elastic region preferably has eight to 16 segments which ensure the radial elasticity.

5 A channel along the inside diameter of the segments serves for the axial positioning as well as fixing of the clamping sleeve. As a result, the clamping sleeve is fixed and positioned or pre-positioned on the stop collar. The channel corresponds to the width of the stop collar. An advantageous design consists in that the clamping sleeve in the channel as well as the stop
10 collar have a corresponding phase or inclination which simplifies the assembly or the pushing down of the clamping sleeve from the stop collar.

Hence, according to a broad aspect, the invention provides a
15 clamping joint made of polymer material or of composite materials, the clamping joint including a connector which has a support sleeve for fitting onto a pipe to be connected and which is defined at one end by way of a stop collar, wherein a sealing element is arranged on the support sleeve, wherein the clamping
20 joint further comprises a clamping sleeve which is already captively connected to the stop collar of the connector prior to the mounting of the pipe, wherein the clamping of the pipe inserted on the support sleeve is made by moving the clamping sleeve on the pipe in a direction opposite to a direction in
25 which the pipe is inserted.

Brief description of the drawings

An exemplary embodiment of the invention is described by way of
30 the Figures, the invention not being restricted to only the exemplary embodiment, in which:

Figure 1 shows a longitudinal section through a pre-assembled clamping joint according to the invention at the
35 beginning of the mounting of the pipe,

Figure 2 shows a longitudinal section through a pre-assembled clamping joint according to the invention with the mounting of the pipe having progressed only a little,

Figure 3 shows a longitudinal section through a pre-assembled clamping joint according to the invention with the pipe inserted completely,

Figure 4 shows a longitudinal section through a pre-assembled clamping joint according to the invention in the finished assembled state,

Figure 5 shows a longitudinal section through a pre-assembled pipe coupling which has a clamping joint according to the invention on both sides,

Figure 6 shows a view of a distributor which has clamping joints according to the invention for connecting the pipes and

Figure 7 shows a longitudinal section and a view of the clamping sleeve of the clamping joint according to the invention.

20 Detailed description of embodiments

Variants, examples and preferred embodiments of the invention are described hereinbelow. Figure 1 shows a clamping joint 1 according to the invention where the pipe 14 to be connected has already been pushed lightly onto the conical region of the support sleeve 3 or the lead-in cone 11. The connector 2 has a lead-in cone 11 which makes it possible for the pipe 14 to be connected to be inserted. The lead-in cone 11 makes it possible to dispense with a previous widening of the pipe 14, which saves on one operating step during assembly and, as a result, makes the assembly simpler and quicker. The pipe 14, which is produced from a polymer material or from a composite material, is widened as it is being inserted over the lead-in cone 11, as a result of which the insertion of the connector 2 or of the support sleeve 3 is made possible. The clamping sleeve 6, which is already pre-assembled on the connector 2, serves, among other things, for

guiding the pipe 14 during the insertion, which can be seen from Figure 2.

When reaching the clamping sleeve 6, the pipe 14 is directed
5 along the inside contour or the inside diameter of the clamping
sleeve 6 and along the support sleeve 3. The sealing element 5,
which is preferably formed by an O-ring seal, serves for the
optimum tightness of the clamping joint 1. The sealing element 5
is arranged on the support sleeve 3 and is situated in a groove
10 12 which is provided for this purpose and which prevents the
displacement of the sealing element 5. The pipe 14 is pushed
into the clamping joint 1 as far as up to the radius 13 and is
then fastened to the clamping sleeve 6, which is already pre-
assembled on the connector 2. The clamping sleeve 6, as already
15 mentioned, is pre-assembled on the connector 2. The connector 2
has a stop 4 on the opposite end of the lead-in cone 11 of the
support sleeve 3. Said stop serves, among other things, for the
pre-assembly of the clamping sleeve 6. The clamping sleeve 6 is
fastened on the stop collar 4. The pre-assembly and the removal
20 of the clamping sleeve 6 from the stop collar 4 are ensured by
means of the radially elastic region 9 of the clamping sleeve 6.
A radially elastic region 9 on the clamping sleeve 6 is formed
by the arrangement of segments 7 on the clamping sleeve 6, which
can be seen in Figure 7.

25

For the pre-assembly, the segments 7 can be widened slightly in
the radial direction in order to insert the stop collar 4 of the
connector 2. Through their elasticity they are then clamped on
the stop collar 4 in a fixed manner, the inside contour of the
30 segments 7 having a channel 8, which corresponds to the width of
the stop collar 4, as a result of which the clamping sleeve 6 is
fixed or positioned in an axial manner on the stop collar 4. The
elastic region 9 consists of at least two segments 7. It is
advantageous when both the clamping sleeve 6 and also the stop
35 collar 4 have a phase 15 which simplifies the pushing down of
the clamping sleeve 6 from the stop collar 4 onto the inserted

pipe 14. Figure 3 illustrates this operation. The elastic region 9, which is formed by the segments 7, is deformed in a manner such that the clamping sleeve 6 is pushed in the direction opposite to the insertion of the pipe 14, as a result of which the phase 15 of the clamping sleeve 6 can be pushed over the phase 15 of the stop collar 4 and, as a result, the clamping sleeve 6 can be pushed onto the inserted pipe 14. By the inside contour or the inside diameter of the clamping sleeve 6 having a tapering in the rigid region 10 of the clamping sleeve 6, the inside diameter in the rigid region 10 reducing in the direction of the elastic region 9, during the assembly or the clamping operation, the tapered part of the clamping sleeve 6 or the clamping sleeve 6 is moved in the direction of the sealing element 5. By means of the sealing element 5 and the groove 12 provided for said sealing element, the support sleeve 3 has an enlarged cross section at this position, which brings about a clamping action when the clamping sleeve 6 is displaced in the direction of the sealing element 5.

Figure 4 shows the finished assembled clamping joint 1. It can also be seen from Figure 4 that the clamping would be strengthened by tensile force on the pipe 14 as the clamping sleeve 6 would also move in said same direction and thus would appear at the sealing element 5 on account of the tapered diameter of the clamping sleeve 6 or the pipe 14 situated in between would be crimped accordingly. The stop collar 4 serves after the assembly for the purpose of also defining the clamping sleeve 6 in the other direction and ensuring that it cannot be removed.

No such clamping joint, where the fitting on of the clamping sleeve is effected against the direction in which the pipe is inserted, is known from the prior art, as such an operation up to now has been perceived as not logical since, as a result, the pipe in the case of the known clamping joints would be pushed down again by the support sleeve. In addition, in the case of conventional clamping joints which are pre-assembled, the

clamping sleeve is also attached on the support sleeve, however not on the side of the stop collar but on the side of the pipe to be inserted.

5 An assembly in said direction of the pipe 14 is possible by means of the development of the inside contour or of the tapering of the inside diameter of the clamping sleeve 6 of the present invention and the cross-sectional widening of the support sleeve 3 by the sealing element 5, a mere cross-
10 sectional widening on the support sleeve 3 without a sealing element 5 being equally conceivable in order to achieve said clamping effect where the clamping is strengthened instead of removed when there is tensile force on the pipe. It can also be seen from Figure 4 that the inside diameter of the connector 2
15 has approximately the same cross section or diameter as the pipe to be inserted. As a result, a narrowing of the line in the case of pipe couplings or fitting connections is able to be reduced with the clamping joint according to the invention. In addition, an optimum transition is formed by the lead-in cone 11 such that
20 no flow-impairing obstructions are created by the inserted connector 2.

Figure 5 shows a pipe coupling 16 which is suitable for connecting pipes 14. The coupling 16 has a clamping joint 1
25 according to the invention on both sides. The pipe coupling 16 is shown in the pre-assembled state. Such clamping joints 1 are also suitable, for example, for connections on fittings.

Figure 6 shows a clamping joint 1 according to the invention
30 which is arranged on a distributor.

The clamping sleeve 6 of the clamping joint 1 according to the invention, which is shown separately in Figure 7, has an elastic region 9. The radially elastic region 9 is composed of segments
35 7 which are arranged along the circumference. The number and size of the segments 7 are to be adapted to the requirements of

the clamping joint 1 and to its dimension. In addition, the clamping sleeve 6 has a rigid region 10 which makes it possible for the inserted pipe 14 to be clamped. The inside contour or the inside diameter in the rigid region 10 is tapered in the direction of the elastic region 9, as a result of which, as described previously, the clamping action is achieved in dependence on the support sleeve 3. The clamping sleeve 6 preferably has a web 17 on the outer circumference, which web serves for the assembly. The clamping joint 1 can be mounted with the aid of a corresponding assembly tool by means of the web 17 on the clamping sleeve 6.

List of references

15	1	Clamping joint
	2	Connector
	3	Support sleeve
	4	Stop collar
	5	Sealing element
20	6	Clamping sleeve
	7	Segment
	8	Channel
	9	Elastic region
	10	Rigid region
25	11	Lead-in cone
	12	Groove
	13	Radius
	14	Pipe
	15	Phase
30	16	Pipe coupling
	17	Web

Claims

1. Clamping joint made of polymer material or of composite materials, the clamping joint including a connector which has a support sleeve for fitting onto a pipe to be connected and which is defined at one end by way of a stop collar, wherein a sealing element is arranged on the support sleeve, wherein the clamping joint further comprises a clamping sleeve which is already captively connected to the stop collar of the connector prior to the mounting of the pipe, wherein the clamping of the pipe inserted on the support sleeve is made by moving the clamping sleeve on the pipe in a direction opposite to a direction in which the pipe is inserted.
2. Clamping joint according to Claim 1, wherein an inside diameter of the connector corresponds approximately to an inside diameter of the pipe to be inserted or is slightly smaller than the inside diameter of the pipe to be inserted.
3. Clamping joint according to Claim 1 or 2, wherein the connector has a lead-in cone.
4. Clamping joint according to any one of Claims 1 to 3, wherein the stop collar of the connector prevents the clamping sleeve moving on one side once the pipe has been mounted.
5. Clamping joint according to any one of Claims 1 to 4, wherein pulling out the inserted pipe displaces the clamping sleeve towards the sealing element and strengthens the clamping.
6. Clamping joint according to any one of Claims 1 to 5, wherein the clamping sleeve has a radially elastic region and a rigid region.
7. Clamping joint according to Claim 6, wherein an inside diameter of the clamping sleeve tapers in the rigid region.

8. Clamping joint according to Claim 7, whrerein the inside diameter of the clamping sleeve tapers in the rigid region in the direction of the elastic region.

5

9. Clamping joint according to any one of Claims 6 to 8, whrerein the elastic region of the clamping sleeve is formed by at least two radially arranged segments.

10 10. Clamping joint according to Claim 9, wherein the segments have a radially extending channel.

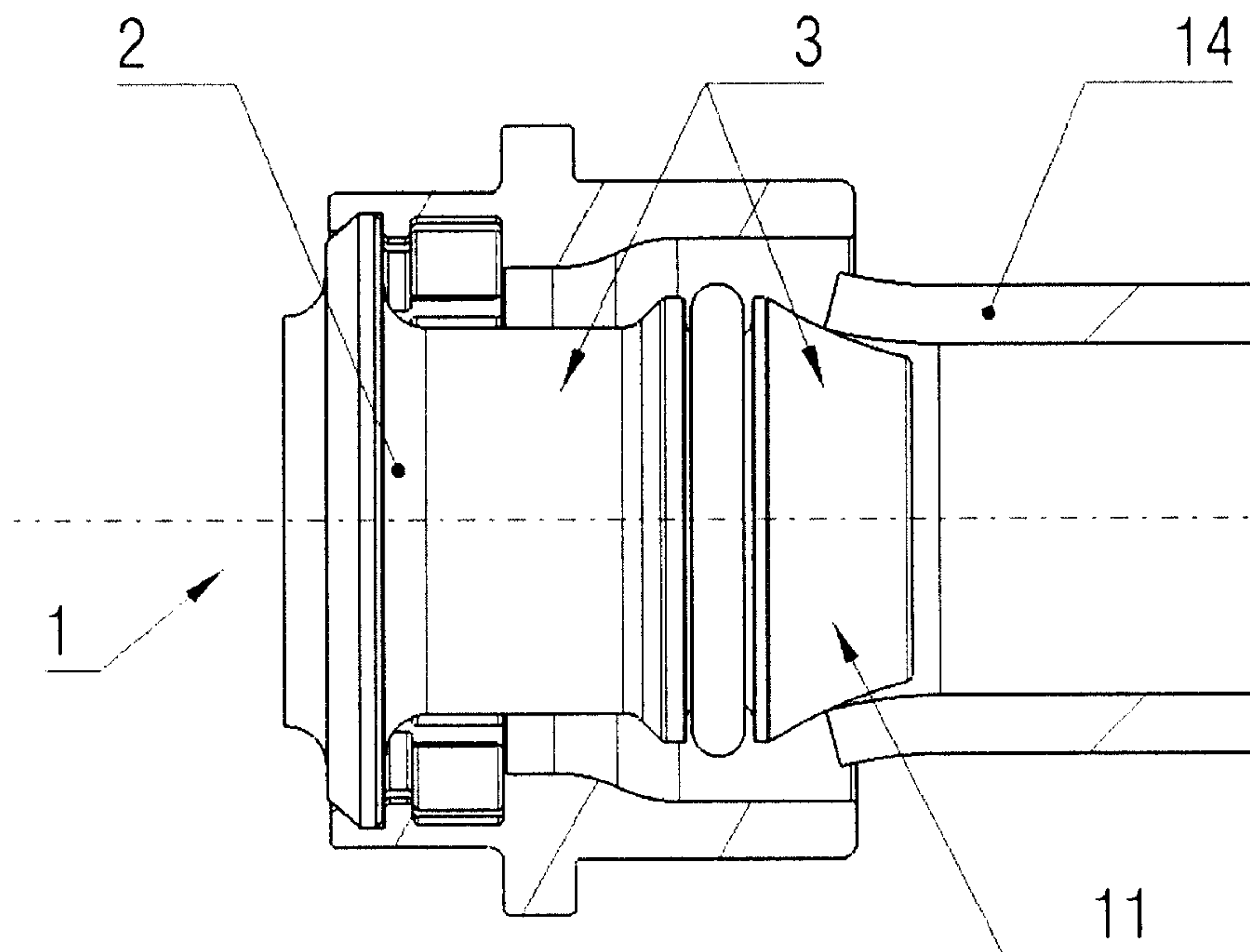


Figure 1

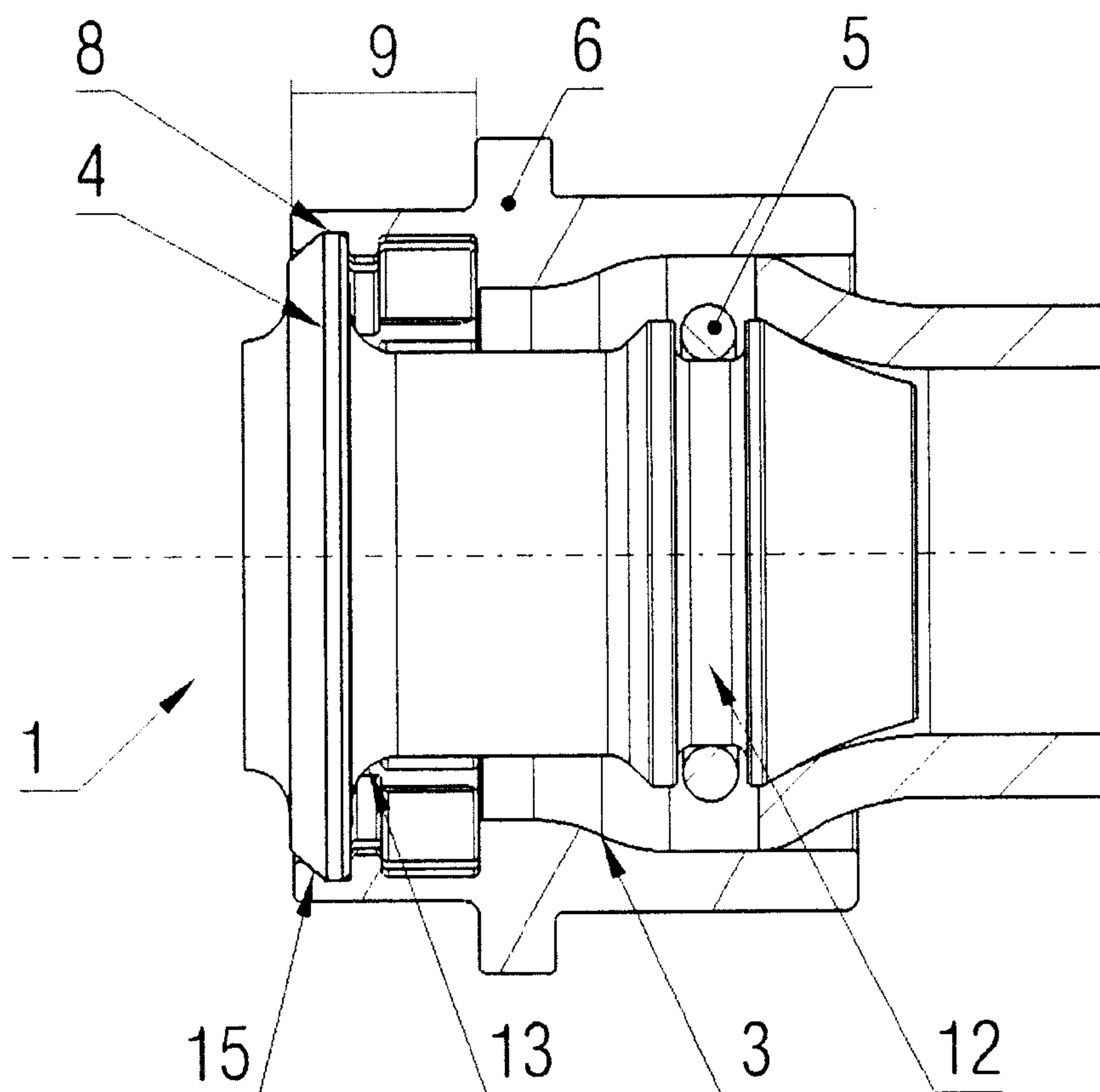


Figure 2

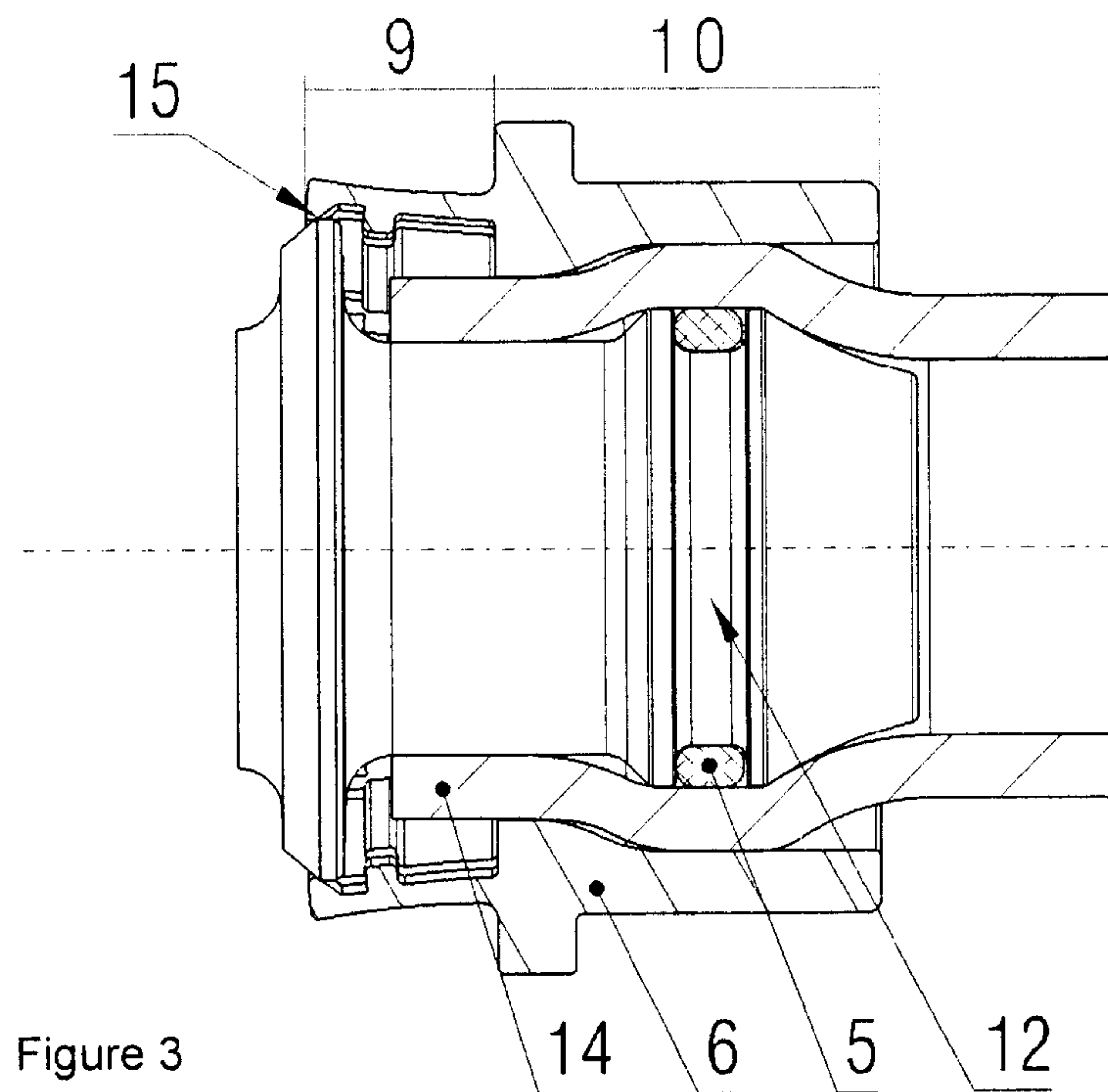


Figure 3

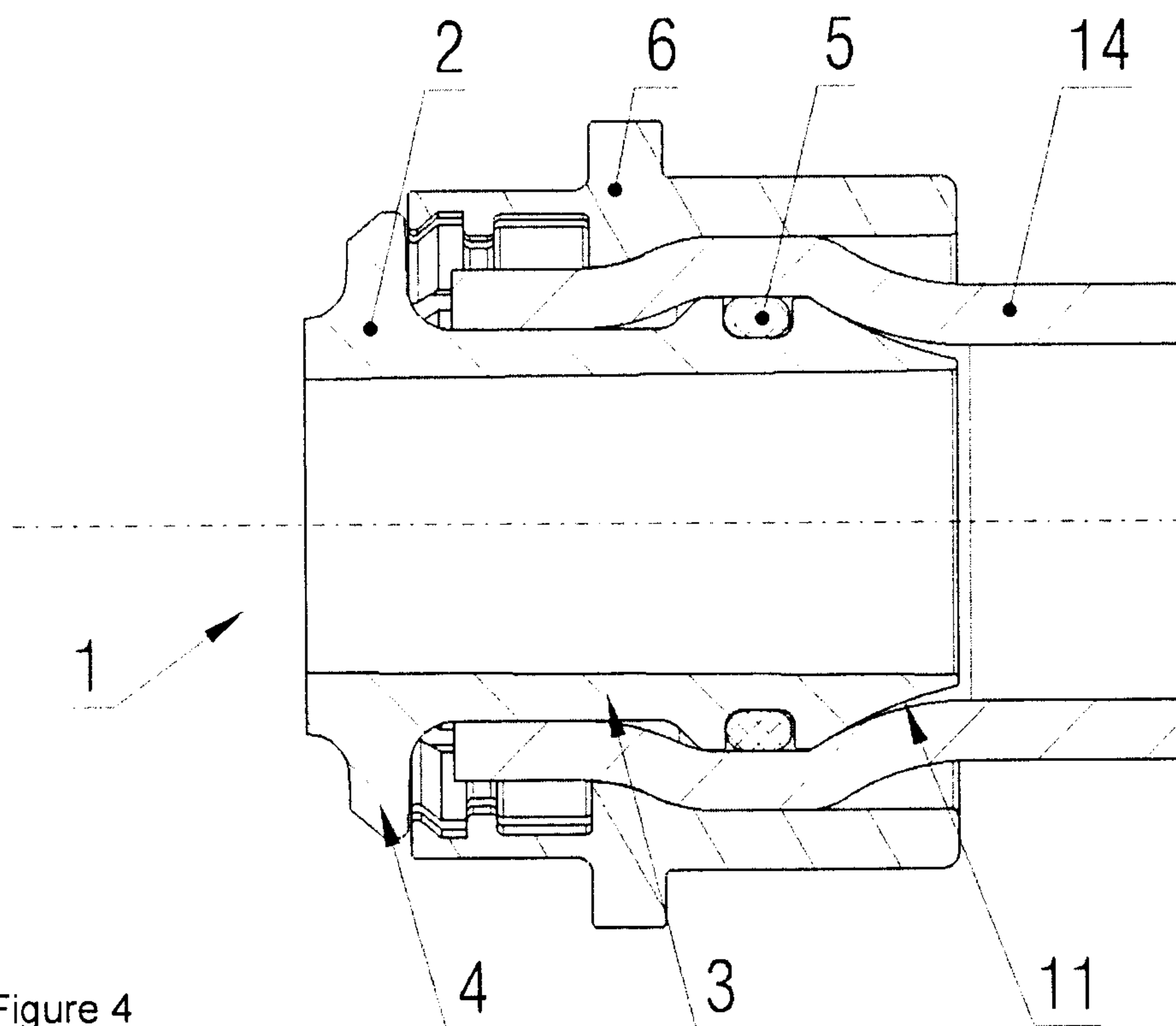


Figure 4

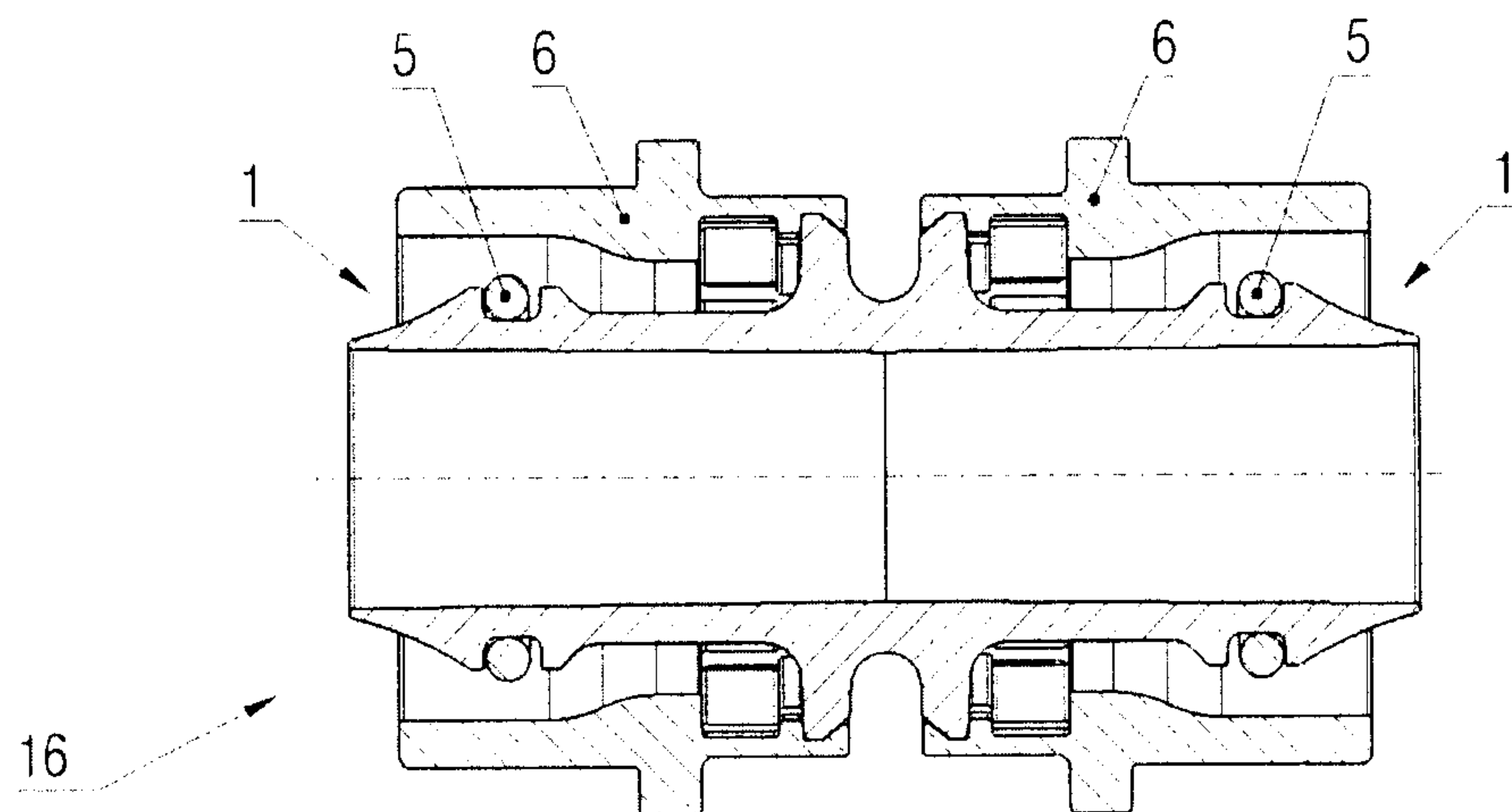


Figure 5

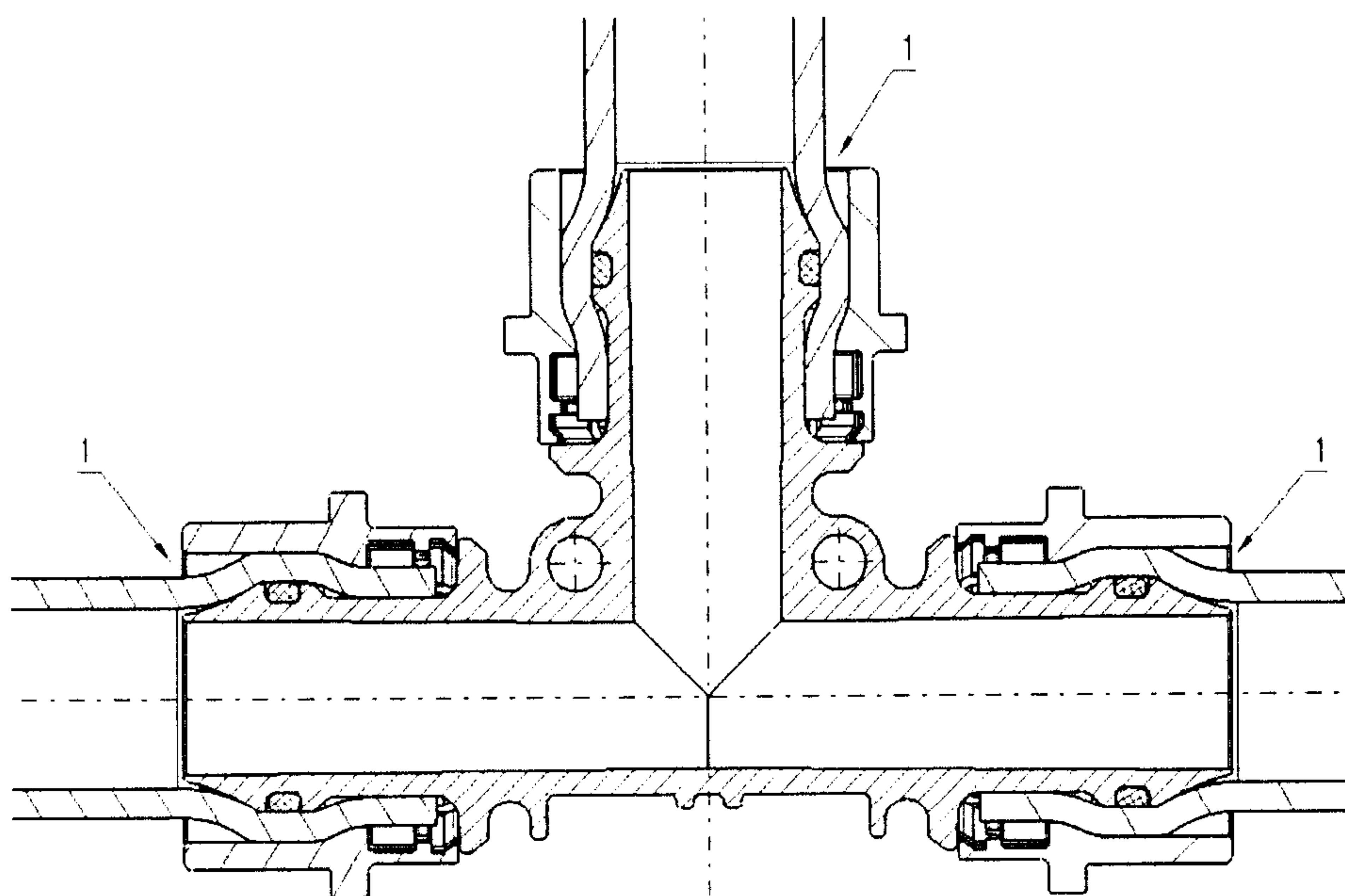


Figure 6

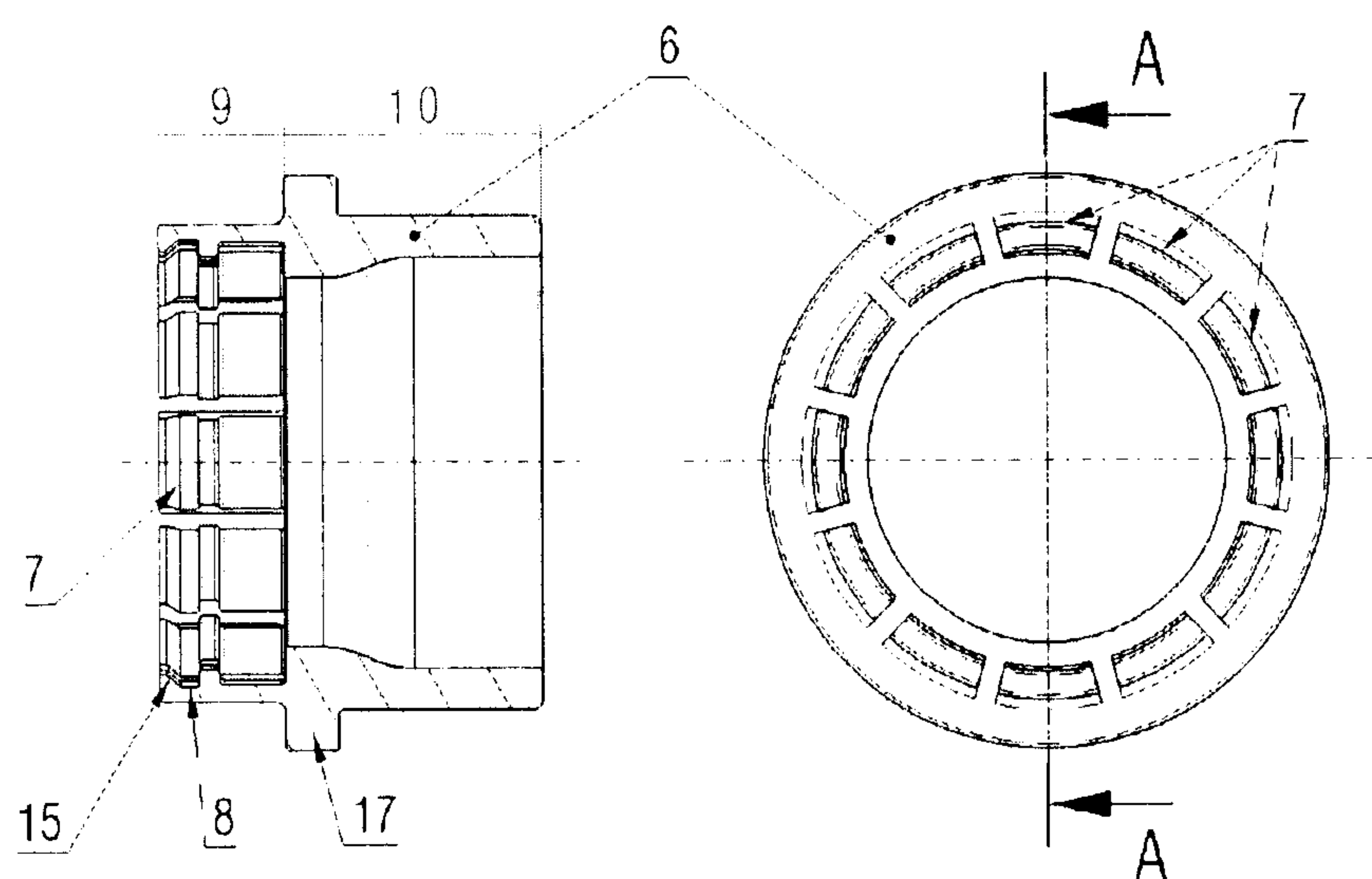


Figure 7

