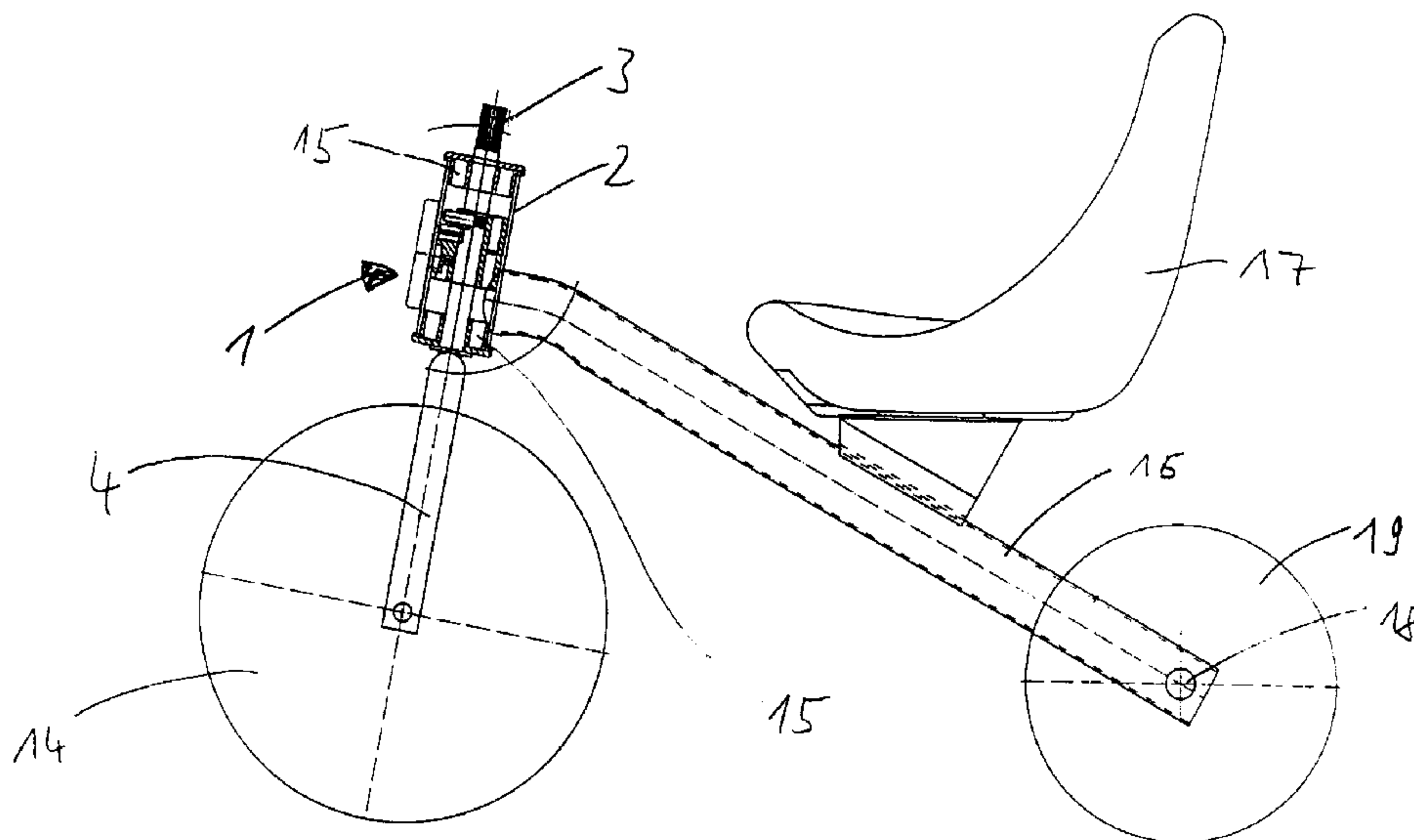




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(54) **RACCORD DE DIRECTION DE VEHICULE**  
(54) **VEHICLE STEERING HEAD**



(57) A vehicle steering head comprising a support tube which rotatably supports therein a fork tube to which a wheel fork and a handlebar can be secured, characterized in that a latch element is secured to said fork tube on a portion provided inside said support tube, that said support tube has supported therein a linkage element for rotation therewith, that said linkage element is displaceable in the longitudinal direction of said support tube, that said linkage element comprises a stop surface which limits a rotation of said fork tube and can be brought into contact with said latch element, and that said linkage element comprises at least one locking element which is releasably connectable to said latch element.

## Abstract

A vehicle steering head comprising a support tube which rotatably supports therein a fork tube to which a wheel fork and a handlebar can be secured, characterized in that a latch element is secured to said fork tube on a portion provided inside said support tube, that said support tube has supported therein a linkage element for rotation therewith, that said linkage element is displaceable in the longitudinal direction of said support tube, that said linkage element comprises a stop surface which limits a rotation of said fork tube and can be brought into contact with said latch element, and that said linkage element comprises at least one locking element which is releasably connectable to said latch element.

## VEHICLE STEERING HEAD

### Description

The present invention relates to a vehicle steering head according to the preamble of the main claim. In particular, the invention relates to a steering head for a vehicle comprising a support tube which has rotatably supported therein a fork tube to which a wheel cover and a handlebar can be secured.

Steering heads of the above-described type are in particular used in bicycles or tricycles, in particular in tricycles or bicycles for children.

In bicycles of the above-described type it is desirable for safety reasons that accidents are avoided which are caused by an excessively large handlebar deflection. In the case of an excessively large handlebar deflection it may happen that the vehicle tilts to the side; furthermore, there is the risk that the user hits against the handlebar, that he/she gets caught with his/her feet in the front wheel or gets injured at the pedals.

Furthermore, it has been found to be a drawback that prior-art bicycles when pushed with a push rod show a tendency towards uncontrolled steering movements of the front wheel which cannot be mastered by small children, in particular.

It is the object of the present invention to provide a vehicle steering head of the above-mentioned type which while being of a simple construction and operable in an easy and reliable manner avoids the drawbacks of the prior art and can in particular limit a handlebar deflection to a desired degree and provides a locking possibility.

According to the invention the object is achieved by the features of the independent claims; the respective subclaims show further advantageous developments of the invention.

Hence, according to the invention a latch element is secured to the fork tube on a portion provided inside the support tube, a linkage element is supported in the support tube for rotation therewith, the linkage element is displaceable in the longitudinal direction of the support tube, the linkage element comprises at least one stop surface which limits a rotation of the fork tube and can be brought into contact with the latch element, and the linkage element comprises at least one locking element which is releasably connectable to the latch element.

According to another aspect of the present invention a latch element is supported on the support tube, a linkage element is arranged on the fork tube and connected to the tube for rotation therewith, the latch element is freely displaceable along the support tube, the linkage element comprises at least one stop surface which limits a rotation of the fork tube and can be brought into contact with the support tube, and at least one latch element is provided that is releasably connectable to the support tube.

The vehicle steering head according to the invention is characterized by a number of considerable advantages.

First of all, it is possible to install the steering head in a frame of any desired design, e.g. of bicycles or tricycles. Since the dimensions of the steering head which are required within the scope of the present invention do not interfere with the remaining structure of the frame, the steering head can be combined with all common types of frames.

Since use is made of a latch element arranged in the support tube, no functional parts of the steering head are outwardly visible or accessible, so that maloperations can be reduced and damage is ruled out altogether. This is of particular importance to vehicles used by children or infants.

Thanks to the use of the linkage element according to the invention, it is possible to reliably lock the fork tube and thus the wheel fork and the front wheel. Such a locking can easily be accomplished by displacing the linkage element, whereby a high degree of operational safety and operational reliability is ensured.

Since the linkage element further comprises stop surfaces which the latch element can be brought into contact with, the steering angle can be limited in a particularly easy way. Such a limitation of the steering angle can thus be realized according to the invention in different ways; the available steering angle is here freely selectable within a wide range. This is of particular advantage to vehicles for children, e.g. tricycles, because a limitation of the steering angle to  $45^\circ$  at each side is possible. As a result, a lateral tilting of a tricycle and injuries at the pedals provided on the front wheel or at the handlebar can be ruled out to a considerable extent.

The possibility offered by the invention, i.e. to provide the linkage element with a locking element which is releasably connectable to the latch element, guarantees that when a push rod is used for pushing the tricycle the front wheel thereof is reliably locked in place during straight travel.

In an advantageous development of the invention, the latch element is designed in the form of a pin extending in a direction transverse to the fork tube. Said pin can either be put through the fork tube, so that it extends at both sides of the fork tube, or

it is possible to make the pin project from the fork tube at one side only. The pin can firmly be connected to the fork tube, e.g. by welding; however, it is also possible to provide a press fit and/or to provide the pin with a knurled portion. Hence, the dimensions of the pin can easily be adapted to the respective conditions of use. The manufacturing costs of the steering head are reduced by the above-described construction to quite a considerable degree.

In an advantageous development of the invention the linkage element is substantially designed in the form of a hollow cylinder. Thus, the linkage element can reliably be guided in the support tube and surround the fork tube. It goes without saying that the linkage element can be designed as one part or several parts, the latter being firmly connected to one another after assembly.

It is advantageous for the longitudinal displacement of the linkage element along the axis of the support tube and the fork tube, respectively, when the support tube comprises at least one longitudinal slot or a similar recess through which a connection element extends that is connected to the linkage element and to a slide arranged outside the support tube. A very easy handling of the linkage element is possible by means of the slide. A displacement of the slide, which may additionally be provided with locking means or fixing safety means, effects a displacement of the linkage element, thereby fixing the front wheel in the straight travel position. It goes without saying that to this end the linkage element may be also be provided with inclined inlet surfaces or intercepting means for the latch element to initiate a locking action when the front wheel is slightly deflected angularly.

The stop surfaces of the latch element are preferably formed on at least one front attachment of the linkage element. It is particularly advantageous when two opposite attachments that are in symmetry with each other are each provided with at least one

stop surface on the linkage element. Thus the two attachments that are in symmetry with each other limit the steering angle in symmetrical fashion to the left and right side.

In an advantageous development of the invention, the associated stop surfaces of the attachments limit the rotation of the fork tube to a predetermined angular range at both sides. Said angular range may e.g. be 45° at both sides.

The locking element is designed in the form of at least one front recess for receiving the latch element. Such an advantageous design makes it possible to grip and fix the latch element upon displacement of the linkage element. It is here advantageous that the recess is retracted relative to the front attachment so that the attachments can always remain in the plane of the latch element while upon a displacement of the latch element it is only the recess that can additionally be brought into engagement.

To implement a simple and operationally reliable structure of the steering head, it may be of advantage when the recess is centrally arranged between said two attachments.

The possible solution described in the independent claim is characterized by a particularly simple construction. It is particularly advantageous that the fork tube itself has not been changed constructionally. It is thus possible to manufacture all functional parts separately in a very simple manner. As a result, advantageous production costs can be achieved.

In a preferred development of the second variant, the linkage element is designed as part of a mudguard which extends from below into the support tube. Costs can also be saved with this embodiment because a mudguard normally made from plastics

exists in most vehicles of the above-described type at any rate. The linkage element can thus be mounted on the mudguard in a particularly easy way and at low costs.

A further advantage of the second variant is that the latch element is designed in the form of a bolt extending in parallel with the fork tube. The latch element can thus be given relatively large dimensions so that the diameter of the support tube itself need not be chosen with such a large size.

It is of particular advantage when the latch element is connected to a slide extending into the support tube to be able to design the lock of the front wheel in a particularly simple manner. Furthermore, according to an advantageous development the locking element is connected to the slide. The locking element serves to reliably maintain the locked state and to prevent any unintended unlocking. The locking element preferably engages into a recess of a bearing which supports the fork tube in the support tube. It is thus not necessary to mount additional parts or to take installation measures on the support tube itself.

It is of particular advantage for the limitation of the steering angle when a lower bearing which supports the fork tube in the support tube has formed thereon an attachment which projects in the direction of the linkage element and can be brought into contact with the stop surfaces formed on the linkage element and thus on the mudguard. This has the advantageous effect that the predetermined angular range can be limited at both sides, e.g. to 45° each.

The invention shall now be described with reference to embodiments taken in conjunction with the drawing, in which:

Fig. 1 is a schematic side view of a children's tricycle with a first embodiment

of the vehicle steering head according to the invention;

- Fig. 2 is a simplified sectional side view of the steering head according to the invention in an unlocked state;
- Fig. 3 is a side view, turned by 90°, of the arrangement shown in Fig. 2;
- Fig. 4 is a sectional side view similar to Fig. 2, in the locked state;
- Fig. 5 is a side view, similar to Fig. 3, of the view according to Fig. 4;
- Fig. 6 is a simplified perspective illustration of the linkage element according to the invention;
- Fig. 7 is a schematic side view of a children's tricycle with a second embodiment of the vehicle steering head according to the invention;
- Fig. 8 is a sectional side view of the vehicle steering head according to the invention, in the unlocked state;
- Fig. 9 is a side view, turned by 90°, of the arrangement shown in Fig. 8;
- Fig. 10 is a sectional side view similar to Fig. 8, in the locked state;
- Fig. 11 is a side view, turned by 90°, which is similar to Fig. 9, in the locked state;
- Fig. 12 is a top view on the linkage element according to the invention and on

the associated mudguard;

Fig. 13 is a sectional view of the arrangement according to Fig. 12 along the sectional lines XIII-XIII of Fig. 12;

Fig. 14 is an enlarged side view showing a portion of the slide and of the locking element in the locked state;

Fig. 15 is a view analogous to Fig. 14, in the unlocked state;

Fig. 16 is a top view on the slide; and

Fig. 17 is a top view on the lower bearing.

The children's tricycle shown in Fig. 1 comprises a front wheel 14 which is supported on a wheel fork 4 which is fixedly connected to a fork tube 3. A handlebar (not shown) can be secured to the upper end of the fork tube 3.

The fork tube 3 is supported in a support tube 2; the support is accomplished by means of slide bearings 15 which are shown in detail in Figs. 2 to 5. The slide bearings 15 correspond to those of the prior art so that a detailed description is here not needed.

The support tube 2 is firmly connected to a frame 16 which has mounted thereon a seat 17 and carries a rear axle 18 with rear wheels 19. Thus the support tube 2 and the fork tube 3 form a steering head 1.

According to the invention the support tube 2 has arranged therein a linkage element 6 which has a substantially cylindrical configuration and is received with a play in the support tube 2. The linkage element 6 is provided with a central recess through which the fork tube 3 extends.

The support tube 2 has formed therein a longitudinal slot 9 through which a connection element 10 extends that is connected to both a slide 11 and the linkage element 6, e.g. by means of a screw 20 (see Figs. 2 and 4). In the illustrated embodiment, the connection element 10 is integrally connected to the slide 11 and extends in a recess 21 of the linkage element 6.

On its front upper portion the linkage element 6 comprises two symmetrical opposite attachments 12 each provided with lateral stop surfaces 7. When viewed from the top, the attachments 12 are designed in the manner of a segment of a partial circle, so that the four stop surfaces 7 are each arranged in symmetry with one another.

In the illustrated embodiment two locking elements 8 which are each formed by a recess 13 are provided on the linkage element 6 in retracted fashion with respect to the stops 12. As becomes apparent from Fig. 6, the walls of the recess 13 may be made resilient to ensure a releasable locking of a bolt-like latch element 5 when the linkage element 6 is pushed upwards.

As becomes apparent from Figs. 2 to 5, the fork tube 3 has provided thereon a bolt-like or pin-like latch element 5 extending at both sides. Said element is thus rotating with the fork tube 3 when a deflection of the handlebar is to take place. The deflection of the handlebar is limited by the latch element 5 abutting on the stop surfaces 7.

The latch element 5 is pressed into the recesses 13 and is thus held by the locking element 8 when the linkage element 6 is pushed upwards by means of the slide 11. The inclined inlet surfaces of the locking element 8 simplify the operation. In the locked state, which is shown in Figs. 4 and 5, a steering movement is thus not possible. Figs 2 and 3 show a downwardly displaced condition of the linkage element in which the latch element 5 is in a position in which it does not cooperate with the locking element 8 but abuts on the stop surfaces 7 at a corresponding steering angle.

According to the invention the linkage element 6 may e.g. be made from a plastic material.

A second embodiment of the vehicle steering head according to the invention is described with reference to Figs. 7 to 16. Like parts are provided with like reference numerals.

As for the description of Fig. 7, reference can be made to the description of Fig. 1. The subsequent figures are illustrations elucidating the details which have been changed.

Like Figs. 2 to 5, Figs. 8 and 9 and 10 and 11, respectively, are illustrations showing the vehicle steering head on an enlarged scale. Like parts are here also provided with like reference numerals, so that reference can be made to the preceding explanations. The slide 11 which extends through a longitudinal slot 9 comprises an outer grip member and an interior portion that are screwed to each other. A top view on the slide is shown in Fig. 16. As can be seen, a central recess 24 is provided through which the fork tube 3 extends. Furthermore, a recess is formed which has pressed thereinto the bolt-like latch element 5.

As already described in conjunction with the first embodiment, a bearing 15 which serves as a slide bearing is used on the upper portion of the steering head 1.

A lower bearing 15 is configured such that an upwardly projecting contour of a linkage element 6 can extend into the bearing 15. As becomes apparent Fig. 12, the linkage element 6 has a recess 25 into which the latch element 5 can be inserted; see also Figs. 9 and 11.

As can further be seen from the top view of Fig. 12, the linkage element comprises two lateral stop surfaces 7 that are angularly spaced apart from each other such that a downwardly oriented attachment 26 (see Figs. 8 to 11) of the bearing 15, which is connected to the support tube 2 for rotation therewith, forms a steering limitation of plus/minus 45°.

Fig. 13 is a lateral sectional view of the mudguard 22 and of the linkage element 6.

Figs. 14 and 15 are front views of the slide 11 where the handpiece has been removed to illustrate the operation of the locking element 8. The locking element is U-shaped and comprises two movable lateral legs that can releasably be inserted into a recess 23 of the bearing 15. Upon insertion and locking, the locking element 8 is pressed against an undercut and thereby held in said position. The slide 11 must be pushed upwards for release purposes.

Fig. 17 is again a top view on the lower bearing 15 on an enlarged scale. The (downwardly projecting) attachment 26 can here be seen and also the recess 23 for inserting the locking element 8 and a recess 27 for guiding the bolt-like latch element 5 therethrough. Furthermore, a surrounding collar-like edge 28 can be seen. 29

designates two opposite attachments which serve as antirotation means and engage into recesses (not shown) of the support tube 2.

The invention is not limited to the illustrated embodiments; rather many alterations and modifications are possible within the scope of the invention.

### Claims

1. A vehicle steering head comprising a support tube (2) which rotatably supports therein a fork tube (3) to which a wheel fork (4) and a handlebar can be secured, characterized in that a latch element (5) is secured to said fork tube (3) on a portion provided inside said support tube (2), that said support tube (2) has supported therein a linkage element (6) for rotation therewith, that said linkage element (6) is displaceable in the longitudinal direction of said support tube (2), that said linkage element (6) comprises a stop surface (7) which limits a rotation of said fork tube (3) and can be brought into contact with said latch element (5), and that said linkage element (6) comprises at least one locking element (8) which is releasably connectable to said latch element (5).
2. The vehicle steering head according to claim 1, characterized in that said latch element (5) is designed in the form of a pin extending in a direction transverse to said fork tube.
3. The vehicle steering head according to claim 1 or 2, characterized in that said linkage element (6) is substantially configured in the form of a hollow cylinder.
4. The vehicle steering head according to any one of claims 1 to 3, characterized in that said support tube (2) comprises at least one longitudinal slot (9) through which a connection element (10) extends that is connected to said linkage element (6) and a slide (11) arranged outside of said support tube (2).
5. The vehicle steering head according to any one of claims 1 to 4, characterized in that said linkage element (6) comprises at least one front attachment (12) which has formed thereon said stop surface (7).

6. The vehicle steering head according to claim 5, characterized in that two opposite attachments (12) that are in symmetry with each other are provided with at least one stop surface (7) each.
7. The vehicle steering head according to claim 6, characterized in that the associated stop surfaces (7) of said linkage element (6) limit the rotation of said fork tube (3) at both sides to a predetermined angular range.
8. The vehicle steering head according to claim 7, characterized in that said angular range is at both sides 45° each.
9. The vehicle steering head according to any one of claims 1 to 8, characterized in that said locking element (8) is designed in the form of at least one front recess (13) for receiving said latch element (5).
10. The vehicle steering head according to any one of claims 5 to 9, characterized in that said recess (13) is retracted relative to said front attachment (12).
11. The vehicle steering head according to any one of claims 6 to 10, characterized in that said recess (13) is centrally arranged between said two attachments (12).
12. A vehicle steering head comprising a support tube (2) which has rotatably supported therein a fork tube (3) to which a wheel fork (4) and a handlebar can be secured, characterized in that said support tube (2) has supported thereon a latch element (5), that a linkage element (6) is arranged on said fork tube (3) and connected to said tube for rotation therewith, that said latch

element (5) is displaceable along said support tube (2), that said linkage element (6) comprises at least one stop surface (7) which limits a rotation of said fork tube (3) and can be brought into contact with said support tube (2), and that there is provided at least one locking element (8) that is releasably connectable to said support tube (2).

13. The vehicle steering head according to claim 12, characterized in that said linkage element (6) is formed as part of a mudguard (22) which extends from below into said support tube (2).
14. The vehicle steering head according to claim 12 or 13, characterized in that said latch element (5) is designed in the form of a bolt extending in parallel with said fork tube (3).
15. The vehicle steering head according to claim 14, characterized in that said latch element (5) is connected to a slide (11) extending into said support tube (2).
16. The vehicle steering head according to claim 15, characterized in that said locking element (8) is connected to said slide.
17. The vehicle steering head according to any one of claims 12 to 16, characterized in that said locking element (8) is insertable into a recess (23) of a support (15) which supports said fork tube (3) in said support tube (2).
18. The vehicle steering head according to any one of claims 12 to 17, characterized in that a lower bearing (15) which supports said fork tube (3) in said support tube (2) has formed thereon an attachment (26) which projects in

the direction of said linkage element (6) and can be brought into contact with said stop surfaces (7).

19. The vehicle steering head according to claim 18, characterized in that the associated stop surfaces (7) of said linkage element (6) limit the rotation of said fork tube (3) at both sides to a predetermined angular range.
20. The vehicle steering head according to claim 19, characterized in that said angular range is at both sides 45° each.
21. A children's tricycle comprising a vehicle steering head according to any one of claims 1 to 20.

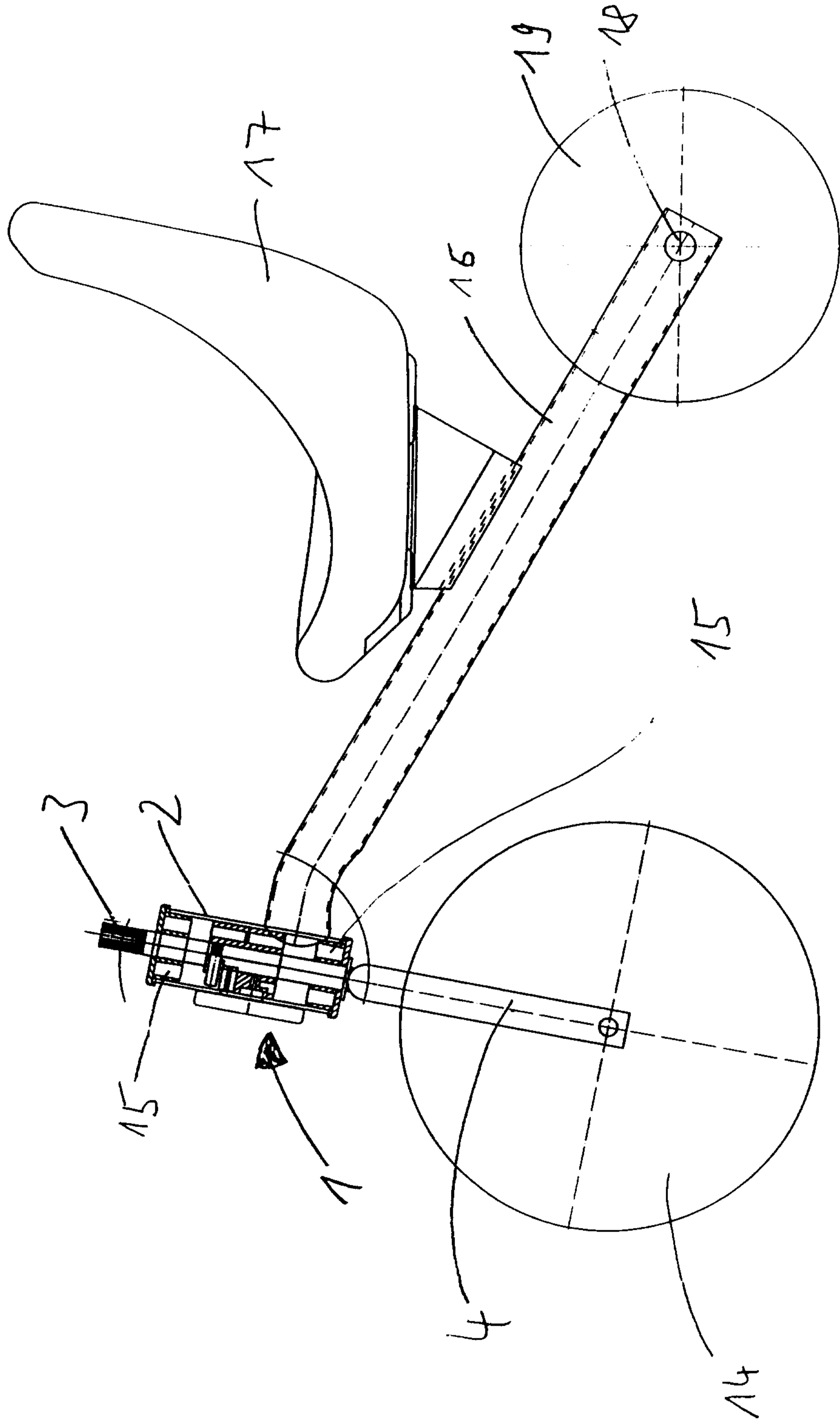


Fig. 1

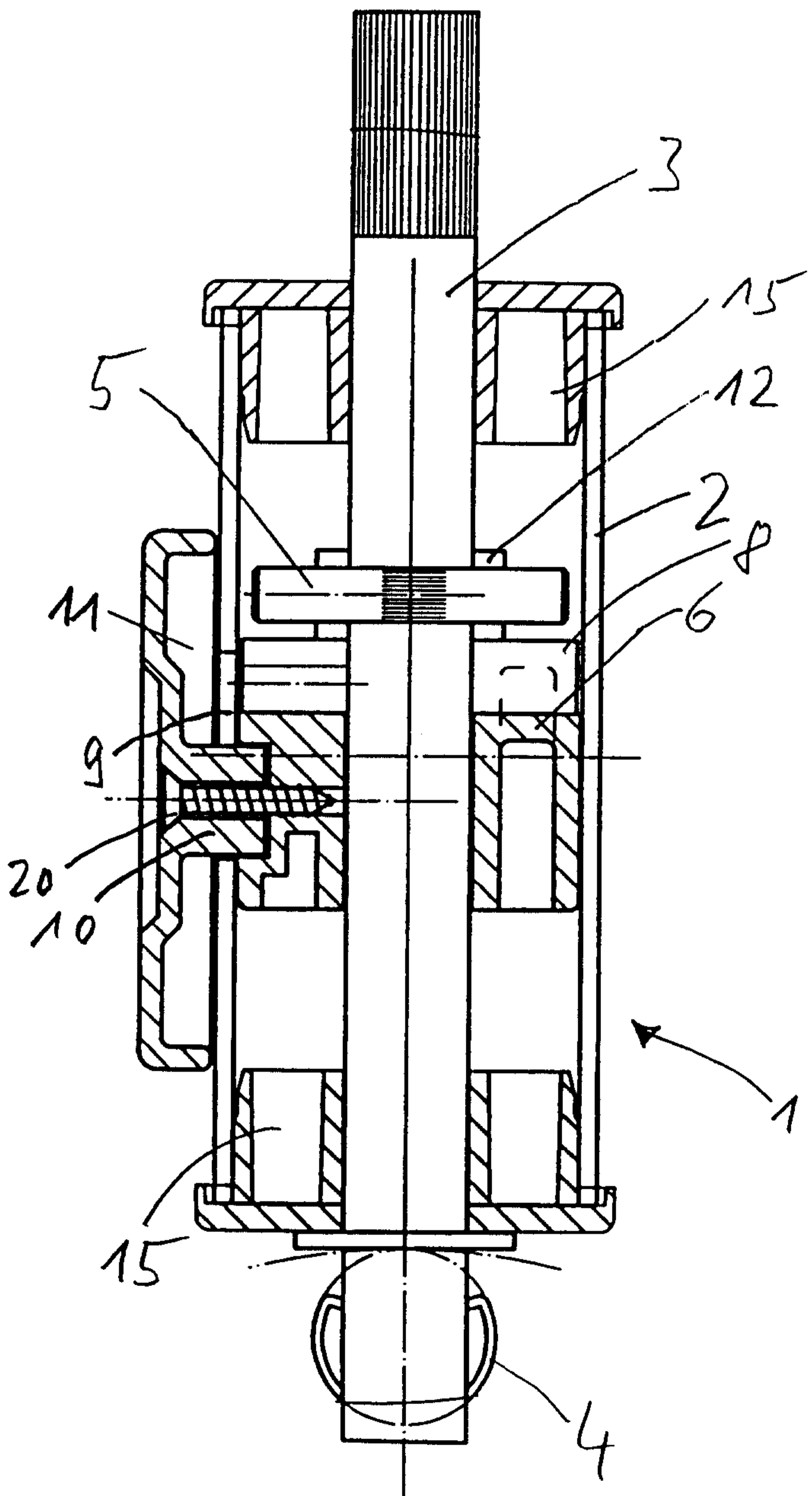


Fig. 2

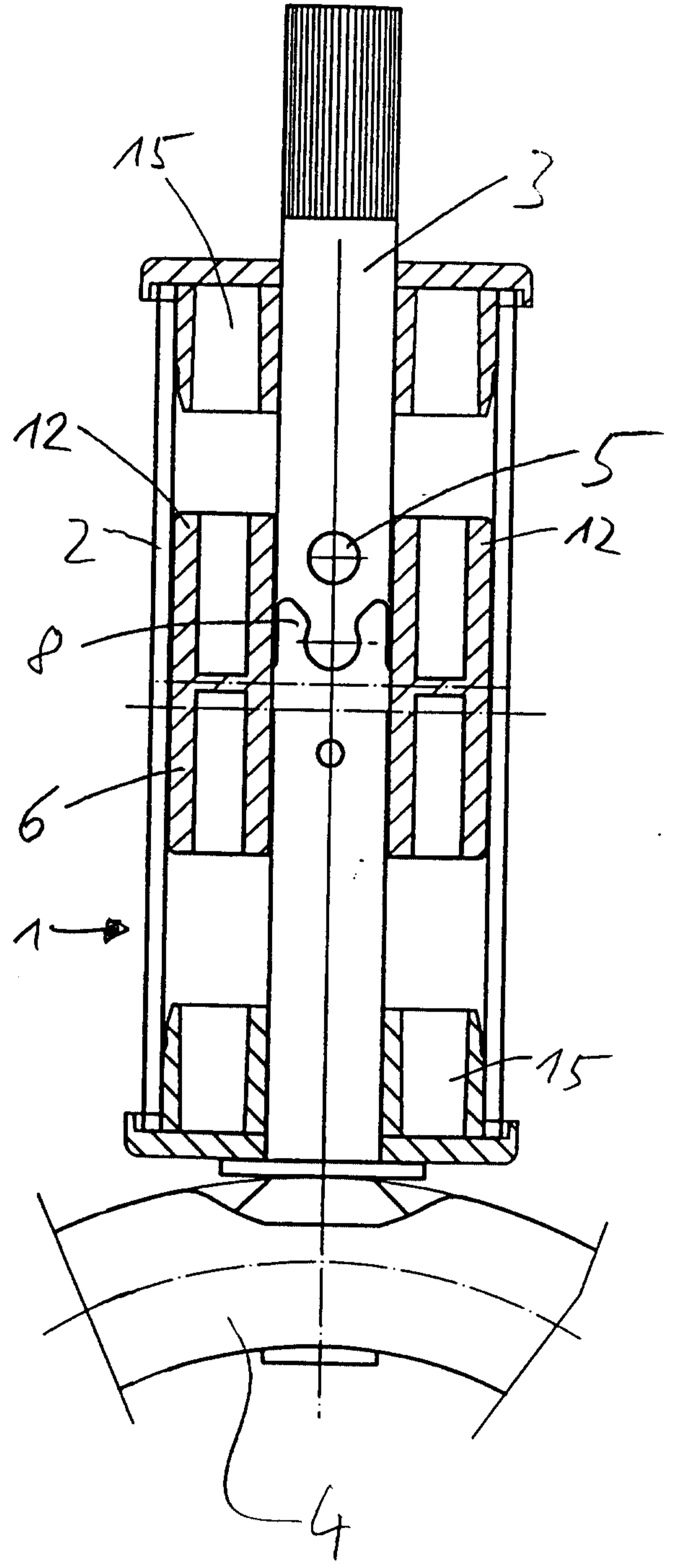


Fig. 3

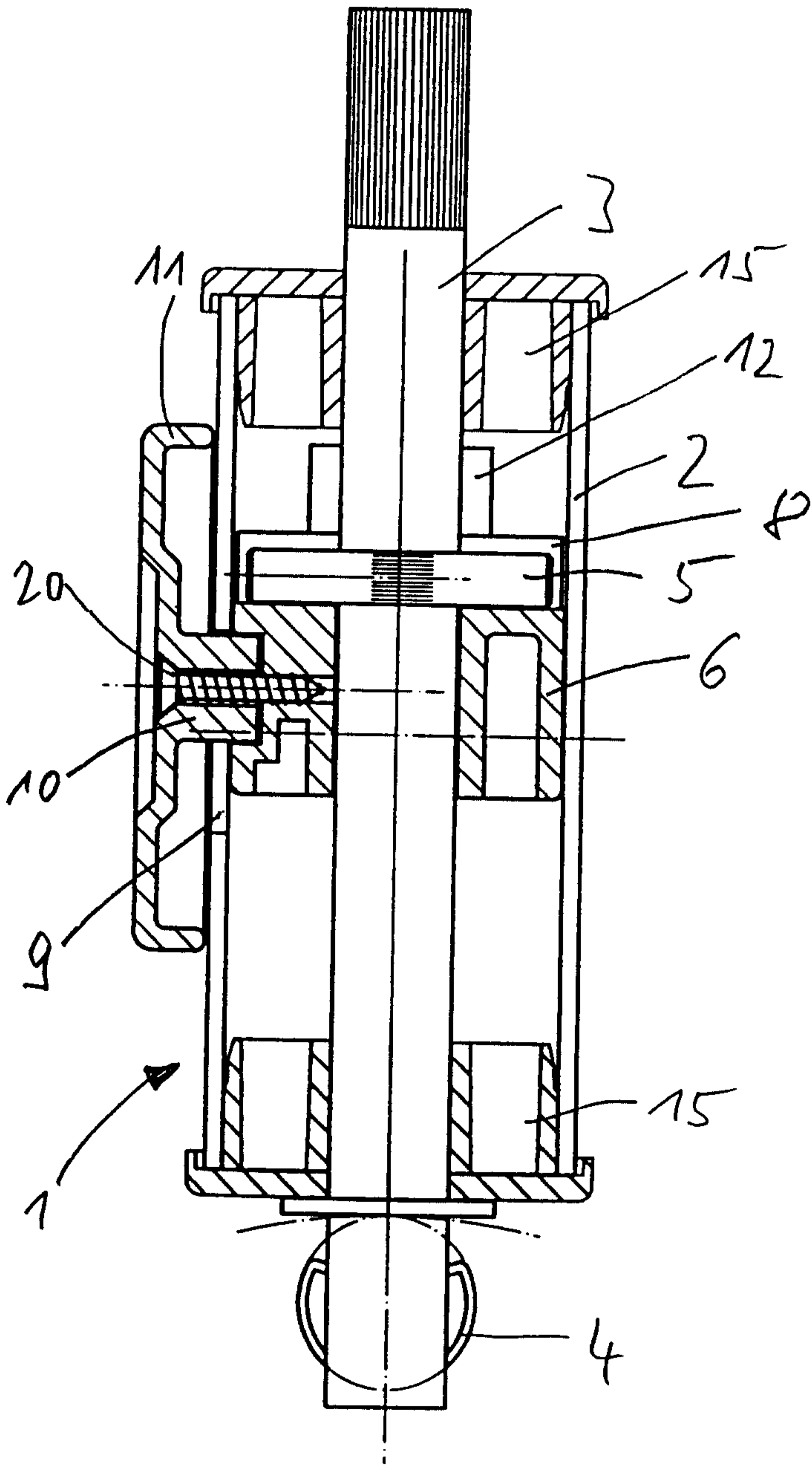


Fig. 4

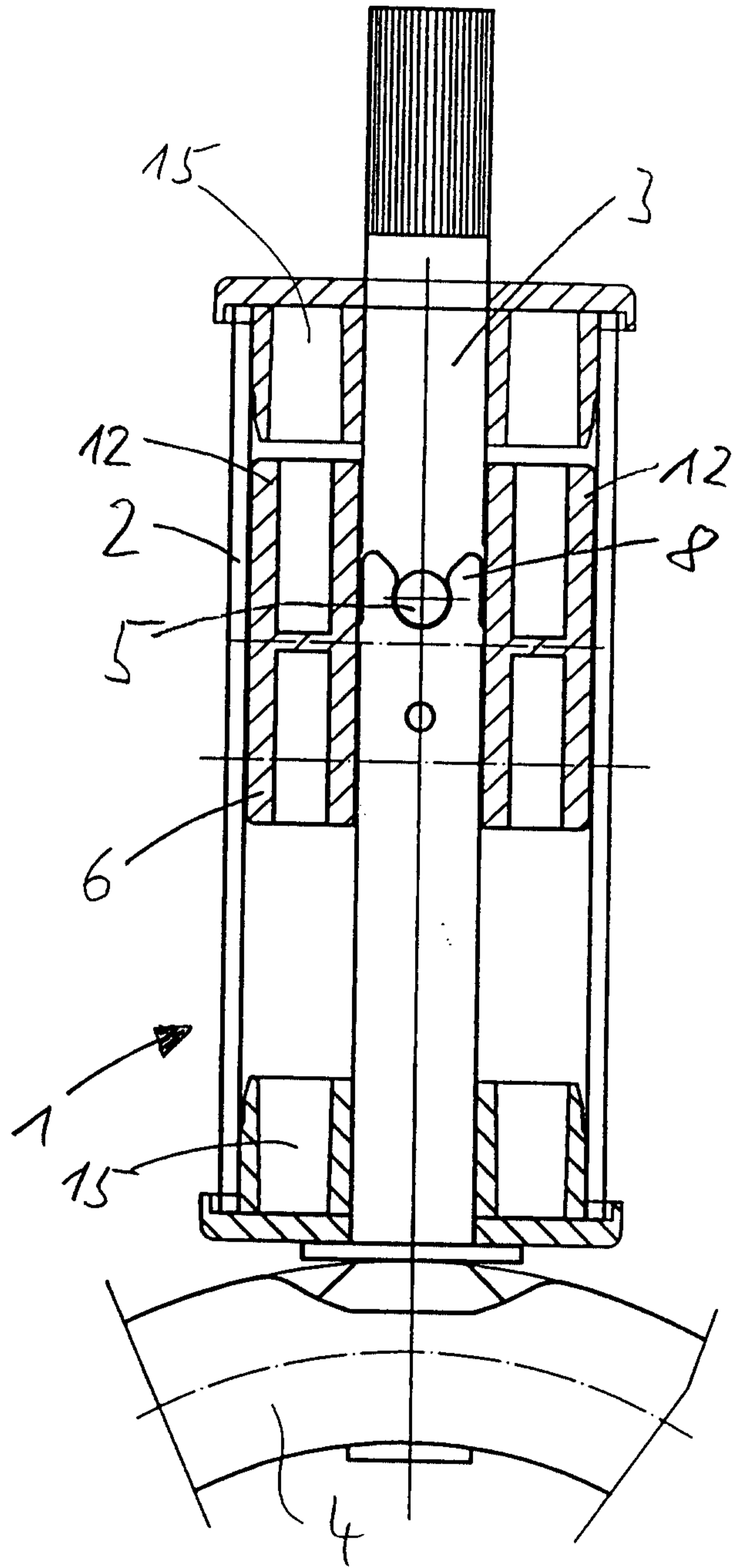


Fig. 5

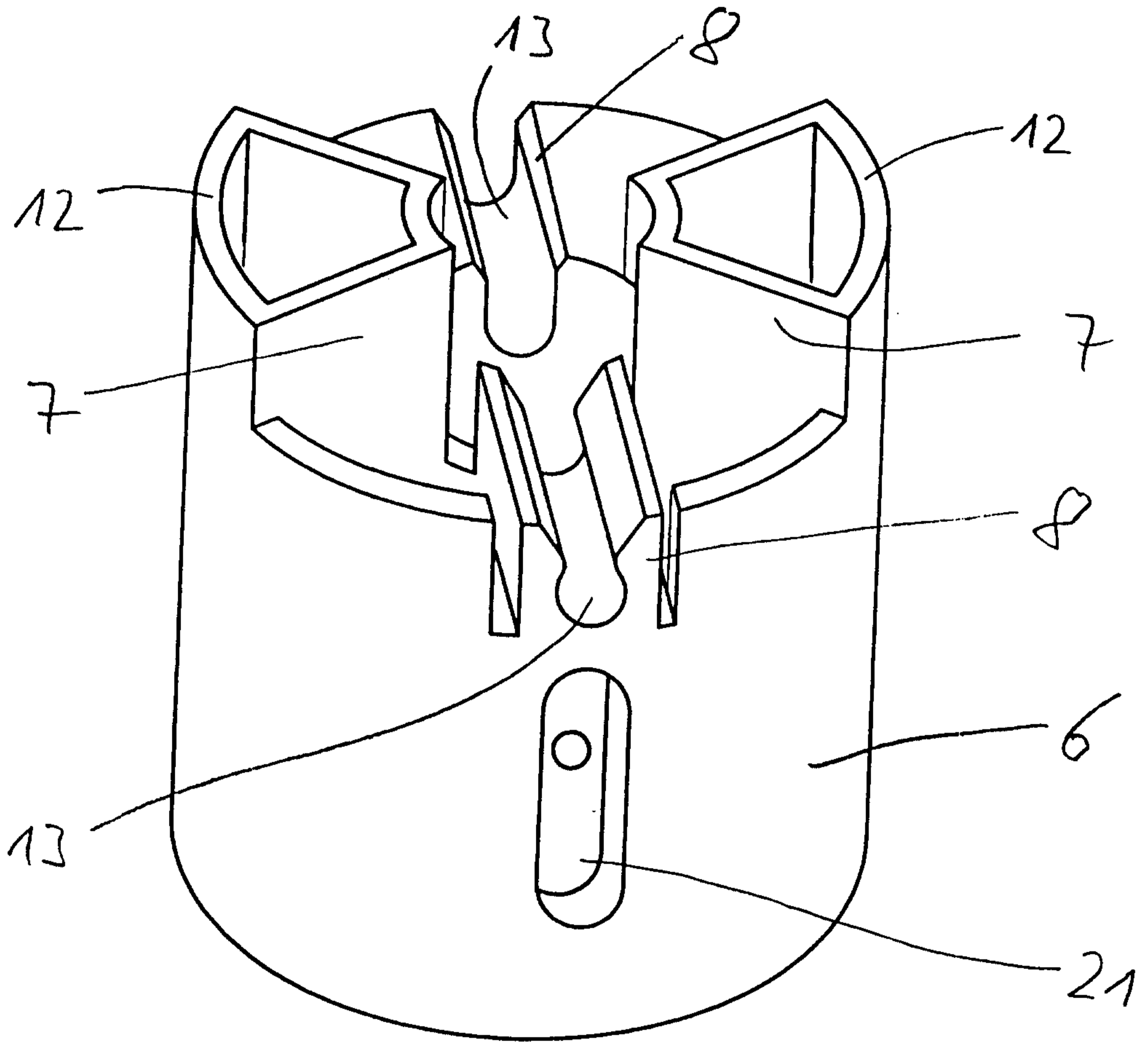


Fig. 6

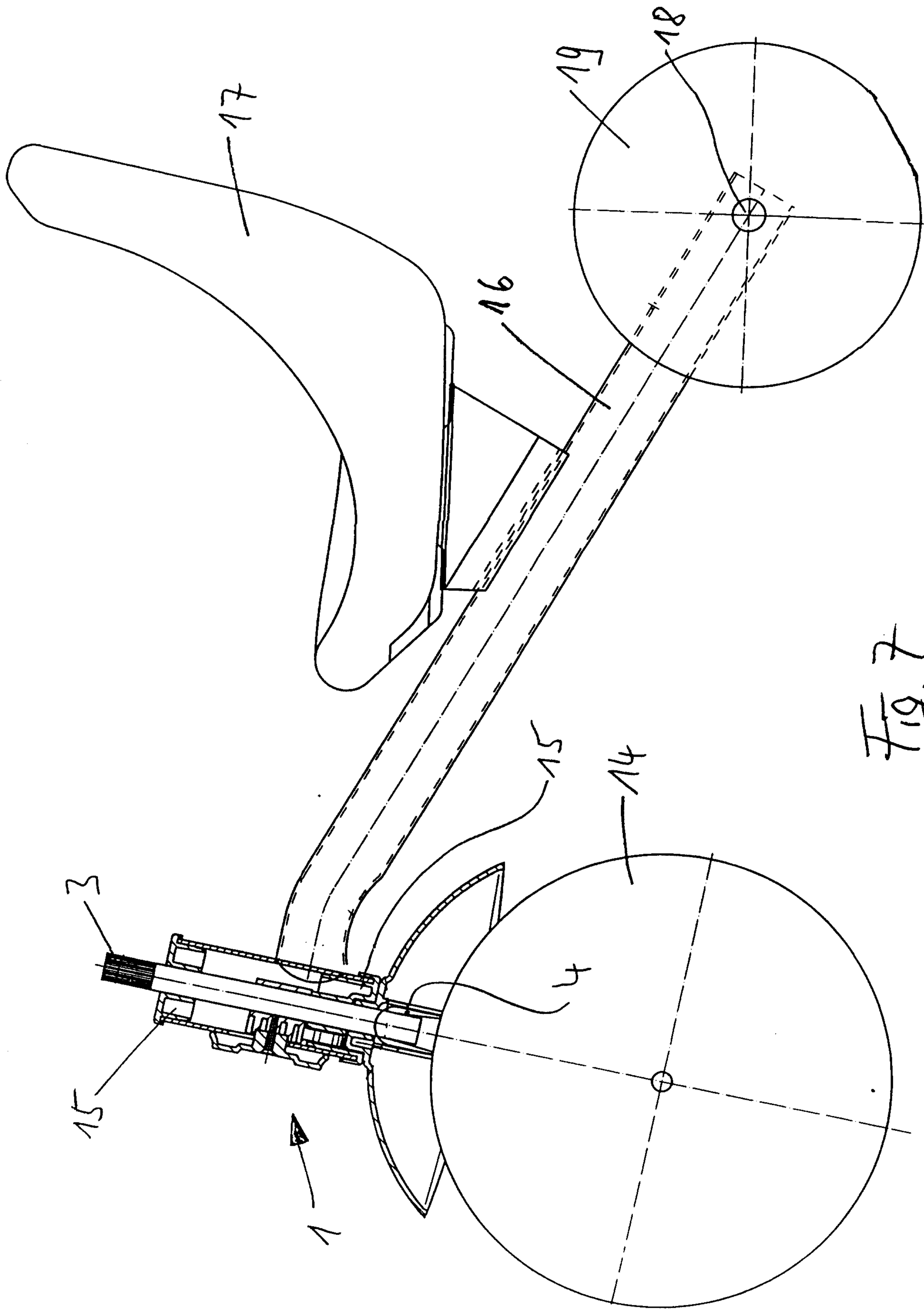
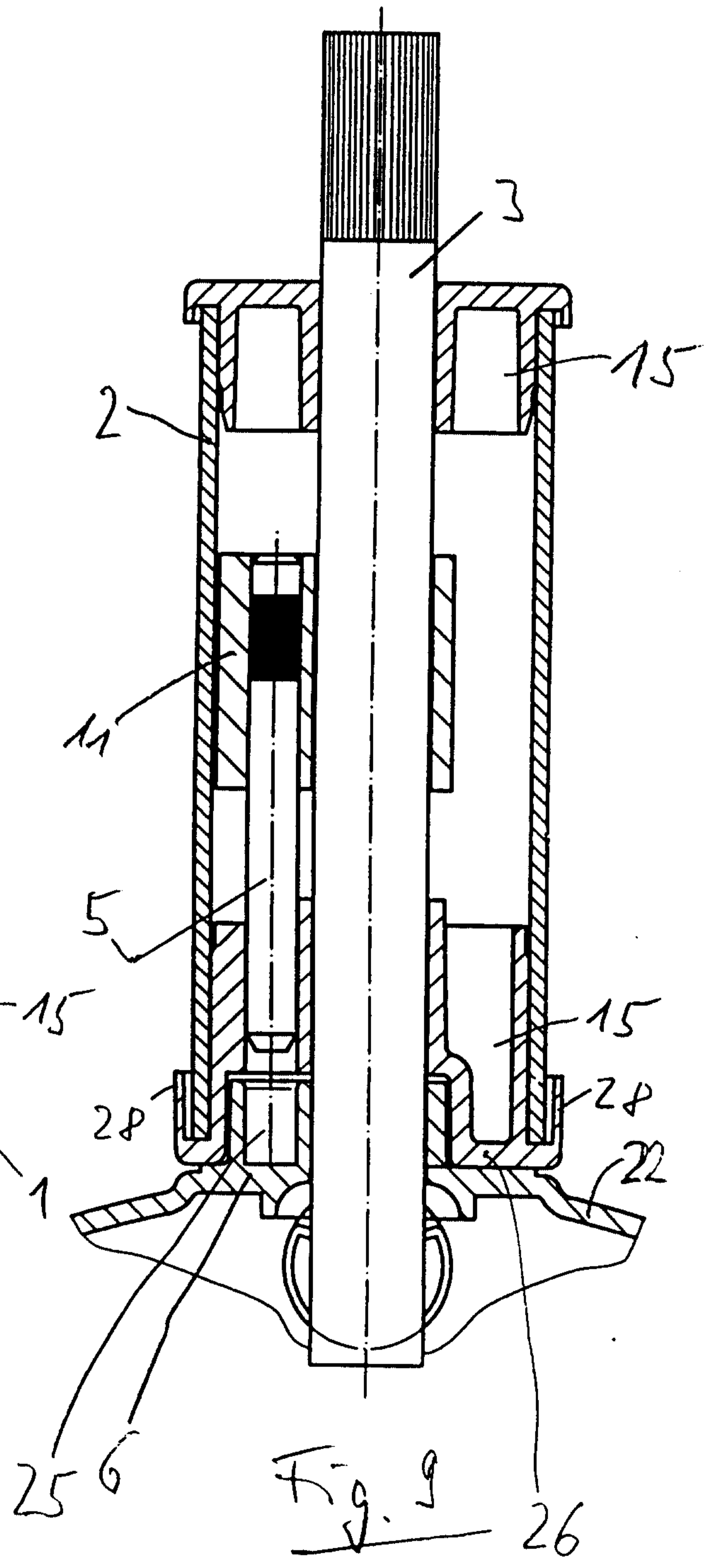
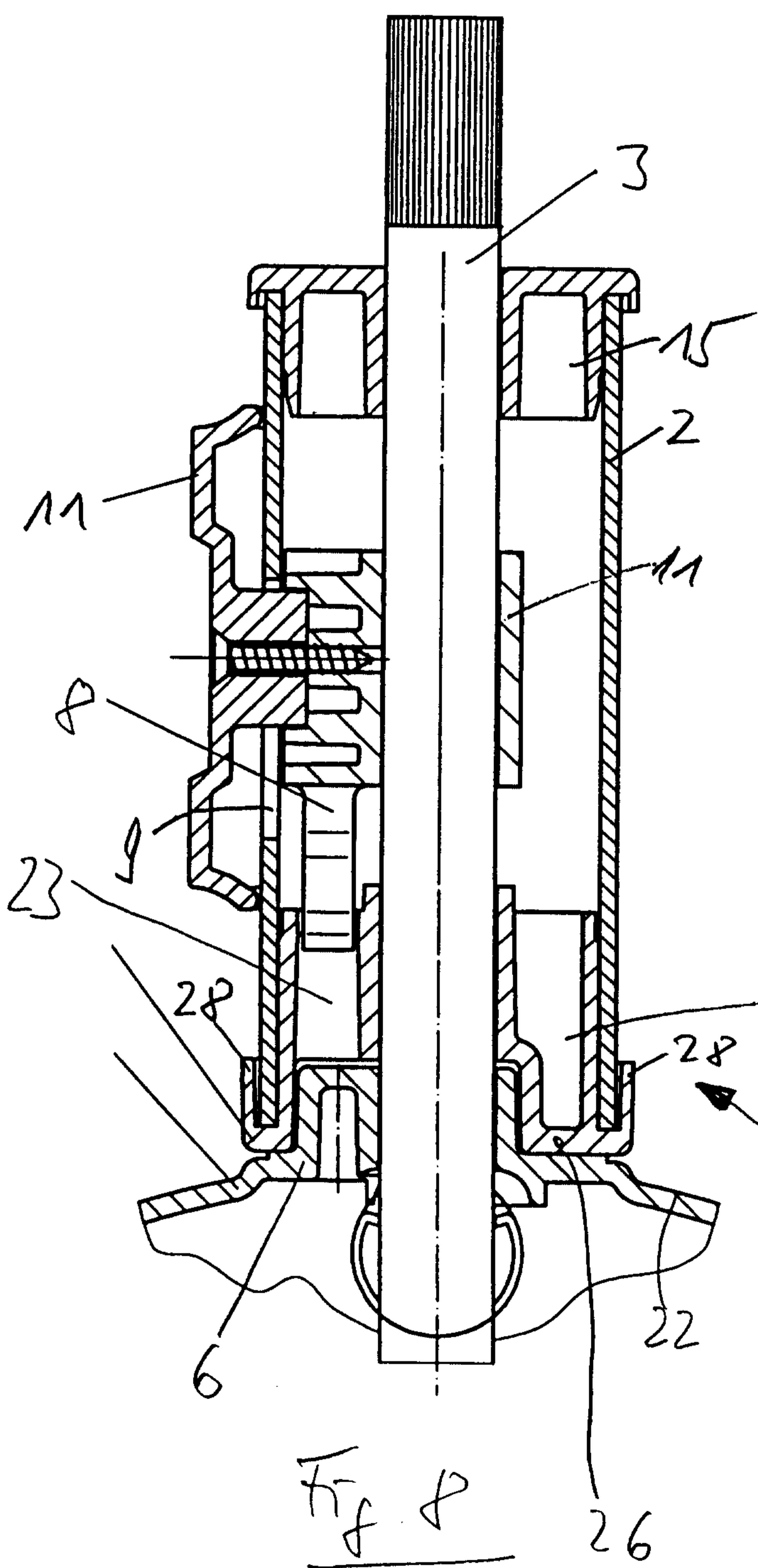


FIG. 7



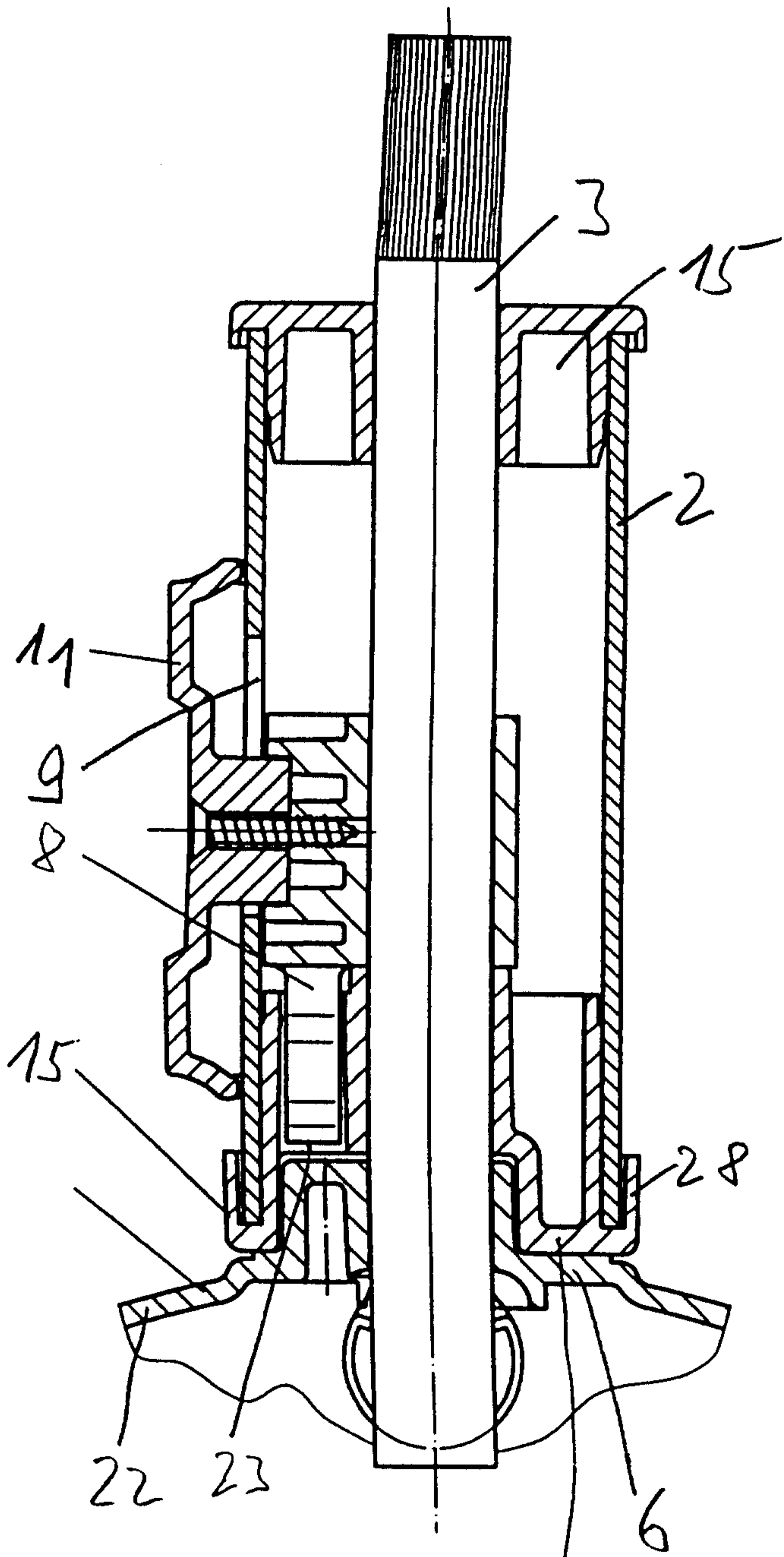


Fig. 10

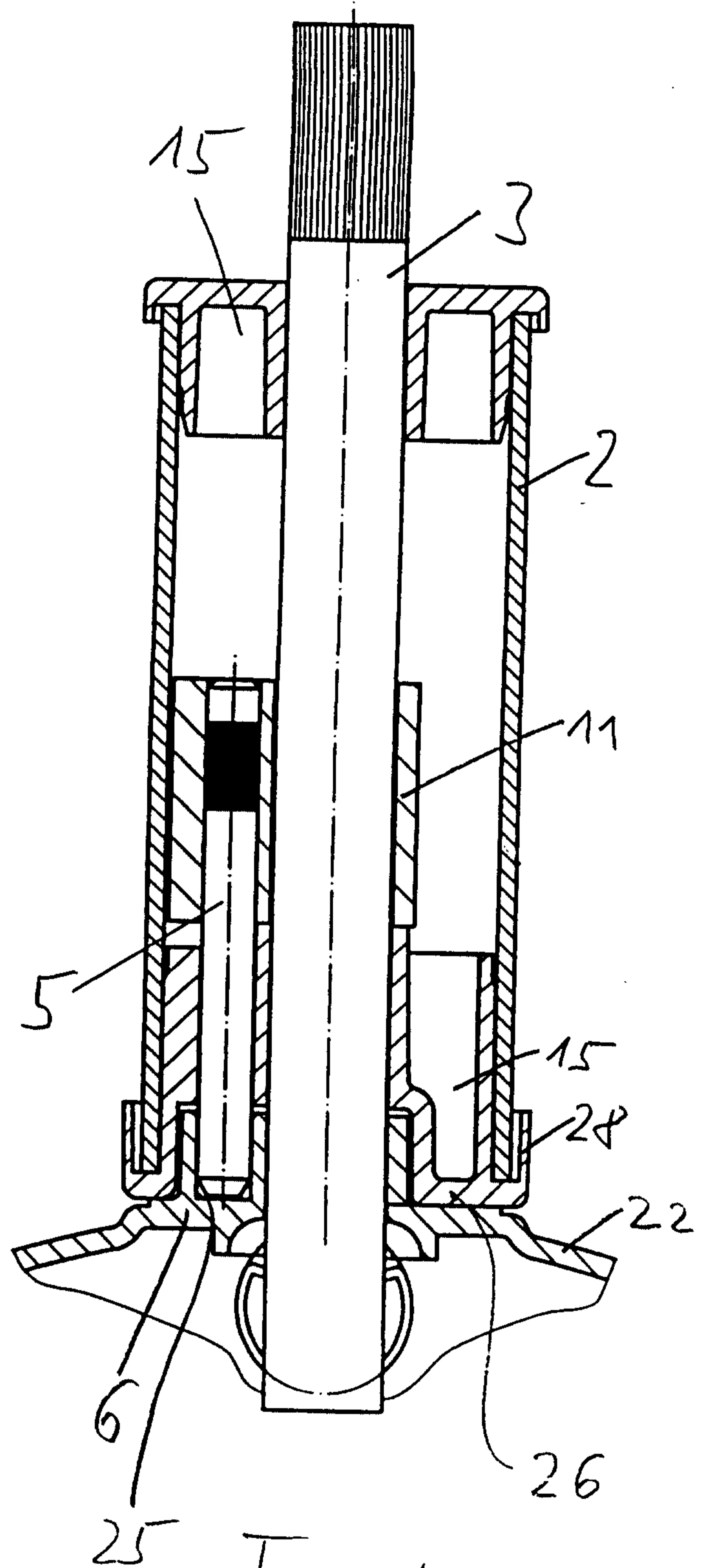


Fig. 11

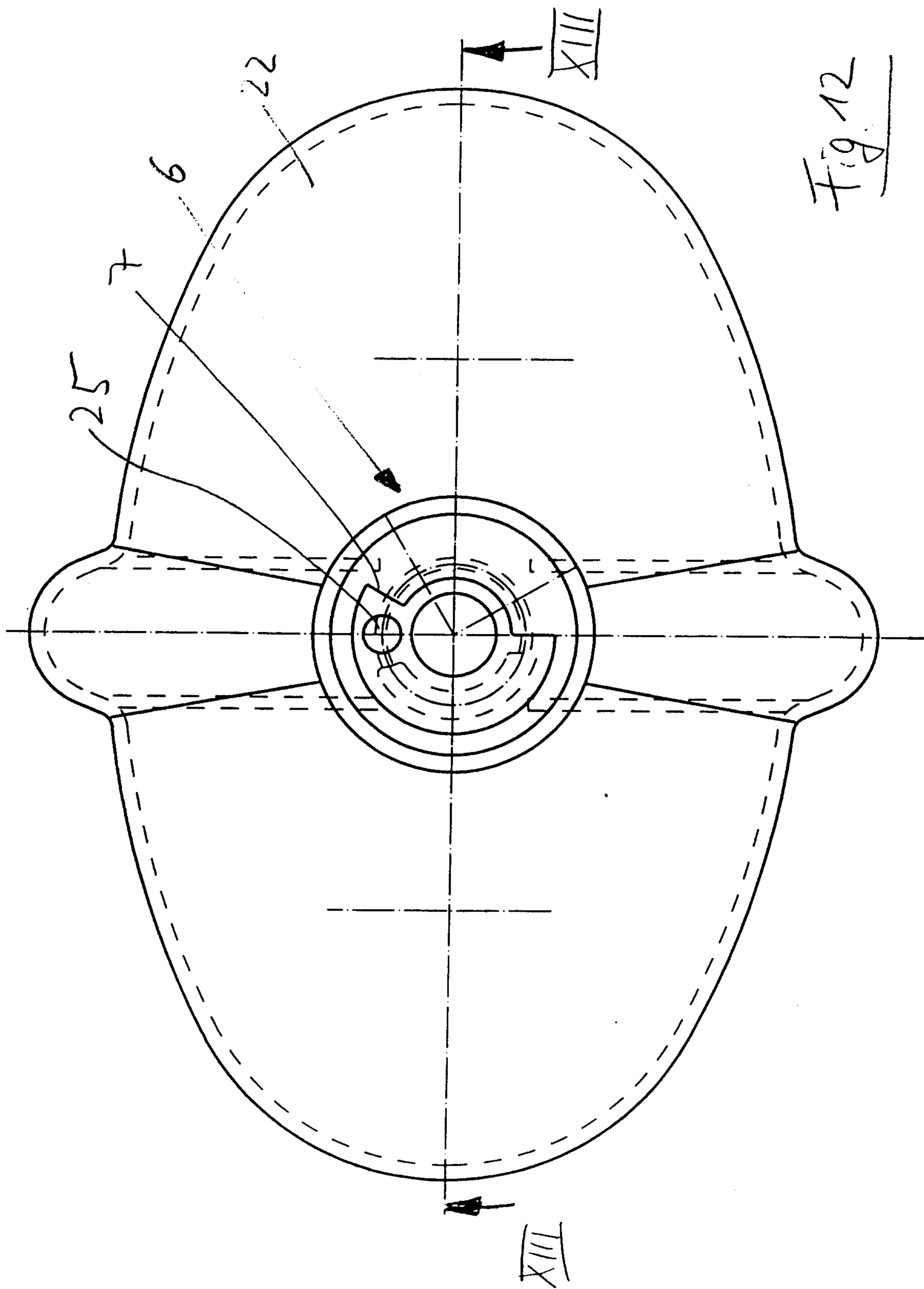


Fig. 12

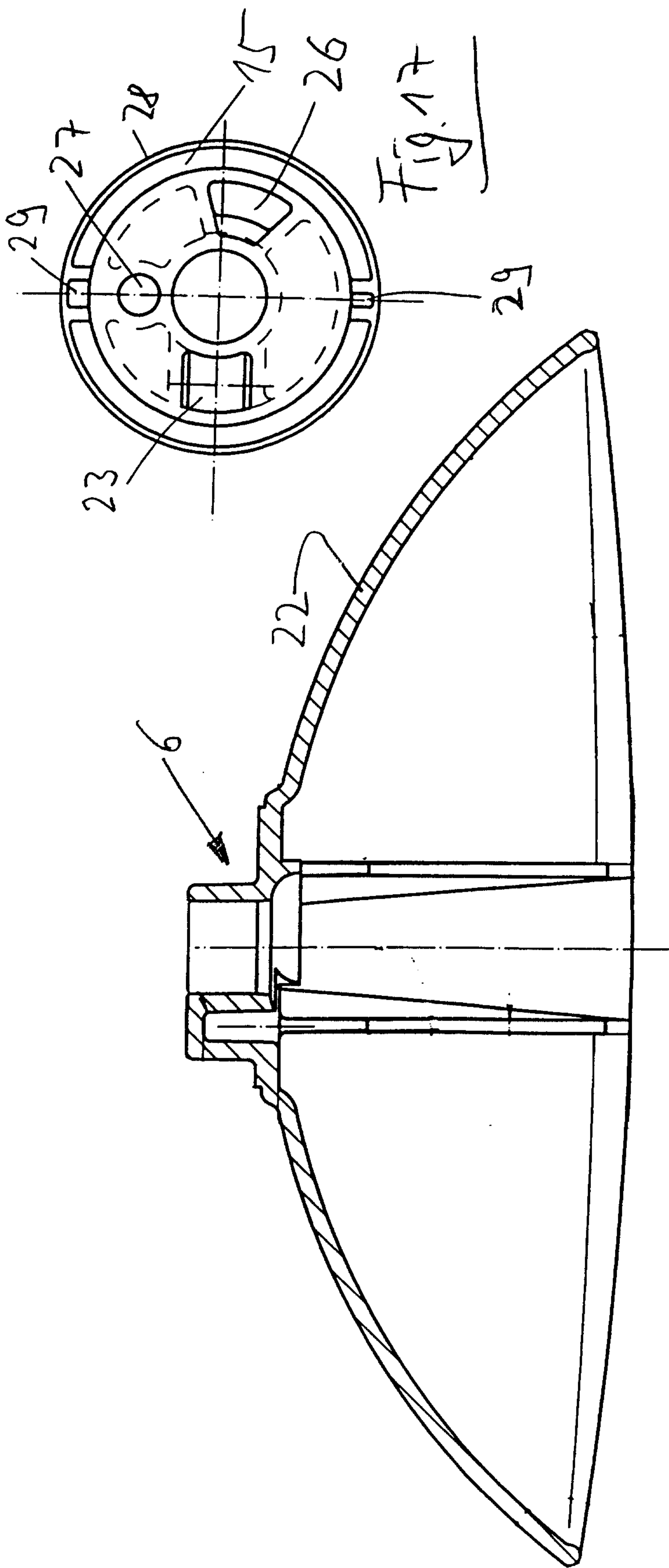


Fig. 17

Fig. 13

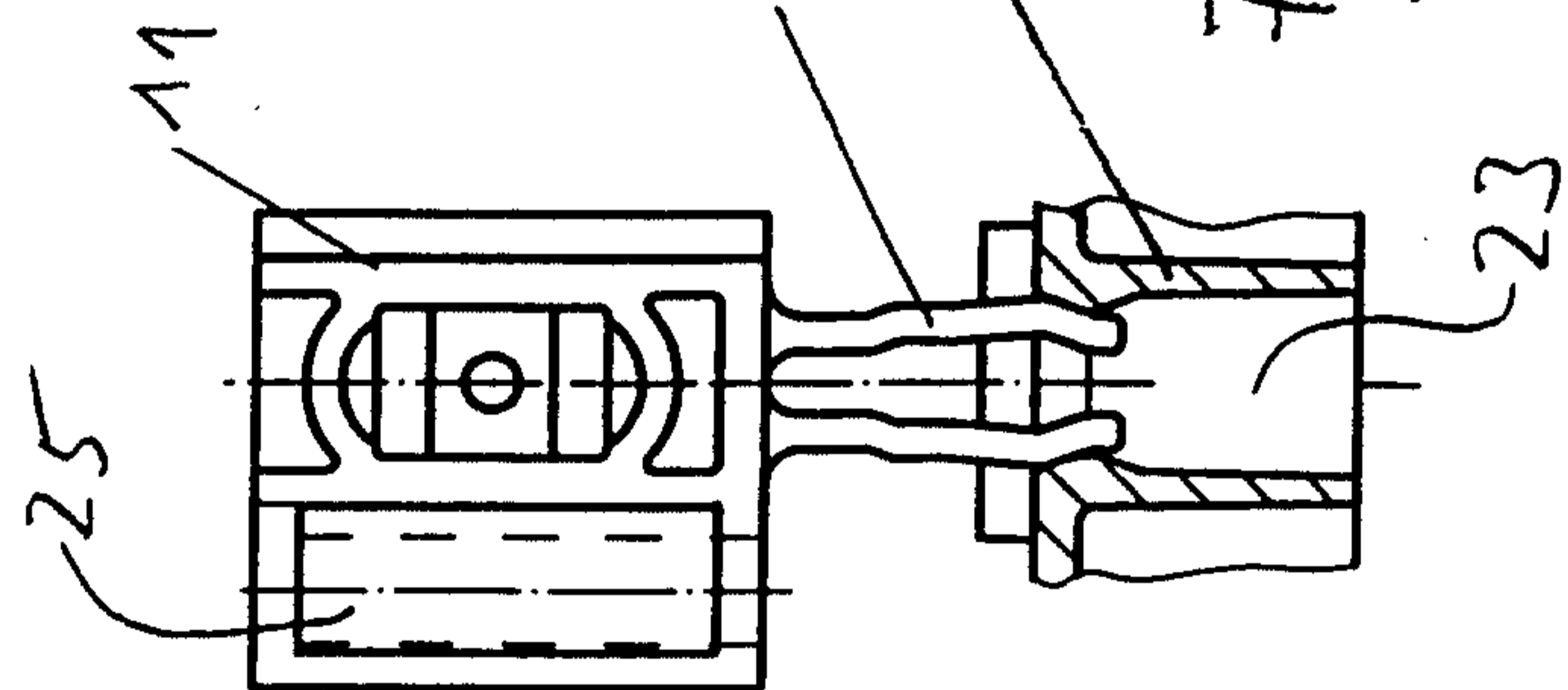


Fig. 15

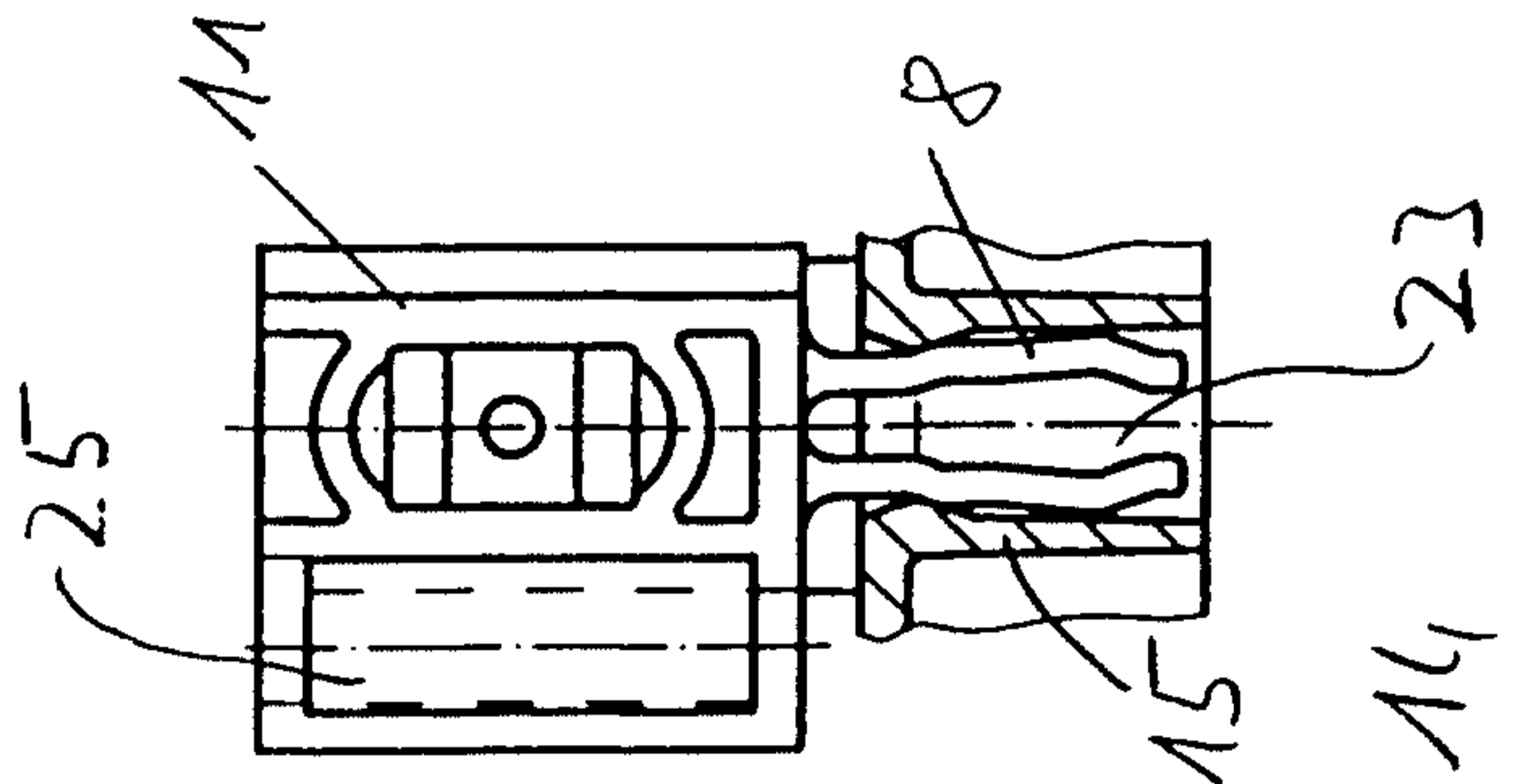


Fig. 14

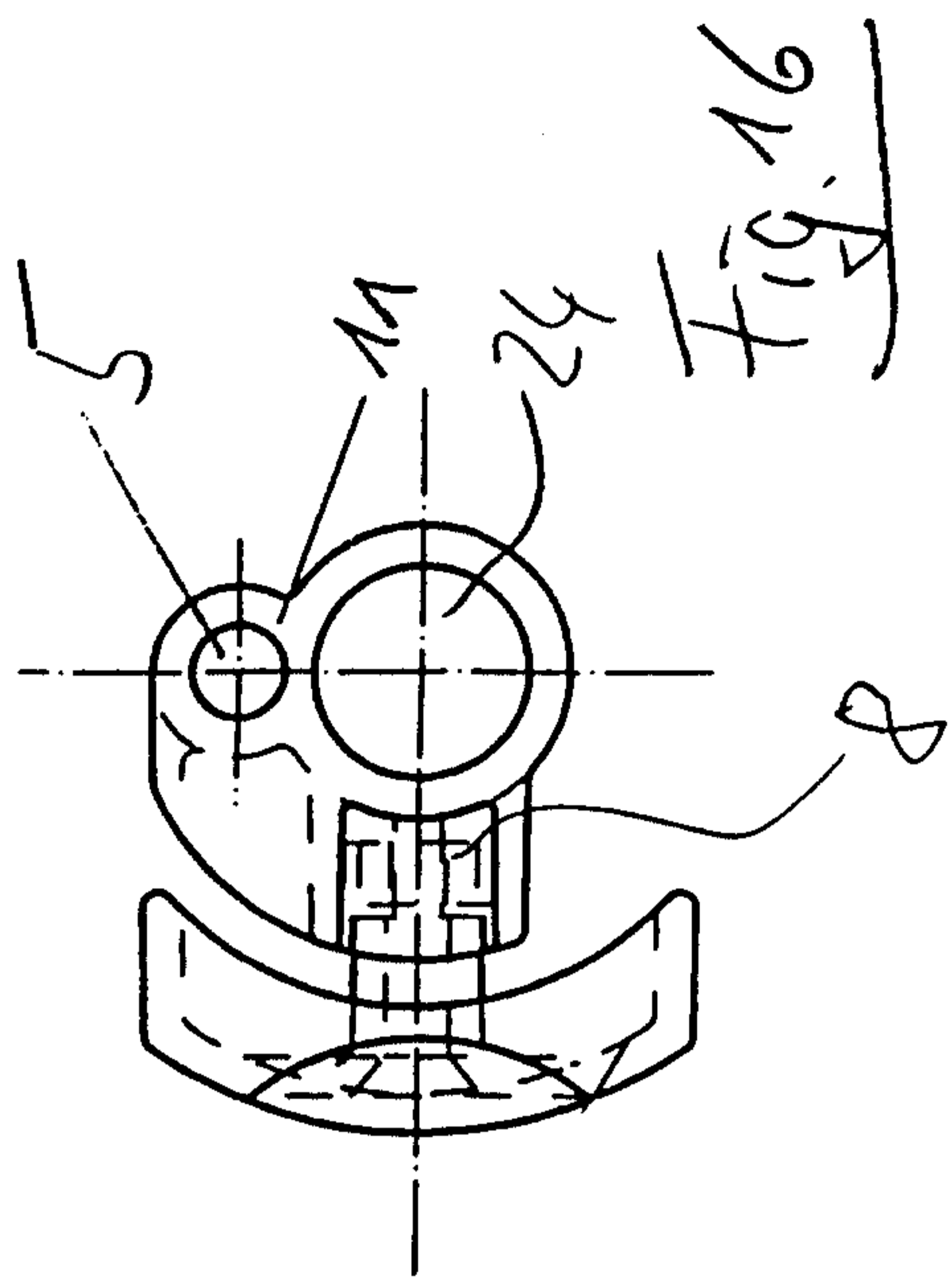


Fig. 16

