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CA 2933142 C 2018/06/12

(11)(21) 2 933 142

(12) BREVET CANADIEN
CANADIAN PATENT

(13) C

(22) Date de dépôt/Filing Date: 2016/06/15

(41) Mise à la disp. pub./Open to Public Insp.: 2016/12/15

(45) Date de délivrance/Issue Date: 2018/06/12

(30) Priorité/Priority: 2015/06/15 (DE10 2015 109546.7)

(51) Cl.Int./Int.Cl. *F16D 3/16* (2006.01)

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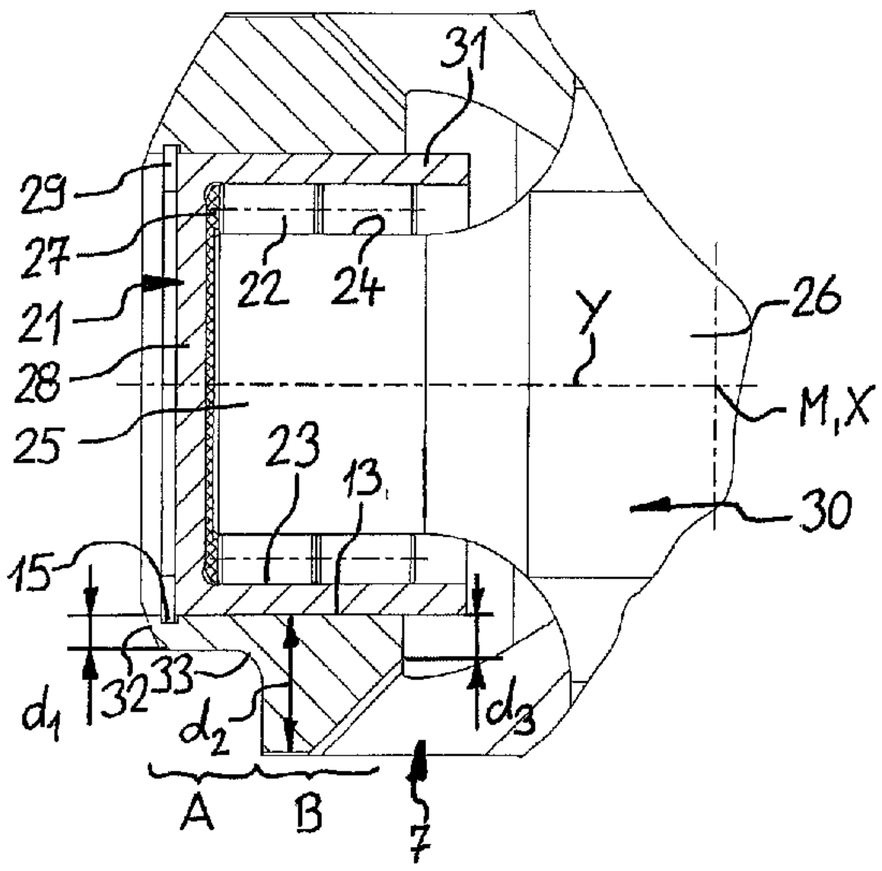
(54) Titre : COLLET DE JOINT DESTINE A UN JOINT UNIVERSEL ET JOINT UNIVERSEL
(54) Title: JOINT YOKE FOR A UNIVERSAL JOINT AND UNIVERSAL JOINT



(57) Abrégé/Abstract:
Joint yoke (7, 107) for a universal joint (2), wherein the joint yoke (7, 107) is rotatably drivable around an axis of rotation (X) and has the following:

a first yoke arm (11, 111) with a first bearing bore (13, 113) and

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(57) **Abrégé(suite)/Abstract(continued)**:

a second yoke arm (12, 112) with a second bearing bore (14, 114),

wherein the first bearing bore (13, 113) and the second bearing bore (14, 114) are arranged centred on a bearing axis (Y), which intersects the axis of rotation (X) at a right angle in a joint centre (M),

wherein the yoke arms (11, 12, 111, 112) have, radially to the axis of rotation (X), an outer portion (A) and an inner portion (B) adjacent to the outer portion (A), and

wherein the wall thickness (d1) of the yoke arms (11, 12, 111, 112), in radial direction to the bearing axis (Y) in a plane orthogonal to the axis of rotation (X) and through the joint centre (M), is reduced in the outer portion relative to the inner portion (B)

characterised in

that each yoke arm (11, 12) has at least two recesses (33, 33', 34, 34'), which are arranged at opposite sides of the respective bearing bore (13, 14), and

that the recesses (33, 33', 34, 34') are arranged at least partially parallel to the axis of rotation (X).

Joint yoke for a universal joint and universal joint

Abstract

Joint yoke (7, 107) for a universal joint (2), wherein the joint yoke (7, 107) is rotatably drivable around an axis of rotation (X) and has the following:

a first yoke arm (11, 111) with a first bearing bore (13, 113) and

a second yoke arm (12, 112) with a second bearing bore (14, 114),

wherein the first bearing bore (13, 113) and the second bearing bore (14, 114) are arranged centred on a bearing axis (Y), which intersects the axis of rotation (X) at a right angle in a joint centre (M),

wherein the yoke arms (11, 12, 111, 112) have, radially to the axis of rotation (X), an outer portion (A) and an inner portion (B) adjacent to the outer portion (A), and

wherein the wall thickness (d1) of the yoke arms (11, 12, 111, 112), in radial direction to the bearing axis (Y) in a plane orthogonal to the axis of rotation (X) and through the joint centre (M), is reduced in the outer portion relative to the inner portion (B)

characterised in

that each yoke arm (11, 12) has at least two recesses (33, 33', 34, 34'), which are arranged at opposite sides of the respective bearing bore (13, 14), and

that the recesses (33, 33', 34, 34') are arranged at least partially parallel to the axis of rotation (X).

JOINT YOKE FOR A UNIVERSAL JOINT AND UNIVERSAL JOINT

Field of the Invention

The invention relates to a joint yoke for a universal joint and a universal joint with such a joint yoke.

Background of the Invention

The invention relates to a joint yoke for a universal joint and a universal joint with such a joint yoke, wherein the joint yoke is rotatably driveable around an axis of rotation and has a first yoke arm with a first bearing bore and a second yoke arm with a second bearing bore, wherein the first bearing bore and the second bearing bore are arranged centred on a bearing axis, which intersects the axis of rotation at a right angle in a joint centre wherein the yoke arms have, radially to the axis of rotation, an outer portion and an inner portion adjacent to the outer portion, and wherein the wall thickness of the yoke arms, in radial direction to the bearing axis in a plane orthogonal to the axis of rotation and through the joint centre, is reduced in the outer portion relative to the inner portion.

A joint yoke of this kind is known from DE 29 00 846 A1 wherein the joint yoke is made of sheet metal.

Universal joints comprise two joint yokes, wherein the yoke arms of the two joint yokes are connected in an articulated manner to each other via a journal cross assembly. A journal cross assembly comprises a cross with four journals, projecting from a base body, wherein respectively two journals are arranged in a centred manner in pairs on a common bearing axis. The journals are supported via bearing arrangements in the bearing bores of the yoke arms. Often rolling member bearings are used, which are arranged in bearing bushes, wherein the bearing bushes are accommodated in the bearing bores. The rolling members of a rolling member bearing roll on an inner bearing face, which is formed by the respective journals, and on an outer bearing face, formed by the bearing bush, inserted in the bearing bore,

or by the bearing bore itself. During the transmission of torques from one of the two joint yokes to the other joint yoke zones of higher loading are produced. In this case, stiffer components of the yoke arms and areas with a larger lever arm of the torque transmission absorb a larger part of the loading. These zones of higher loading are arranged, relative to the axis of rotation, radially outwards, i.e. at the ends of the journals remote from the body of the journal.

DE 103 03 291 A1 discloses for achieving a more constant load distribution a cross, in which the inner bearing faces of at least two journals, arranged on a common journal axis, are represented respectively by an outer circumferential face of a journal or by an outer circumferential face of a bushing, mounted on the journal. The inner bearing faces have respectively one first bearing face portion, arranged on a rotational symmetrical envelope face, arranged coaxially to the respective journal axis, and respectively a second bearing face portion, which is arranged within the envelope face, which extends in direction from the base body to the respective free end with a continuously decreasing distance to the respective journal axis and which extends across a portion of the circumference of the respective journal.

As the second bearing face portion extends in axial direction in relation to the respective journal axis with continuously decreasing distance to the journal axis, a load distribution of the bearing forces is ensured in axial direction. Furthermore, the second bearing face portion extends only along a part of the outer circumferential face, so that a reduction of the maximum loadings is achieved in the main loading zone.

However, it is disadvantageous, that the journal of the journal cross assembly have to undergo a relative cumbersome manufacture, to form the corresponding bearing face portions.

DE 199 53 963 A1 discloses a solution, in which in the cylindrical wall of the bearing bores recesses are provided, which extend along a portion of the circumference and have in axial direction of a journal axis a varying depth. The journals of the cross are mounted in a bearing bush via rolling member bearings, wherein the bearing bush is accommodated in the bearing bore. Thus, in the area of the recesses, which are situated in the area of the main loading zone, a deformation of the bearing bush is enabled, so that the maximum loadings are reduced.

DE 1 425 952 A1 shows for reducing the maximum loadings in a rolling member bearing a shaft, formed oval in cross-section, and which is supported in a ring in a rolling member manner. In the area of the main loading zone, the shaft has the largest radius of curvature, so that the bearing load is distributed to more rolling member bodies, than in an embodiment, in which the shaft is formed circular in cross-section. The disadvantage is, however, that in axial direction of the shaft no bearing load distribution is achieved.

DE 29 33 505 A1 shows a journal cross assembly with journals rollingly supported in bearing bushes. The bearing bushes are accommodated in bearing bores of the joint yokes. The outer circumferential faces of the bearing bushes are essentially cylindrical and have in the area of the main loading zones flattenings, which extend along a part of the circumference and which in direction of the journal axis, starting from a base body, on which the journals are formed, approach in direction to the respectively free end of the journal the journal axis.

For the bearing load distribution in axial direction in relation to the journal axes, DE 1 122 781 B shows a cross with journals, which outer circumferential face is formed conical. In this case, however, no bearing load distribution is achievable in circumferential direction. Furthermore, the rolling member bodies are at low loading not abutting across their whole longitudinal extension the bearing face of the bearing bore.

Description

Object of the present invention is, to provide a joint yoke for a universal joint with increased life span.

The object is met by a joint yoke with the features described and claimed herein.

By means of reducing the wall thickness of the yoke arms in the outer portions along the bearing bores, in relation to the axis of rotation, a relief of the support of the journals of a cross is achieved in these outer portions, as the yoke arm is weakened in the areas of reduced wall thickness and is correspondingly more elastic. The Hertzian stress of the outer portions is reduced, by means of which the life span of the bearing of the joint yokes is over-proportionally increased. The inner portions along the bearing bores, in relation to the axis of rotation, are in contrast loaded higher. As these inner portions are however loaded less than the outer portions, a constant loading in direction of the bearing axis is achieved, which leads also to an improvement of the life span.

For each yoke arm, two recesses are provided, which are arranged on opposite sides of the respective bearing bore and extend parallel to each other and to the axis of rotation. The recesses are in the sense of the invention to be considered parallel to the axis of rotation or to each other, if these are arranged slightly inclined for enabling the manufacture by means of a forging process, i.e. are arranged slightly at an angle to the axis of rotation and to each other. An angle deviation to the axis of rotation of up to 10 degrees is, thus, still seen to be parallel in the sense of the invention. This corresponds approximately to common forging inclinations.

Preferably, the wall thickness is reduced, starting from the plane, which is arranged orthogonal to the axis of rotation and which extends through the joint centre, at least in an angle range of +/- 45 degree around the bearing axis.

According to a preferred embodiment the wall thickness is not reduced in an outer portion along the bearing bores, arranged radially to the axis of rotation, at free ends of the yoke arms. In other words, it can be provided, that the wall thickness of the yoke arms is reduced in radial direction to the bearing axis in a plane orthogonal to the axis of rotation and through the joint centre in the outer portion relative to another outer portion in the area of free ends of the yoke arms, arranged radially to the axis of rotation, in a plane, which contains the axis of rotation and the bearing axis.

The outer portions along the bearing bores start respectively from an outer end of the bearing bores, relative to the axis of rotation and extend across a portion of the longitudinal extension of the bearing bores in direction to the axis of rotation. Following directly thereto are respectively the inner portions, wherein these do not compulsorily have to extend up to the inner ends of the bearing bores. Thus, it is possible, that a portion, arranged totally inwards, is adjacent to the inner portion wherein the wall thickness of said totally inward portion can again be reduced relative to the inner portion.

The wall thickness of the yoke arms can be reduced along a large part of the circumference around the bearing bore, i.e. over more than half of the circumference around the bearing bores, wherein the reduced portions can be split to at least two circumferential portions.

In an embodiment it is provided, that the yoke arms have relative to the axis of rotation outwards recesses, which extend along the longitudinal extension of the

outer portions of the bearing bores, whereby the wall thickness is reduced. The recesses are provided in relation to the axis of rotation, in outer surfaces of the yoke arms.

The joint yokes can have a base portion, from which the yoke arms project parallel to each other. The joint yoke has preferably between the bearing axis and the base portion a recess, which extends at least partially around the bearing axis, to reduce the wall thickness.

The invention is on the one hand met by a universal joint with a joint yoke, described above, wherein the joint yoke is connected articulatedly via a cross to a further joint yoke. In this case, also the further joint yoke can be a joint yoke as described above.

The wall thickness of the yoke arms is not reduced in the outer portion at the free ends of the yoke arms or no recess is provided there.

Preferred embodiments are described in the following in detail using the drawings. Herein, it shows

Fig. 1 a half longitudinal sectional view of a universal joint shaft,

Fig. 2 a half longitudinal sectional view of a first embodiment of a joint yoke according to the invention,

Fig. 3 a partial cross-sectional view of the joint yoke of Fig. 2,

Fig. 4 a side view of the joint yoke of Fig. 2,

Fig. 5 a partial longitudinal sectional view of a second embodiment of a joint yoke according to the invention,

Fig. 6 a partial cross-sectional view of the joint yoke of Fig. 5,

Fig. 7 a side view of the joint yoke of Fig. 5,

Fig. 8 a cross-sectional view through the yoke arm of a joint yoke in two embodiments, wherein the upper half shows a joint yoke according to the State of the Art and the lower half shows a joint yoke of Fig. 2,

Fig. 9 a half longitudinal sectional view of a third embodiment of a joint yoke of Fig. 2 as a forged part,

Fig. 10 a partial cross-sectional view of the joint yoke of Fig. 9,

Fig. 11 a half longitudinal sectional view of a fourth embodiment of a joint yoke of Fig. 5 as a forged part,

Fig. 12 a partial cross-sectional view of the joint yoke of Fig. 11,

Fig. 13 a half longitudinal sectional view of a fifth embodiment of a joint yoke,

Fig.14 a partial cross-sectional view of the joint yoke of Fig. 13.

Fig. 1 shows a universal joint shaft 1, which has two universal joints 2, 3 as well as a shaft 4, connecting the two universal joints 2, 3 and allowing a change of the distance between these. The two universal joints 2, 3 are aligned centred on an axis of rotation X. Each one comprises a first inner joint yoke 5, 6 in form of a so-called tube yoke, which are respectively non-rotationally connected to the shaft 4, and a second outer joint yoke 7, 8 in form of a so-called flange yoke, which are also respectively non-rotationally connected to the shaft 4, as well as a journal cross assembly 9, 9', by means of which the first joint yoke 5, 6 and the second joint yoke 7, 8 are pivotably connected to each other.

The universal joint shaft of Fig. 1 is shown as a schematical drawing and has at least one joint yoke, which corresponds to the following first embodiment of Figures 2, 3 and 4 or to the following second embodiment of Figures 5, 6 and 7. A universal joint shaft can also have several joint yokes according to any one of the following embodiments. The following two embodiments of the joint yokes are formed as flange yokes, so that these can serve as outer second joint yokes 7, 8. In the following it is purely exemplary started from the fact, that the second joint yoke of the left shown universal joint is represented by one of the following embodiments. Obviously, also both outer or only the right outer joint yoke can be formed as described in the following. The joint yokes of the following embodiments can also be formed as tube yokes, i.e. first joint yokes, wherein these can also comprise any combination of one of the following embodiments.

Figures 2 to 4 show a first embodiment of a second joint yoke 7 in different views. Figure 2 shows a partial longitudinal sectional view, Fig. 3 shows a partial cross-sectional view and Fig. 4 shows a side view of the second joint yoke 7. The second yoke 7 is rotatable around the axis of rotation X and has a base portion 10, from which a first yoke arm 11 and a second yoke arm 12 project parallel to each other and parallel to the axis of rotation X. In the first yoke arm 11 a first bearing bore 13 and in the second yoke arm 12 a second bearing bore 14 is provided. The two bearing bores 13, 14 are aligned centred on a common bearing axis Y and are thus aligned to each other. The bearing axis Y is arranged at a right angle to the axis of rotation X and intersects this in a joint centre M. The first bearing bore 13 and the second bearing bore 14 are formed as through bores and, thus, extend, in relation to the axis of rotation X, in radial direction through the respective yoke arms 11, 12. In the yoke arms, as described in the following in more detail, a bearing bush 21 is inserted for supporting a journal of a cross, wherein the bearing bush 21 is secured by a locking ring, which rests in a locking groove 15 extending around the bearing axis Y.

On a side, facing away from the yoke arms 11, 12, the base portion 10 has a flange 16, by means of which the second joint yoke 7 can be connected to a to be driven or driving component. Generally, instead of a flange also a journal can be provided, which can be connected with a shaft component of a shaft of Fig. 1. Embodiments with journals show for example Figures 11 to 14. The journals, shown there, can be provided in this or similar shape also in the other embodiments.

To be able to mount a cross, wherein the cross 4 has journals projecting from a base body, which are arranged in pairs in a centred manner to each other and are aligned in opposite directions, the first yoke arm 11 has at a first free end 17 a first assembly recess 19 facing inwards. The second yoke arm 12 has a second assembly recess 20 arranged at a second free end 18 and facing inwards. The two yoke arms 11, 12 are, thus, formed mirror-symmetrically to a plane, which is arranged at a right angle to the bearing axis Y and contains the axis of rotation X. The assembly recesses 19,

20 enable only the insertion of a cross in the bearing bores 13, 14, wherein a journal of the cross is initially passed through the first assembly recess 19 in an inclined manner and is then inserted into the first bearing bore 13. The journal is inserted into the first bearing bore 13 so deeply, that the opposite journal can be passed through the second assembly recess 20 till the opposite journal can be inserted by means of displacement of the whole cross into the second bearing bore 14. Then, the bearing bushes can be inserted from the outside into the bearing bores 13, 14 and can be secured by a locking ring, which is inserted into the locking groove 15.

Fig. 8 shows a cross-sectional view through a first yoke arm 11, wherein the lower part, shown in Fig. 8, corresponds to the second yoke arm 7 of Figures 2 to 4. The upper part, shown above the bearing axis Y, corresponds to a common joint yoke according to the State of the Art.

Fig. 8 shows the first yoke arm 11 with the first bearing bore 13. Into this a bearing bush 21 is inserted. The bearing bush 21 accommodates several rolling members in form of rollers 22, which are arranged centrally to the axis of rotation X and are provided along the bearing axis Y in two rows. The rollers 22 roll on an outer bearing face 23 of the bearing bush 21. The rollers 22 roll on an inner bearing face 24 of a journal 25 of a journal cross 30. The cross 30 has a base body 26, from which four journals 25 project, wherein two journals are centred respectively in pairs on a bearing axis Y and point away from each other.

The bearings bush 21 has a sleeve wall 31, which is formed cylindrical and with which the bearing bush 21 is inserted into the first bearing bore 13. The inner face of the sleeve wall 21 forms the outer bearing face 23. Furthermore, the bearing bush 21 has a sleeve bottom 28, which closes the bearing bush 21, in relation to the joint centre M, to the outside. The bearing bush 21 is supported via the sleeve bottom 28 on a locking ring 29, which rests in the locking groove 15.

The rollers 22 roll against a pressure plate 27 in axial relation to the bearing axis Y in the bearing bush 21, wherein the pressure plate 27 is supported on the sleeve bottom 28. In the other direction, the rollers 22 are supported by a ring, not shown here and attached on the sleeve wall 31, and are held in the bearing bush 21. On this ring, generally, also sealing means are provided, to seal the bearing bush 21 in direction to the base body 26 in relation to the cross 30. Because of reasons of clarity, neither the ring nor the sealing means are shown.

The journal, which is arranged facing away from the shown journal 25 in relation to the base body 26, is supported correspondingly in the second yoke arm. The journals arranged vertically to the bearing axis Y and which are also not shown, are supported in corresponding bearing bores of a first joint yoke. Thus, a torque can be transmitted between the second joint yoke 7 and a first joint yoke, so that the universal joint shaft and the universal joint rotate around the axis of rotation X. In this case, forces are produced in the drawing plane of Fig. 8, which insofar as the first joint yoke is the driving element, act from the journal 25 onto the first yoke arm 11 and via the bearing, also the bearing faces 23, 24 and the rollers 22. The bearing load of the embodiment of the second joint yoke 7 is shown in the lower half, below the representation of the joint yoke in form of a trapeze. The bearing load of a joint yoke according to the State of the Art is shown in Fig. 8 above the embodiment of the joint yoke according to the upper shown half as a trapeze.

Firstly it is recognizable, that the bearing load is the highest in relation to the axis of rotation X radially outside, as also here the lever arm is the largest for the force transmission. The bearing load decreases towards the inside. According to the State of the Art, it is recognizable, that the bearing load is significantly larger radially at the outside than the bearing load radially at the inside.

For homogenising the bearing load according to the embodiment a first recess 33 is provided in the lower shown half of Fig. 8 in the outer surface 32 of the first yoke arm 11. In Fig. 4 it is visible, that the first recess 33 is arranged in relation to the axis of rotation X on one side of the first bearing bore 13 and extends parallel to the axis of rotation X. Furthermore, a second recess 34 is provided, which is provided on the other side of the first bearing bore 13 and also extends parallel to the axis of rotation X. The recesses 33, 34 extend up to a third recess 35, which extends partially around the axis of rotation X and is provided in the base body 10 between the first yoke arm 11 and the flange 16.

Because of the first recess 33 and the second recess 34 the wall thickness d1 is small in cross-section at a right angle to the axis of rotation X, i.e. in a plane orthogonal to the axis of rotation X and through the joint centre M, wherein this plane corresponds to the picture plane of Fig. 8, in the area of the recess 33, 34 of the first yoke arm 11, compared with a maximum wall thickness d2 in that area, which follows, in relation to the axis of rotation X, inwardly to the recesses 33, 34. The area of the recesses 33, 34 corresponds in this case to an outer portion A along the bearing bore in relation to the axis of rotation X. Attached thereto is an inner portion B along the bearing bore 13.

The wall thickness d1 in the outer portion A in the area of the recess 33, 34 is in the present preferred example, smaller than the maximum wall thickness of the residual inner portion B, which follows inwardly from the recess 33, 34 and which axially overlaps the rollers in relation to the bearing axis Y.

Thus, the first yoke arm 11 is weakened in the area of the recess 33, 34, so that in this area a higher elastic deformation of the first yoke arm 11 can take place and the bearing loads are reduced in this area. Correspondingly, the inner areas of the first yoke arm 11 have to absorb higher loads, so that the bearing load is increased here. This is evident in the not so steep trapeze, which reflects the bearing load in the

lower half of the representation of Fig. 8. The highest produced bearing load is, thus, smaller and the smallest bearing load is higher compared to the State of the Art. Because of this, an increased life span of the bearing of the journal 25 in the first yoke arm 11 is achieved.

As visible in Fig. 4, the first recess 33 and the second recess 34 extend in direction to the flange 16 or to the base portion 10 at least so far, as the first bearing bore 13 extends in direction to the axis of rotation X and in the side view of Fig. 4. In the present example even still further than the extension of the first bearing bore 13.

Figures 5 to 7 show a second embodiment of the second joint yoke. Components or features, which correspond to the components or features of the first embodiment, are provided with reference numerals, which are increased by the value 100 and are described in connection with the first embodiment.

In contrast to the first embodiment the two recesses 33, 34 are connected by a third recess 136, 136'. The third recess 136, 136' extends between the bearing axis Y and the base portion 10 partially around the bearing axis Y and, thus, around the respective bearing bore 113, 114. As the two yoke arms 111, 112 are arranged mirror-symmetrically to each other it is in the following presentably referred to the first yoke arm 111. The first recess 133 extends from the first free end 117 of the first yoke arm 111 in direction to the base portion 110, then joins in circumferential direction the third recess 136, which extends around the first bearing bore 113. The third recess 136 merges into the second recess 134, which leads again to the first free end 117. Thus, the wall thickness is not only reduced in a cross-sectional plane at a right angle to the axis of rotation X, but also in the whole area between a plane, which is arranged at a right angle to the axis of rotation X and contains the bearing axis Y, and the base portion 110.

In all embodiments it is provided, that the wall thickness of the yoke arms is not reduced in the outer portion along the bearing bores at the free ends of the yoke arms or no recess is provided in this portion.

This type of design of the recess 133 is especially advantageous, when the second joint yoke 107 is formed as a forged part, wherein the forging direction extends parallel to the bearing axis Y.

Figures 9 and 10 show a third embodiment of a second joint yoke, wherein this is formed as a forged part. Components or features, which correspond to components or features of the first embodiment, are provided with the same reference numerals and are described in connection with the first embodiment.

The recesses 33, 34 are arranged inclined to the axis of rotation X. They are arranged on an imaginary envelope of cone around the axis of rotation X, wherein the envelope of cone tapers towards the flange 16. The arrangement of the first and the second recesses 33, 34 approximately parallel to the axis of rotation is especially suitable for joint yokes, which are produced as forged parts, wherein the forging direction extends parallel to the axis of rotation X.

Figures 11 and 12 show a fourth embodiment of a second joint yoke, wherein this is formed as a forged part. Components or features, which correspond to the components or features of the second embodiment, are provided with the same reference numerals and are described in connection with the second embodiment.

The recesses 133, 134 are arranged inclined to the axis of rotation X. They are arranged on an imaginary envelope of cone around the axis of rotation X, wherein the envelope of cone is tapered towards the journal 116. The arrangement of the first

and second recesses 133, 134 approximately parallel to the axis of rotation is especially suitable for joint yokes, which are produced as forged parts, wherein the forging direction extends parallel to the axis of rotation X.

Furthermore, the second joint yoke 107 has no flange, but a journal 137 for connecting to an element of a shaft.

Figures 13 and 14 show a fifth embodiment of a second joint yoke, wherein this is formed as a forged part. Components or features, which correspond to components or features of the fourth embodiment, are provided with the same reference numerals and are described in connection with the fourth or the second embodiment.

The first, second and third recesses 133, 134, 136 are arranged such, that they are especially suitable in a forged part, in which the forging direction extends transversally to the axis of rotation X.

Reference numerals list

1	universal joint shaft
2	universal joint
3	universal joint
4	shaft
5	first joint yoke
6	first joint yoke
7, 107	second joint yoke
8	second joint yoke
9, 9'	journal cross assembly
10, 110	base portion
11, 111	first yoke arm
12, 112	second yoke arm
13, 113	first bearing bore
14, 114	second bearing bore
15, 115	locking groove
16, 116	flange
17, 117	first free end
18, 118	second free end
19, 119	first assembly recess
20, 120	second assembly recess
21	bearing bush
22	roller
23	outer bearing face
24	inner bearing face

25	journal
26	base body
27	pressure plate
28	sleeve bottom
29	locking ring
30	cross
31	sleeve wall
32	upper surface
33, 33'; 133, 133'	first recess
34, 34'	second recess
35, 35'; 135, 135'	recess
136, 136'	third recess
137	journal

A	outer portion
B	inner portion
M	joint centre
X	axis of rotation
Y	bearing axis

What is claimed is:

1. A joint yoke for a universal joint, the joint yoke being rotatably drivable around an axis of rotation, the joint yoke comprising:

a first yoke arm with a first bearing bore; and

a second yoke arm with a second bearing bore, the first bearing bore and the second bearing bore being arranged centered on a bearing axis, the bearing axis intersecting the axis of rotation at a right angle at a joint center,

wherein the first and second yoke arms, radially to the axis of rotation, include an outer portion and an inner portion adjacent to the outer portion,

wherein the first and second yoke arms each have at least two recesses that are arranged at opposite sides of the respective bearing bore such that a wall thickness of the yoke arms, in a radial direction to the bearing axis in a plane orthogonal to the axis of rotation and through the joint center, is reduced in the outer portion relative to the inner portion,

wherein the recesses being arranged at least partially parallel to the axis of rotation and

wherein the wall thickness of the yoke arms is reduced in a radial direction to the bearing axis in a plane orthogonal to the axis of rotation and through the joint center in the outer portion relative to an outer portion in an area of free ends of the yoke arms arranged radially to the axis of rotation, in a plane, that contains the axis of rotation and the bearing axis.

2. The joint yoke according to claim 1, wherein the outer portions extend, respectively, from an outer end of the bearing bores in a direction to the axis of rotation.

3. The joint yoke according to claim 1, wherein the wall thickness of the yoke arms is reduced across at least half of a circumference around the bearing bores.

4. The joint yoke according to claim 1, wherein the yoke arms have, relative to the axis of rotation, outward recesses which extend along a longitudinal extension of the outer portions of the bearing bores.

5. The joint yoke according to claim 1, wherein the joint yoke has a base portion, from which the yoke arms project parallel to each other, and a third recess, the third recess being provided between the bearing axis and the base portion and extending at least partially around the bearing axis.

6. A universal joint with a joint yoke according to claim 1, wherein the joint yoke is connected articulatedly via a cross to a second joint yoke.

7. A universal joint comprising:

a first joint yoke and a second joint yoke,

wherein the first joint yoke is connected articulatedly via a cross to the second joint yoke and

wherein the first and second joint yokes are joint yokes according to claim 1.

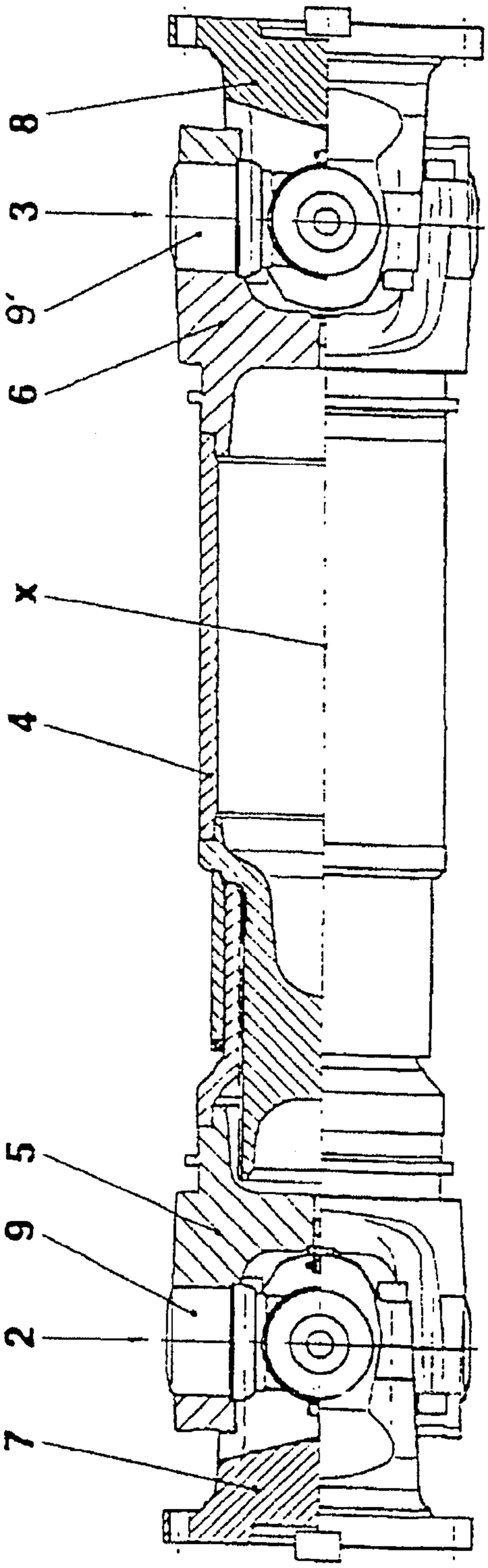


FIG. 1

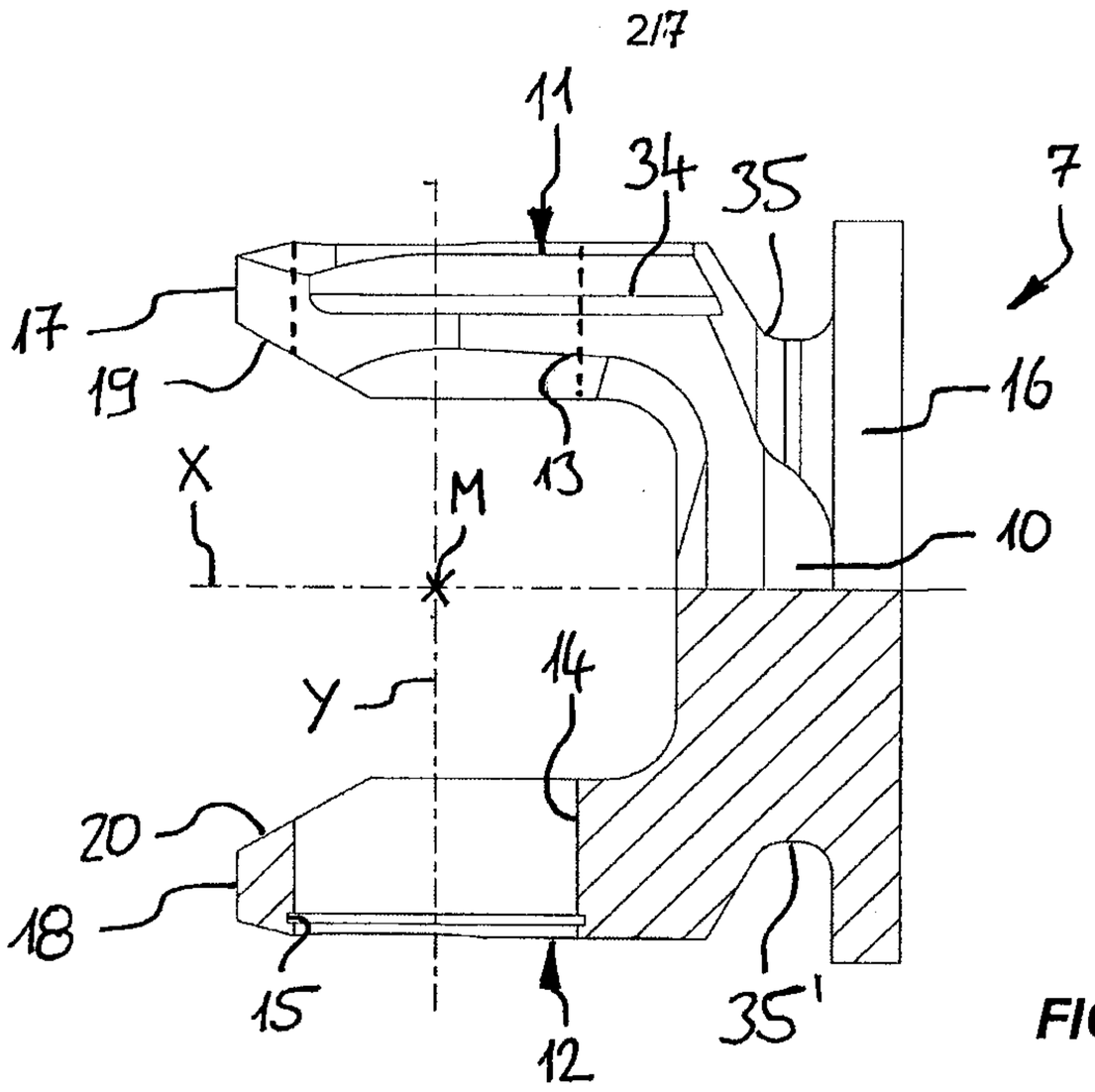


FIG. 2

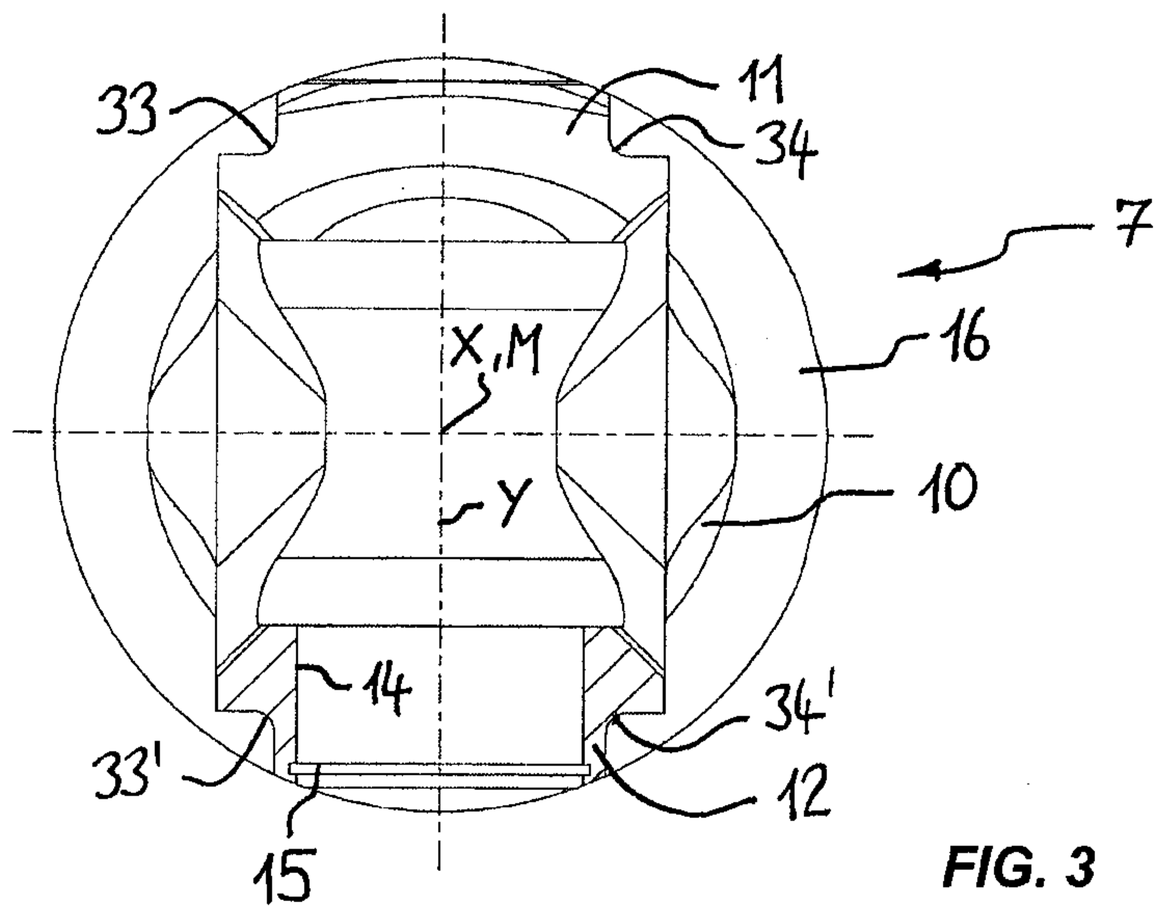


FIG. 3

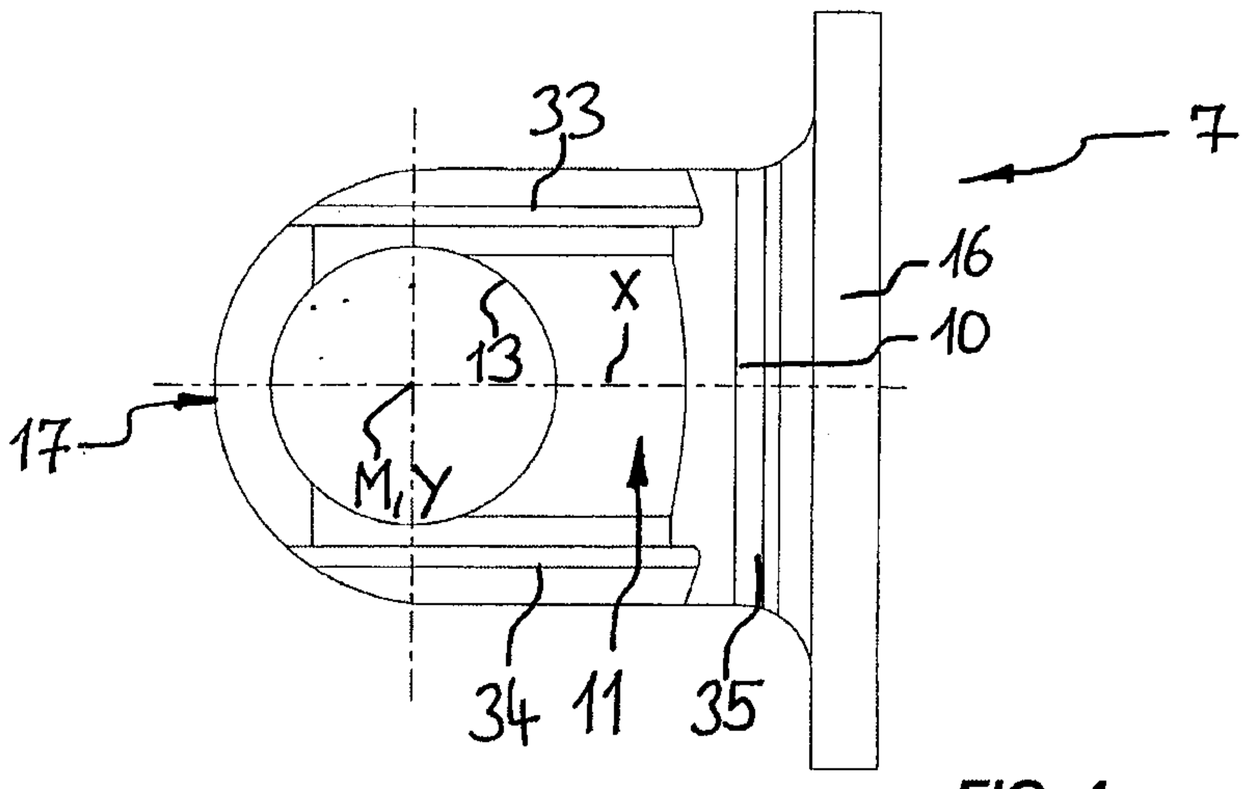


FIG. 4

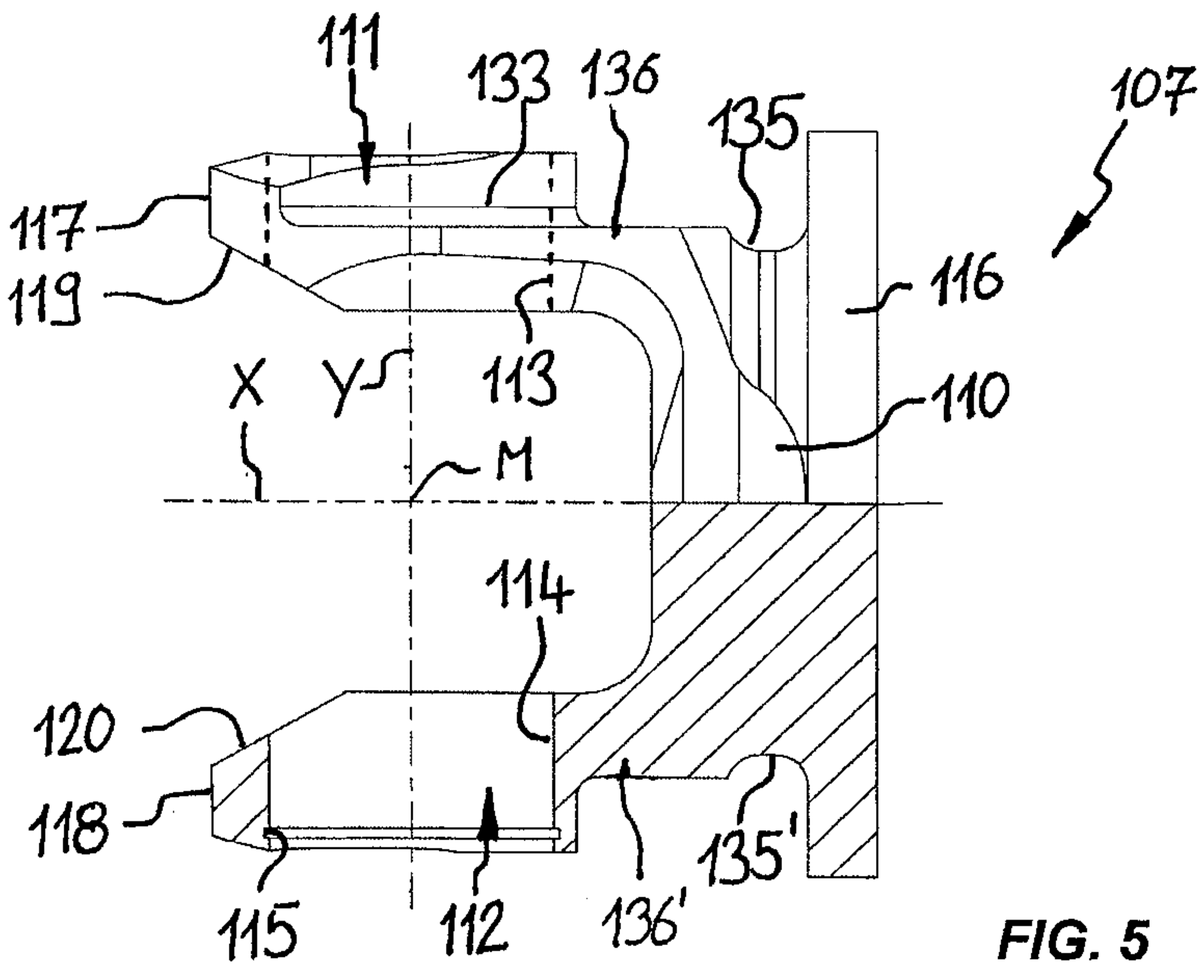


FIG. 5

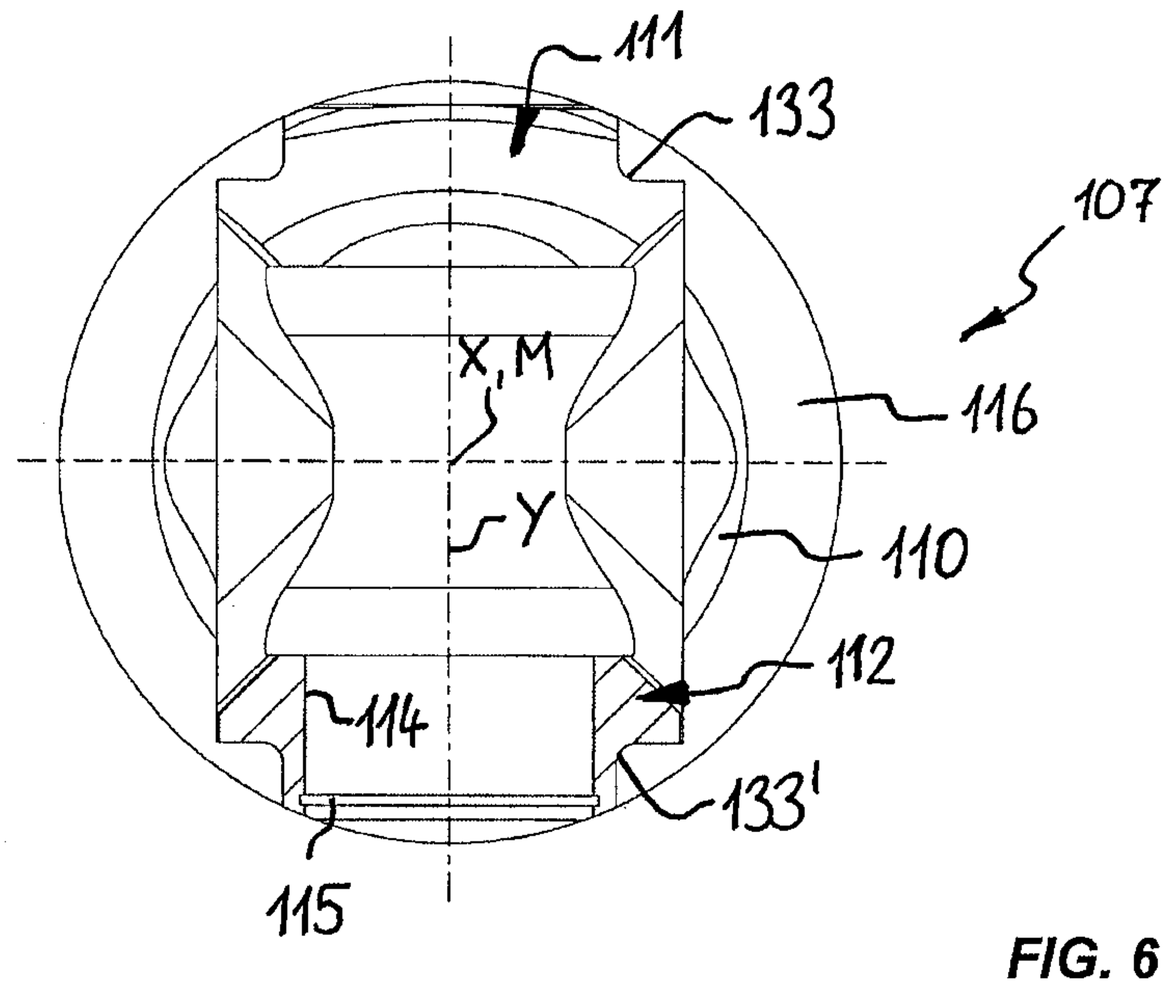


FIG. 6

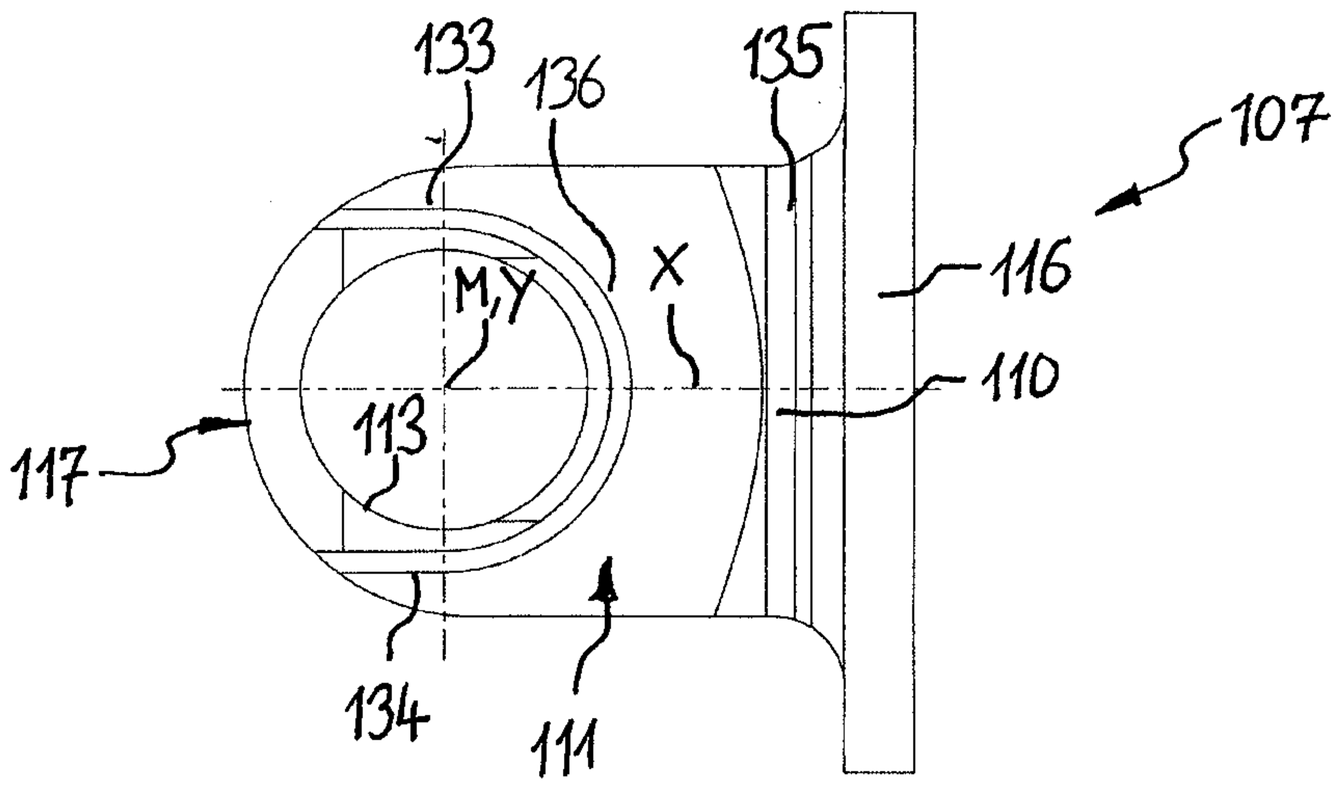


FIG. 7

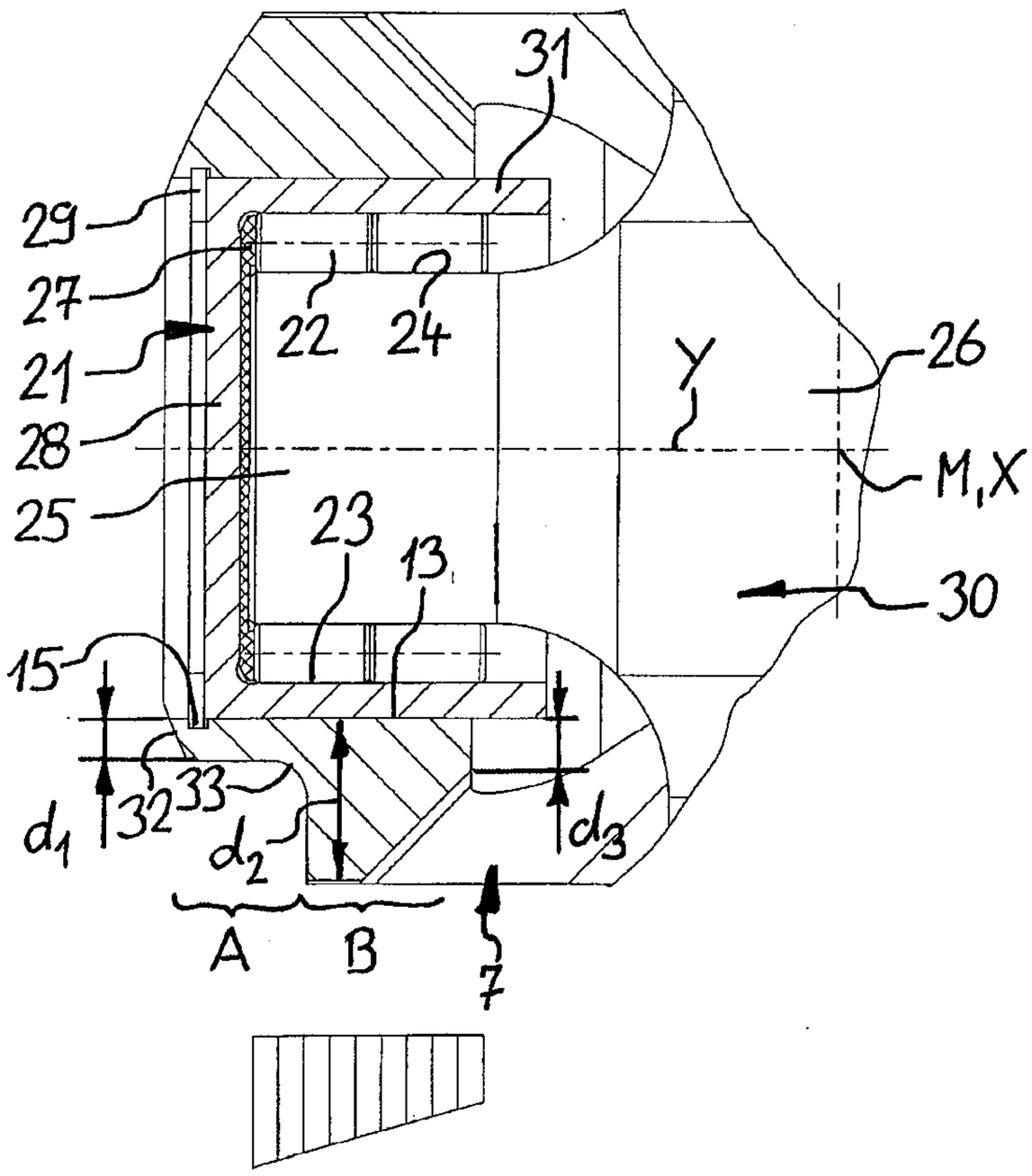


FIG. 8

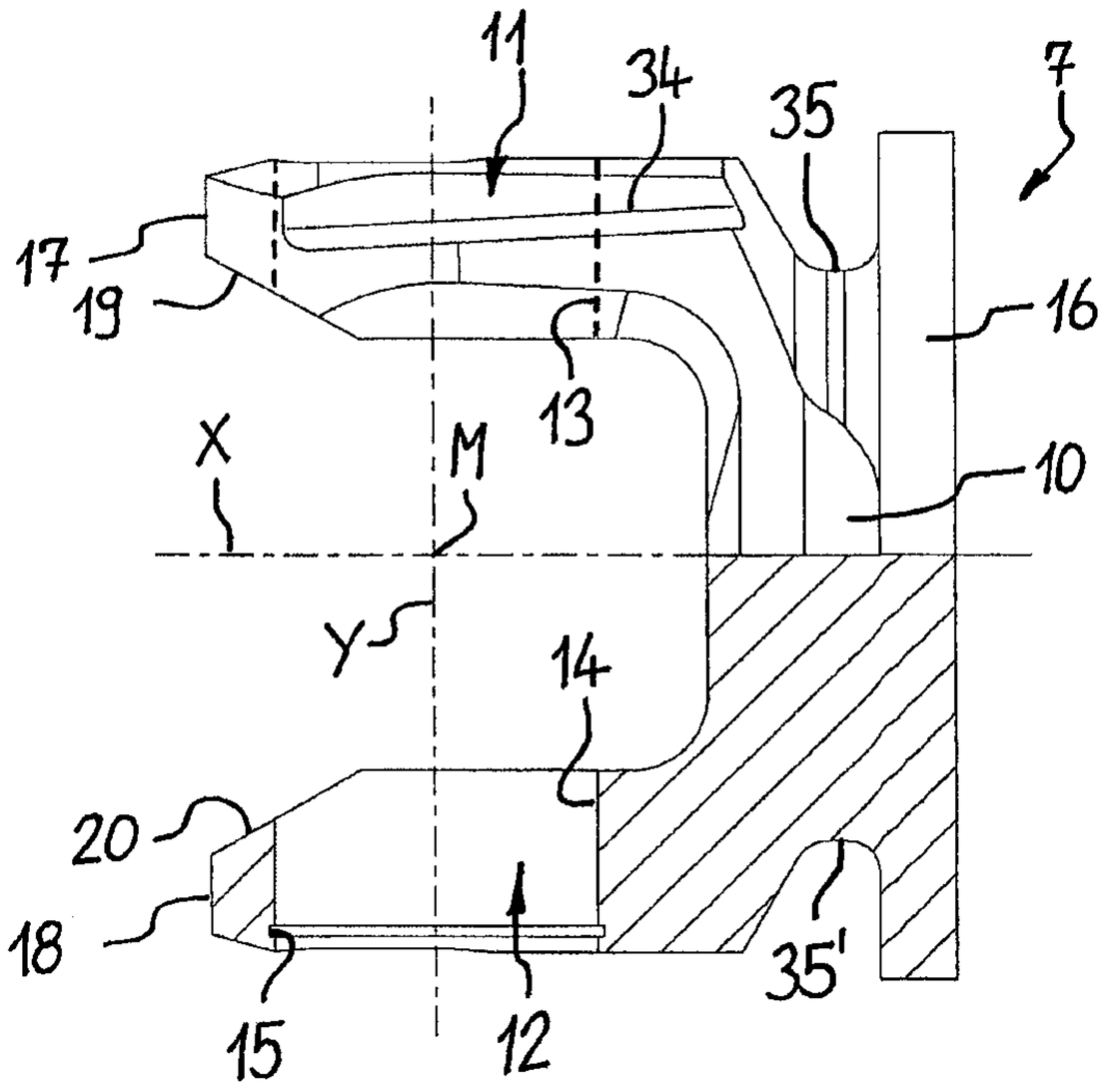

11
34
35
7
17
19
16
13
X
M
10
Y
14
20
18
35'
15
12

FIG. 9

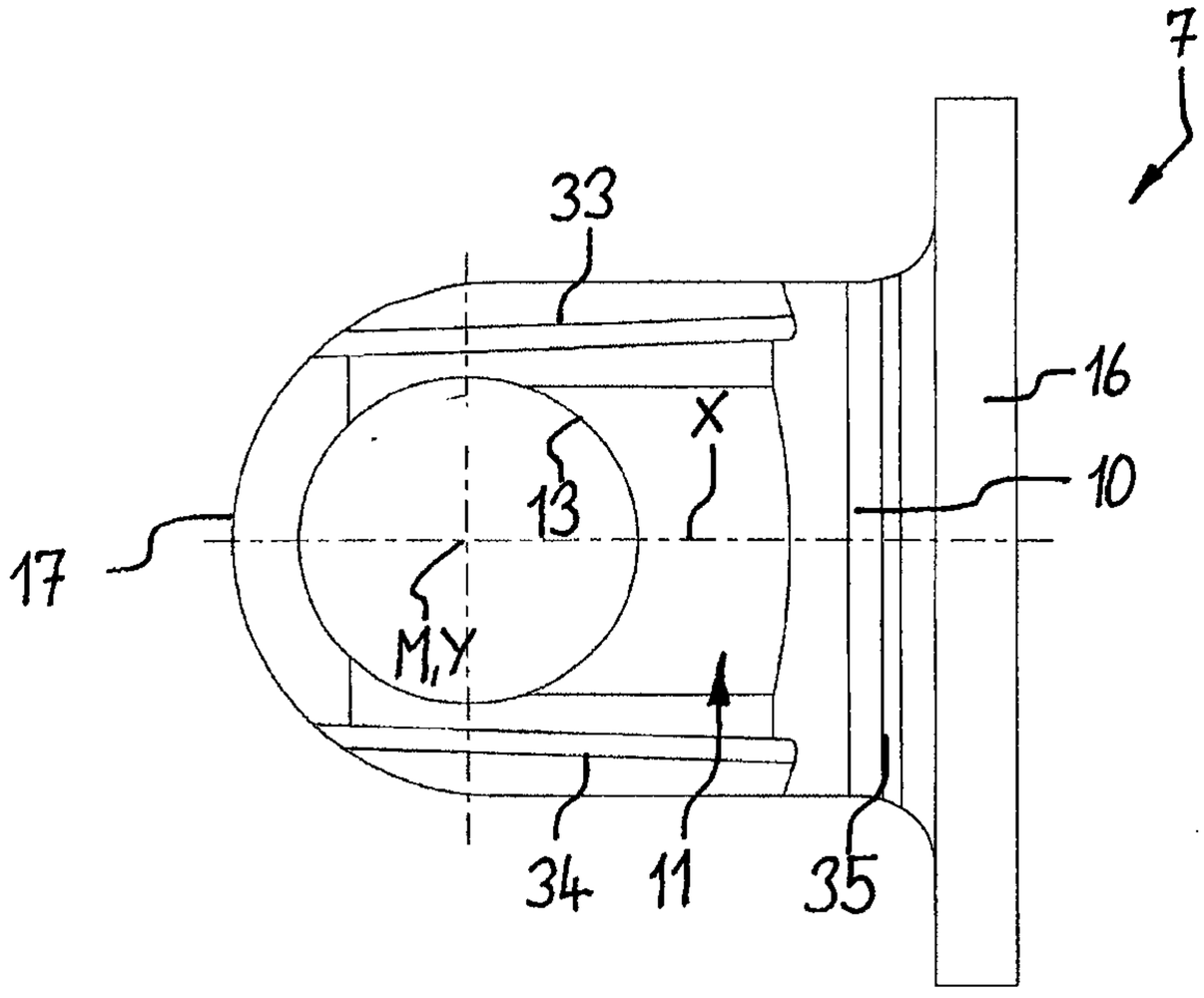

7
33
16
X
13
10
17
M,Y
34
11
35

FIG. 10

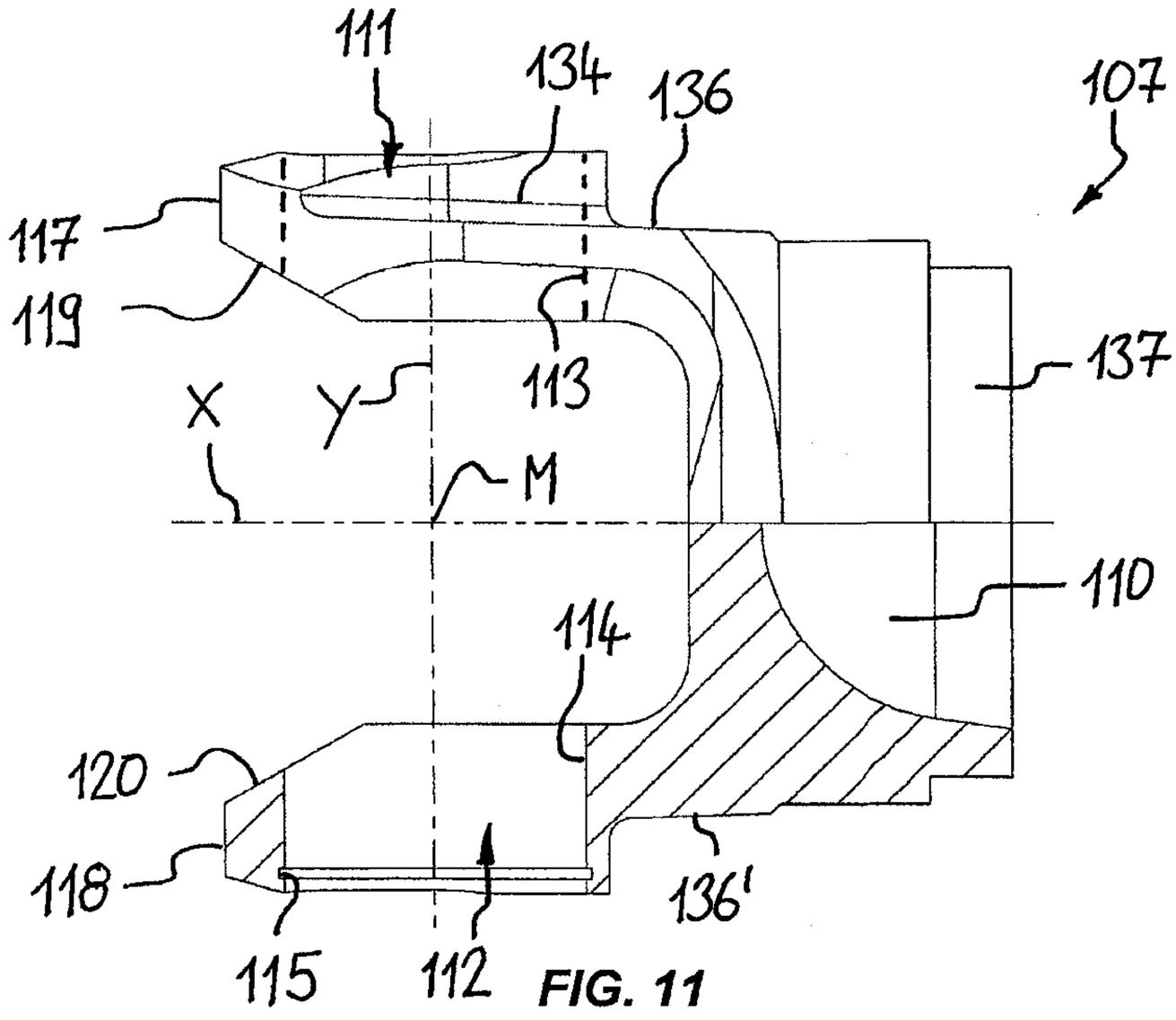

111
134
136
107
117
119
113
137
X
Y
M
110
114
120
118
136'
115
112

FIG. 11

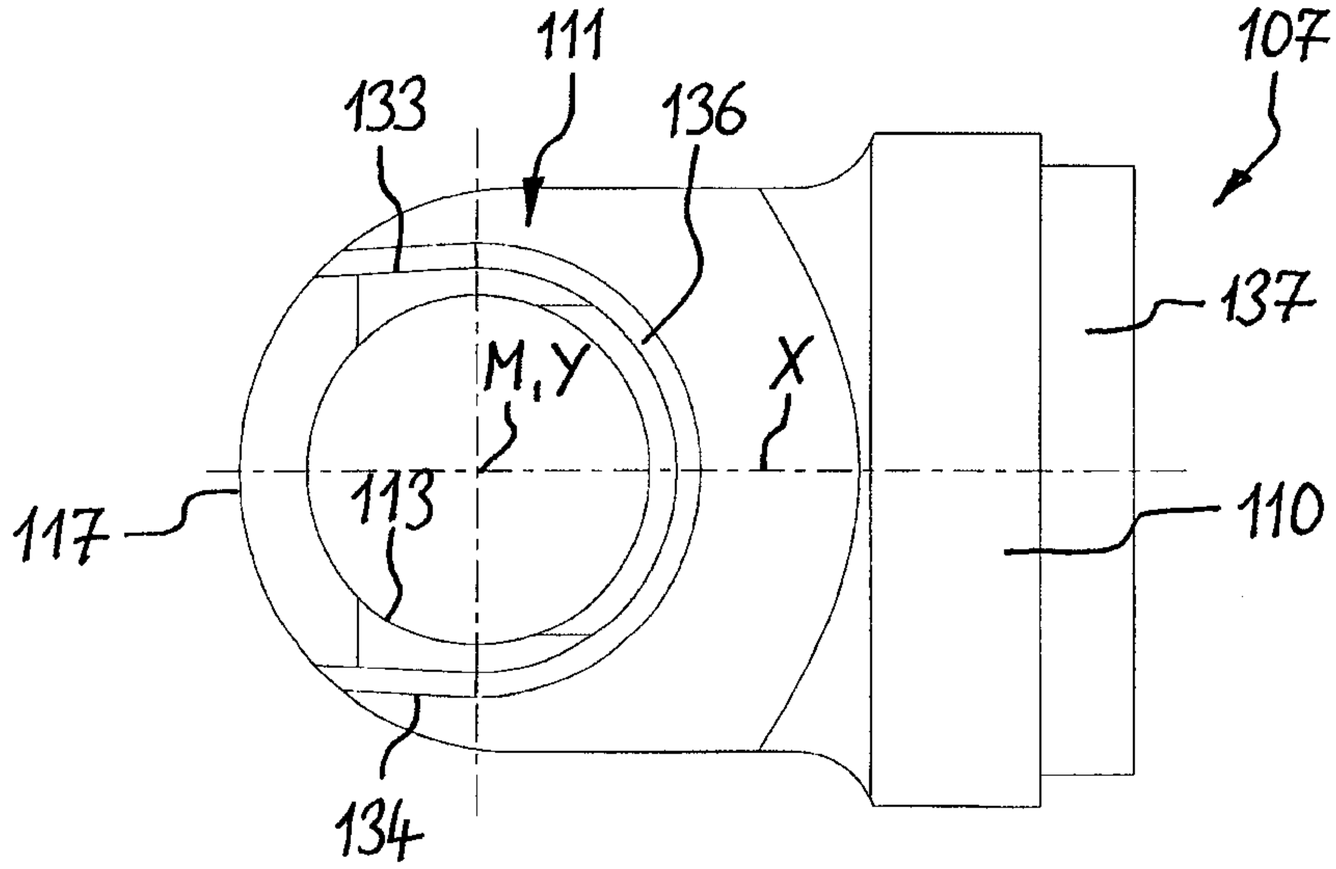

111
107
133
136
137
M, Y
X
117
113
110
134

FIG. 12

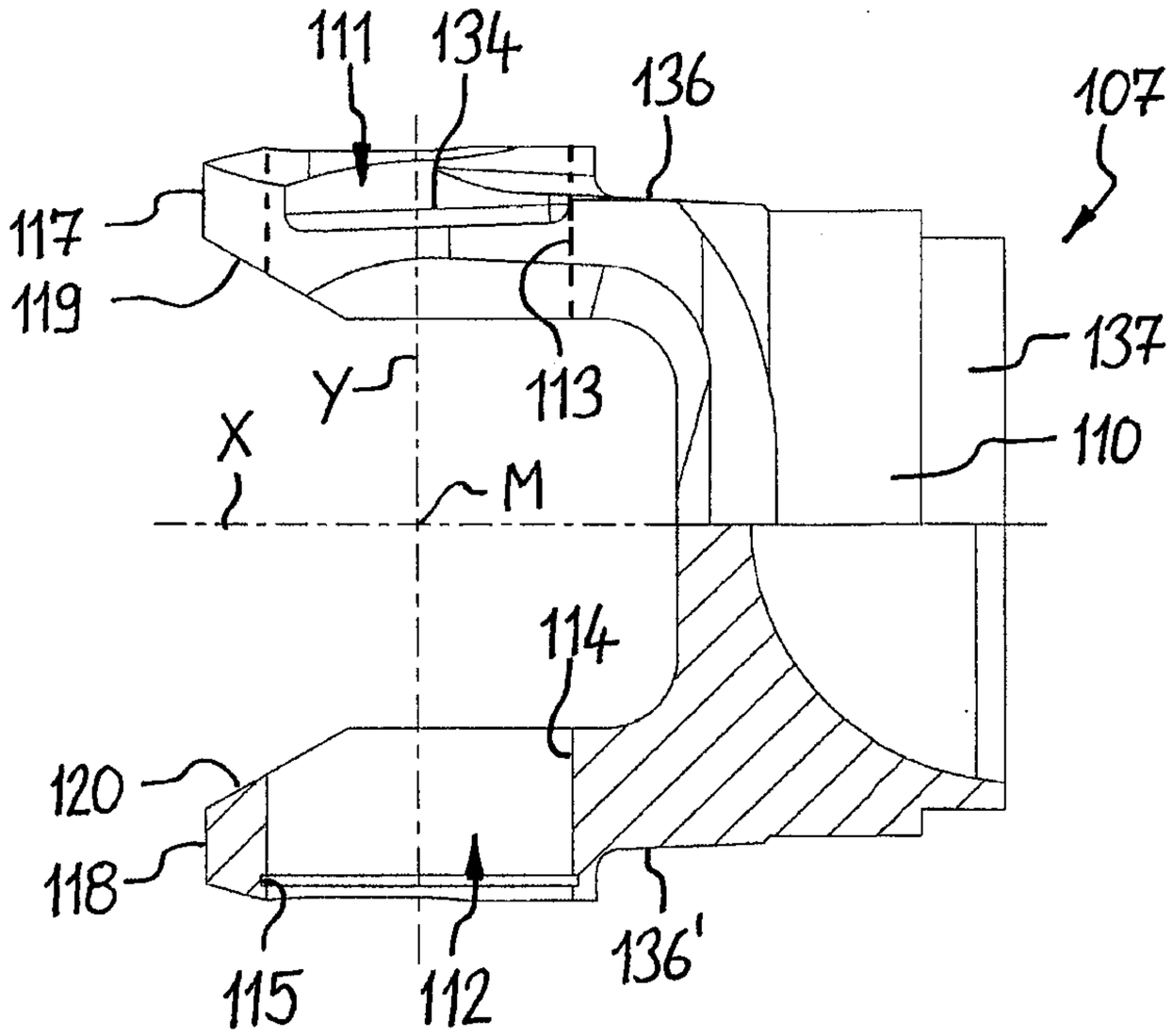

111
134
136
107
117
119
137
Y
113
X
110
M
114
120
118
115
112
136'

FIG. 13

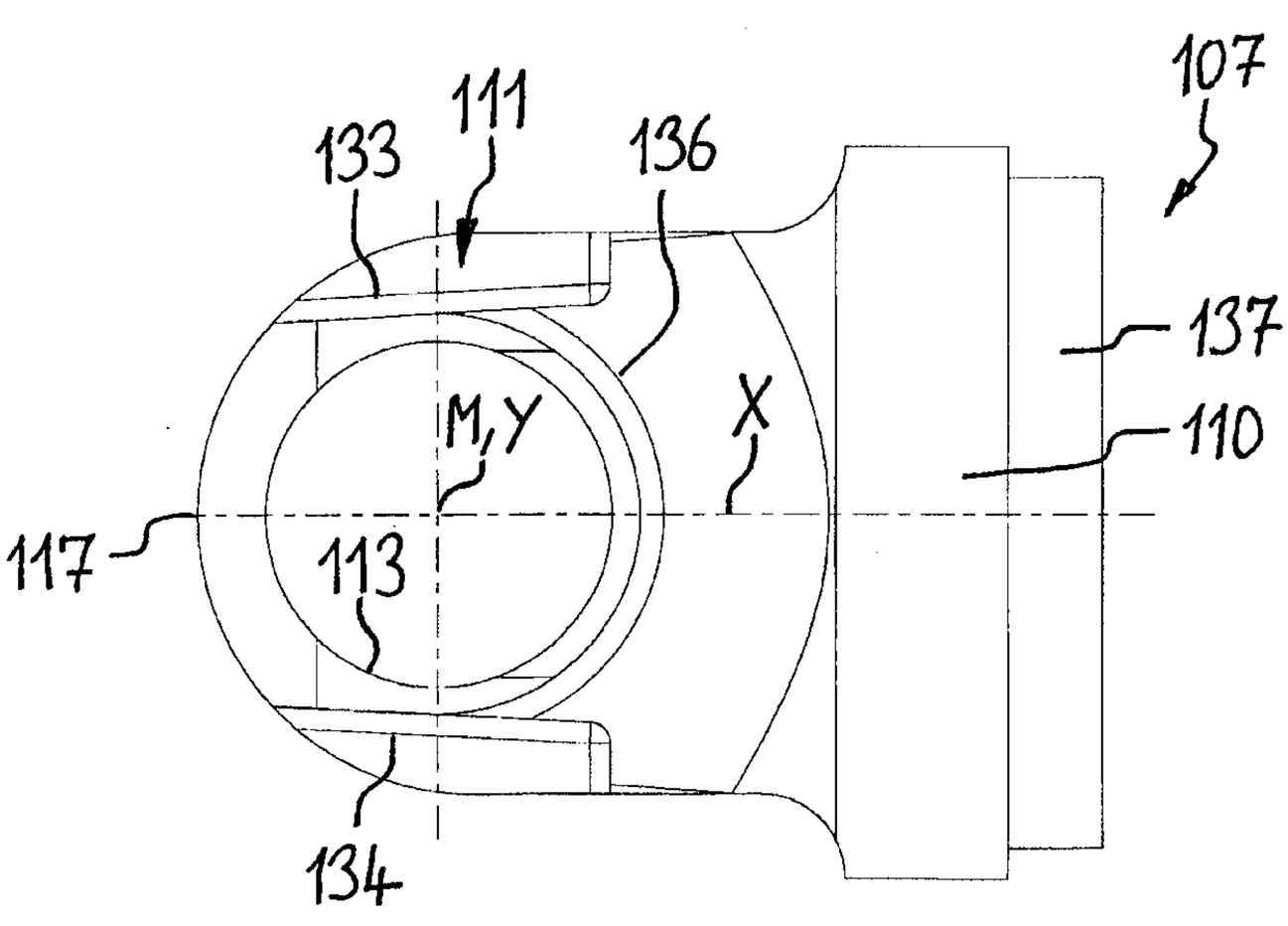
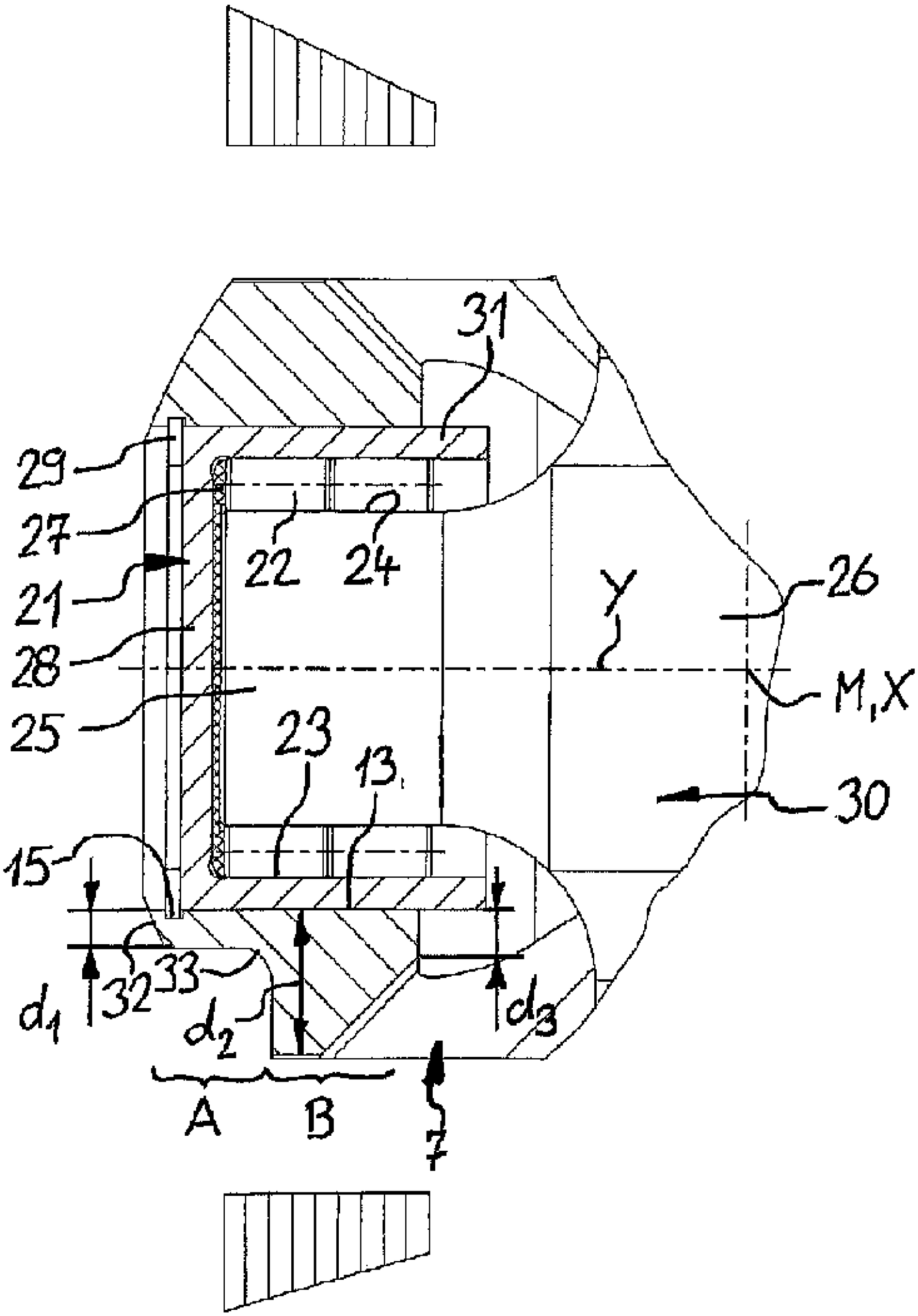

107
133
111
136
137
M,Y
X
110
117
113
134

FIG. 14


31
29
27
21
28
25
22
24
26
Y
M,X
30
23
13
15
d1
32
33
d2
d3
A
B
7