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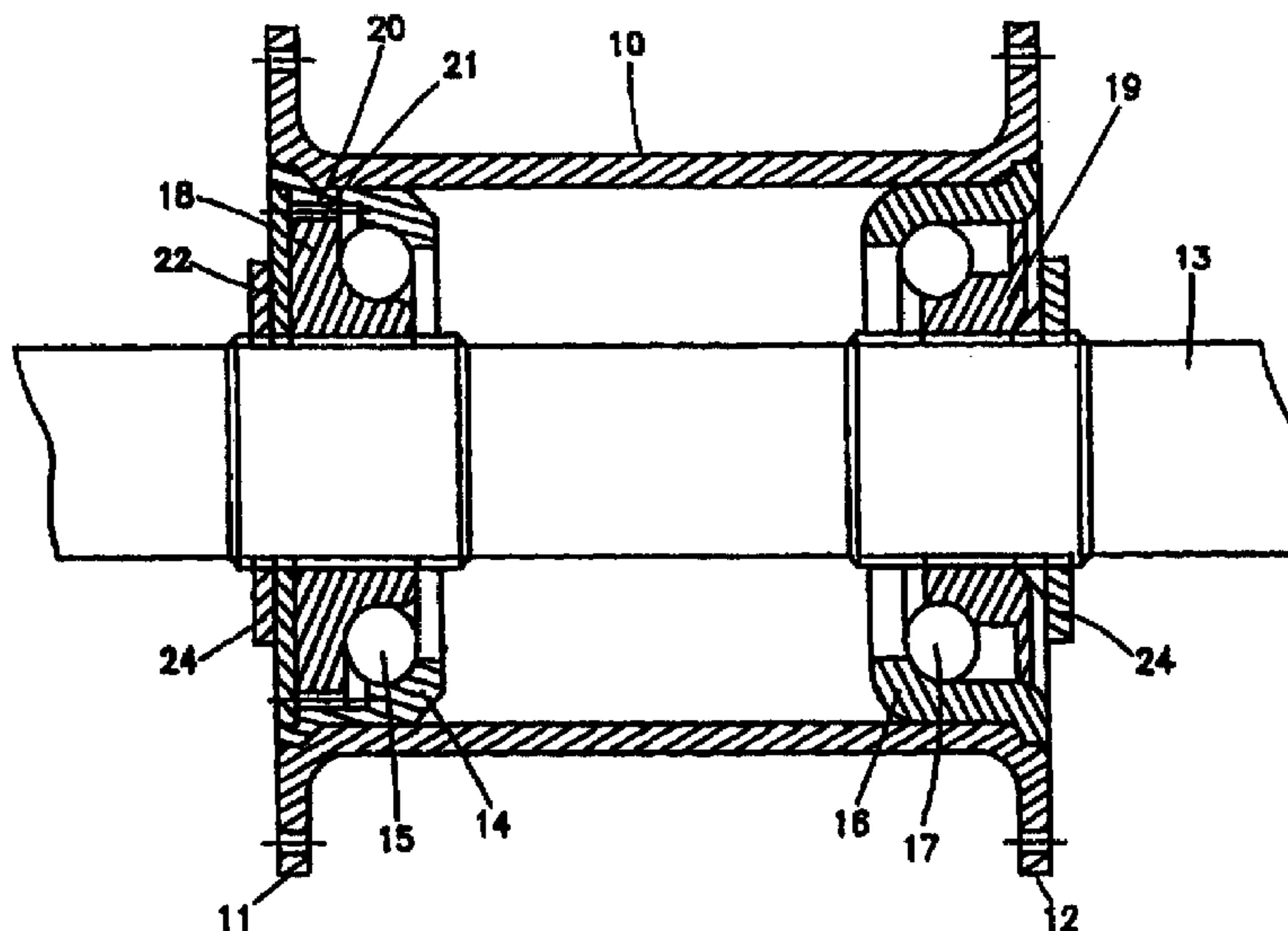
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(54) **STRUCTURE DE MOYEU**

(54) **HUB STRUCTURE**

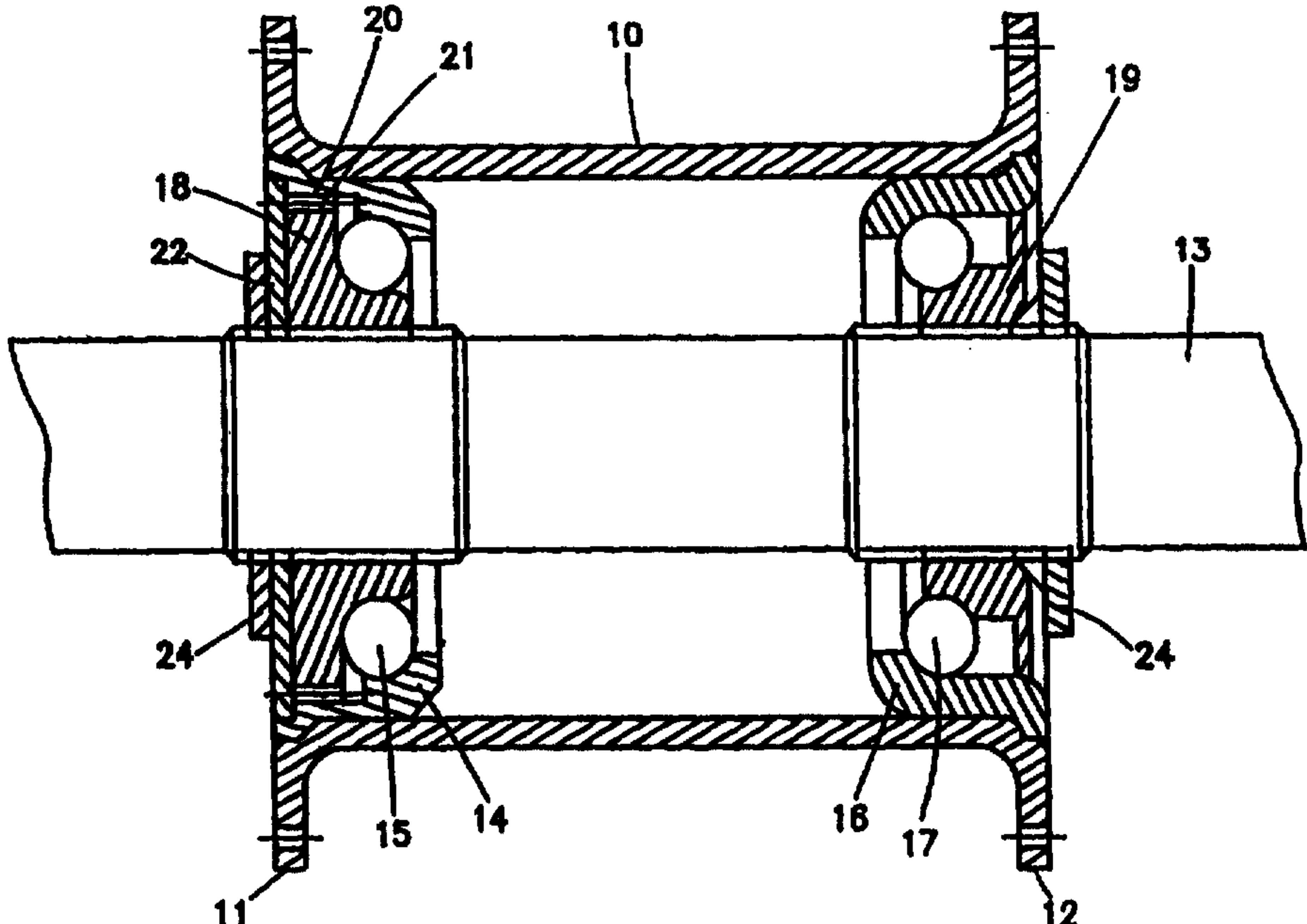


(57) La présente invention concerne un type de structure de moyeu comprenant, pour l'essentiel, un mécanisme d'embrayage constitué par un embrayage et par les dents triangulaires du boîtier de roulement à l'intérieur du moyeu, de façon que l'organe dans son ensemble peut assurer de façon indépendante une fonction de freinage unidirectionnel sans qu'il soit nécessaire d'ajouter des composants comme c'est le cas avec les structures classiques. Dans le cas où l'on souhaite ajouter une fonction supplémentaire de changements de vitesse par paliers, la compatibilité élevée des composants permet de ne remplacer que le support de plateau, et non plus de nombreux composants comme c'était le cas dans les structures classiques, ce qui augmentait les coûts d'assemblage. Vu la tendance actuelle des bicyclettes qui présentent des caractéristiques en constante évolution, la présente invention permet de réduire la nécessité de modifier la taille des composants concernés et par conséquent, de réduire les coûts de production.

(57) The subject invention discloses a type of hub structure, comprising mainly the clutch mechanism that is composed of a clutch and the ratchet teeth of the bearing housing inside the hub, so that the whole unit can independently perform a single-direction brake function without additional components as in conventional structures. With its high compatibility of components, only the chain wheel support has to be replaced in case of additional function of multi-step speed changes without replacing many components as in conventional structures, which would result in higher assembling costs. Under the trend of everchanging bicycle specifications, it will reduce the change of measurements of relevant components, thus reducing the production costs.

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(21) International Application Number: PCT/CN98/00181 (22) International Filing Date: 3 September 1998 (03.09.98) (30) Priority Data: 08/922,591 3 September 1997 (03.09.97) US (71) Applicants (for all designated States except US): YANG GE INDUSTRIAL CO., LTD. [CN/CN]; 1 8th Road, Taichung Industrial Park, Taichung, Taiwan (CN). YA AN GE DEVELOPMENT ENTERPRISE CO., LTD. [CN/CN]; 1 8th Road, Taichung Industrial Park, Taichung, Taiwan (CN). (72) Inventor; and (75) Inventor/Applicant (for US only): YANG, C., Shu-Chiung [CN/CN]; 9-1 Lane 20, Rong-Hua Street, Taichung City, Taiwan (CN). (74) Agent: LIU, SHEN & ASSOCIATES; A0601, Huibin Building, 8 Beichen Dong Street, Chaoyang District, Beijing 100101 (CN).		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DE (Utility model), DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i>
(54) Title: HUB STRUCTURE  (57) Abstract The subject invention discloses a type of hub structure, comprising mainly the clutch mechanism that is composed of a clutch and the ratchet teeth of the bearing housing inside the hub, so that the whole unit can independently perform a single-direction brake function without additional components as in conventional structures. With its high compatibility of components, only the chain wheel support has to be replaced in case of additional function of multi-step speed changes without replacing many components as in conventional structures, which would result in higher assembling costs. Under the trend of everchanging bicycle specifications, it will reduce the change of measurements of relevant components, thus reducing the production costs.		

HUB STRUCTURE

Field of the Invention

5 The subject invention relates to a type of hub structure, particularly to one that can independently perform its brake function, perform conveniently, and enable more convenient assembling.

10 Description of Prior Art

Conventionally, a prior art of hub structure involves a spindle inside a hub, with two sides accommodating the bearing, so the hub may freely rotate in two directions; to enable single-direction brake function, it needs additional fitting of other clutch components; in other words, the
15 outside of the spindle will have to be burdened with a set of clutch components and ratchet components, with additional chain wheel on the extension of its outside cylinder; in other words, said clutch component, ratchet component and extended cylinder chain wheel will compose an independent unit, thus the result is many additional components to be
20 fitted onto the outside of the hub. However, under the trend of ever-changing bicycle specifications, if multi-step speed change function is desired, there is the need to install many additional chain wheels, and that would require the replacement of all components such as the clutch, the ratchet, the extension cylinder and the chain wheels, etc., which result
25 in inadequate compatibility among the components and the need to manufacture many more components of various measurements and specifications; it would not only increase the assembling costs, but would also significantly increase the production costs.

Summary of the Invention

5 The primary object of the subject invention is to provide a type of hub structure that is not only applicable to a single wheel shaft, but also to a rear wheel shaft; serving as a hub for double purposes of a single speed or multi-step speed change; said hub itself can independently perform the brake function; said hub has a high compatibility, so that
10 when multi-step speed change function is required, only a few components have to be replaced, in order to lower the assembling costs; moreover, its simplified structure will enable simple assembling and maintenance purposes.

 To achieve the above object, the present invention provides a hub
15 structure, comprising :

 a hub, including a first rim and a second rim;

 a spindle, rotating freely and installed inside the hub;

 a bearing housing and a bearing being located inside the first rim of the hub; inside said bearing housing in the first rim being a number
20 of ratchet teeth; another bearing housing and a bearing being located inside the second rim of the hub;

 a clutch and a cone, being respectively located at the spindle and between the two bearings; said clutch and the cone being fixed on the spindle and may rotate simultaneously with the spindle; on the
25 circumference of the clutch being one or more check pawls that can be toothed with the ratchet teeth in the bearing housing inside the first rim; so that when the spindle turns in one direction, they may serve as a brake device on a bicycle.

The advantages of the hub structure of the present invention lies in that the whole unit can independently perform a single-direction brake function without additional components. Its high compatibility of components result in lower assembling costs. It will reduce the change of measurements of relevant components, thus reducing the production costs.

Brief Description of the Drawings

The present invention will be better understood and its various objects and advantages will be more fully appreciated from the following detailed description in conjunction with the accompanying drawings; which are only for the purposes of reference and description and shall not be based to restrict or limit the subject invention, in which :

Fig. 1 is a plane section view of the hub structure according to the first embodiment of the subject invention when applied to a single wheel shaft;

Fig. 2 is an exploded view of the hub structure according to the first embodiment of the subject invention when applied to a single wheel shaft;

Fig. 3 is a plane section view of the hub structure according to the first embodiment of the subject invention when applied to a rear wheel shaft;

Fig. 4 is an exploded view of the hub structure according to the first embodiment of the subject invention when applied to a rear wheel shaft;

Fig. 5 is a plane section view of the hub structure according to the second embodiment of the subject invention when applied to a single wheel shaft; and

Fig. 6 is an exploded view of the hub structure according to the

second embodiment of the subject invention when applied to a single wheel shaft.

5 Detailed Description of the Preferred Embodiment

Please refer to Fig. 1 and 2 which are respectively a plane section view and an exploded view of the hub structure according to the first embodiment of the subject invention when applied to a single wheel shaft. Said hub mechanism is preferably applicable to a single wheel shaft,
10 comprising a hub 10 which involves a first rim 11 and a second rim 12; a free rotating spindle 13 that is located inside the hub 10; a bearing housing 14 and a bearing 15 that are located inside the first rim 11 of the hub 10; another bearing housing 16 and a bearing 17 that are located inside the second rim 12 of the hub 10; a clutch 18 and a cone 19 that are
15 respectively located at the spindle and between the two bearings 15 and 17, so that the spindle 13 may rotate freely inside the hub 10. Said clutch 18 and cone 19 are joined with screws to the spindle 13 and are rotating with the spindle 13. Inside the bearing housing 14 are a number of ratchet teeth 20 distributed in a ring shape, and on the circumference of
20 the clutch are two (one or two) opposite check pawls 21 that can be toothed with the ratchet teeth 20 on the bearing housing 14, so that when the spindle 13 turns in one direction, it serves as a brake device such as on a bicycle. On the outside of the clutch 18 is a water-resistant cover 22. Said water-resistant cover 22 is fastened to the clutch 18 with a number
25 of screws 23, to enable protection against water. The two fixing pieces 24 are fixed with screws onto the spindle 13, to fix the components in position.

Referring to Figs. 3 and 4 which are respectively a plane section

view and an exploded view of the hub structure according to the first embodiment of the subject invention when applied to a rear wheel shaft, comprising a hub 10 which includes a first rim 11 and a second rim 12; a spindle 13 that can freely rotate inside the hub 10; a bearing housing 14 and a bearing 15 that are fitted inside the first rim 11 of the hub 10; another bearing housing 16 and a bearing 17 that are fitted inside the second rim 12 of the hub 10; a clutch 18 and a cone 19 that are respectively located in the spindle 13 and between the two bearings 15 and 17. Said clutch 18 involves a small cone 25 and a bearing 26 that are located on the spindle 13, and said cone 19 involves a small cone 27 and a bearing 28 that are located on the spindle 13, so that the spindle 13 may rotate freely inside the hub 10. Inside the bearing housing 14 in the first rim 11 are a number of ratchet teeth 20, and on the circumference of the clutch 18 are corresponding two check pawls 21 that can be teathed with the ratchet teeth 20 on the bearing housing 14, so that when the spindle 13 turns in one direction, it serves as a brake device as on a bicycle. On the outside of the clutch 18 is welded with a chain wheel support 29. A water-resistant cover 22 is appropriately thickened to include an external thread 30. Said water-resistant cover 22 can be screwed together by the external thread 30 to the internal thread 31 of the chain wheel support 29. Said chain wheel support 29 is installed on the spindle 13 with a small cone 32 and a bearing 33. A chain wheel 34 is fastened with a fixing piece 35 to the chain wheel support 29, so that when the chain wheel 34 turns in one direction, the chain wheel support 29 will drive the clutch 18 to turn. On the circumference of the clutch 18 are corresponding two check pawls 21 that can be toothed with the ratchet teeth 20 of the bearing housing 14, serving as a brake device on a bicycle.

Please refer to Figs. 5 and 6 which are respectively a plane section

view and an exploded view of the hub structure according to another embodiment of the subject invention when applied to a rear wheel shaft. The length of said chain wheel support 29 can be appropriately lengthened, so that said chain wheel support 29 can be used to support
5 two or more chain wheels 34, thus forming multi-step speed-change hub mechanism.

The subject invention involves the delicate design inside the hub of a clutch mechanism comprising a clutch 18 and the ratchet teeth 20 on the bearing housing 14, so that the whole unit can independently perform
10 its single-direction brake function, without the addition of other components as in conventional structures. Also the subject invention has a high compatibility of the components. When it is used for multi-step speed changes, all we have to do is to replace the chain wheel support 29, without the need of replacing many components, as in conventional
15 structures which would increase the assembling costs. Under the trend of ever-changing bicycle specifications, the subject invention will require less amendment of relevant component measurements, thus reducing the production costs.

It is hereby declared that the above description, covering the
20 preferred embodiment, should not be based to limit or restrict the subject claims, and that all equivalent structural and/or configurational variations and/or modifications deriving from the subject description with drawings and contents therein, should reasonably be included in the intent of the subject invention and the subject claims. The spirit and scope of the
25 present mention is limited only by the terms of the appended claims.

Claims

1. A hub structural improvement, comprising:

a hub including a first rim and a second rim;

5 a spindle rotating freely and installed inside said hub;

a first bearing housing engaging an internal surface of said second rim;

a first cone extending into said first bearing housing and threadedly engaging said spindle;

10 a first bearing disposed between said first bearing housing and said first cone;

a second cone extending into said first cone and provided on an opposing side of said first bearing, said second cone threadedly engaging said spindle;

15 a second bearing disposed between said first and second cones;

a second bearing housing engaging an internal surface of said first rim around said spindle and having a number of ratchet teeth;

20 a clutch disposed inside said second bearing housing around said spindle, said clutch threadedly engaging said spindle and having at least one check pawl to engage said ratchet teeth;

a third bearing located between said second bearing housing and said clutch;

25 a third cone disposed on a side of said clutch opposite said third bearing, said third cone threadedly engaging said spindle;

a fourth bearing located between said third cone and said clutch;

30 a chain wheel support mounted on said spindle and fixed to said clutch for simultaneous rotation therewith; and

a chain wheel mounted on said chain wheel support.

2. The hub structural improvement as claimed in Claim 1, further comprising a fourth cone disposed on a side of said chain wheel support opposite said clutch and threadedly engaging said spindle, and a fifth bearing disposed between said chain wheel support and said fourth cone, said chain wheel support surrounding said third cone and said fourth cone and projecting radially inward to threadedly engage said spindle between said third cone and fourth cone, wherein said clutch, said third cone, said chain wheel support, and said fourth cone abut against one another and are tightened in sequence on the spindle.

3. A hub structural improvement, comprising:

- a hub including a first rim and a second rim;
- 15 a spindle rotating freely and installed inside said hub;
- a first bearing housing engaging an internal surface of said second rim;
- a first cone disposed inside said first bearing housing and threadedly engaging said spindle;
- 20 a first bearing disposed between said first bearing housing and said first cone;
- a second cone extending into said first cone and provided on an opposing side of said first bearing, said second cone threadedly engaging said spindle;
- 25 a second bearing disposed between said first and second cones;
- a second bearing housing engaging an internal surface of said first rim around said spindle and having a number of ratchet teeth;
- 30 a clutch disposed inside said second bearing housing around said spindle and having at least one check pawl to

engage said ratchet teeth;

a third bearing located between said second bearing housing and said clutch;

a chain wheel support fixed to said clutch for simultaneous rotation therewith and provided oppositely of said third bearing, said chain wheel support threadedly engaging said spindle;

a third cone disposed on one side of said chain wheel support and threadedly engaging said spindle;

a fourth bearing located between said third cone and said chain wheel support; and

a chain wheel mounted on said chain wheel support.

4. A hub structural improvement, comprising:

a hub including a first rim and a second rim;

a spindle rotating freely and installed inside said hub;

two bearing housings, each of which engages an internal surface of one of said first and second rims;

two cones each of which is disposed inside a respective one of said bearing housing and threadedly engaging said spindle;

two bearings each of which is disposed between a respective one of said bearing housings and a corresponding one of said cones;

two additional cones, each of which is disposed adjacent one side of corresponding one of said cones on a side opposite a corresponding one of said bearings and threadedly engaging said spindle; and

two additional bearings, each of which is disposed between a respective one of said cones and a corresponding one of said additional cones.

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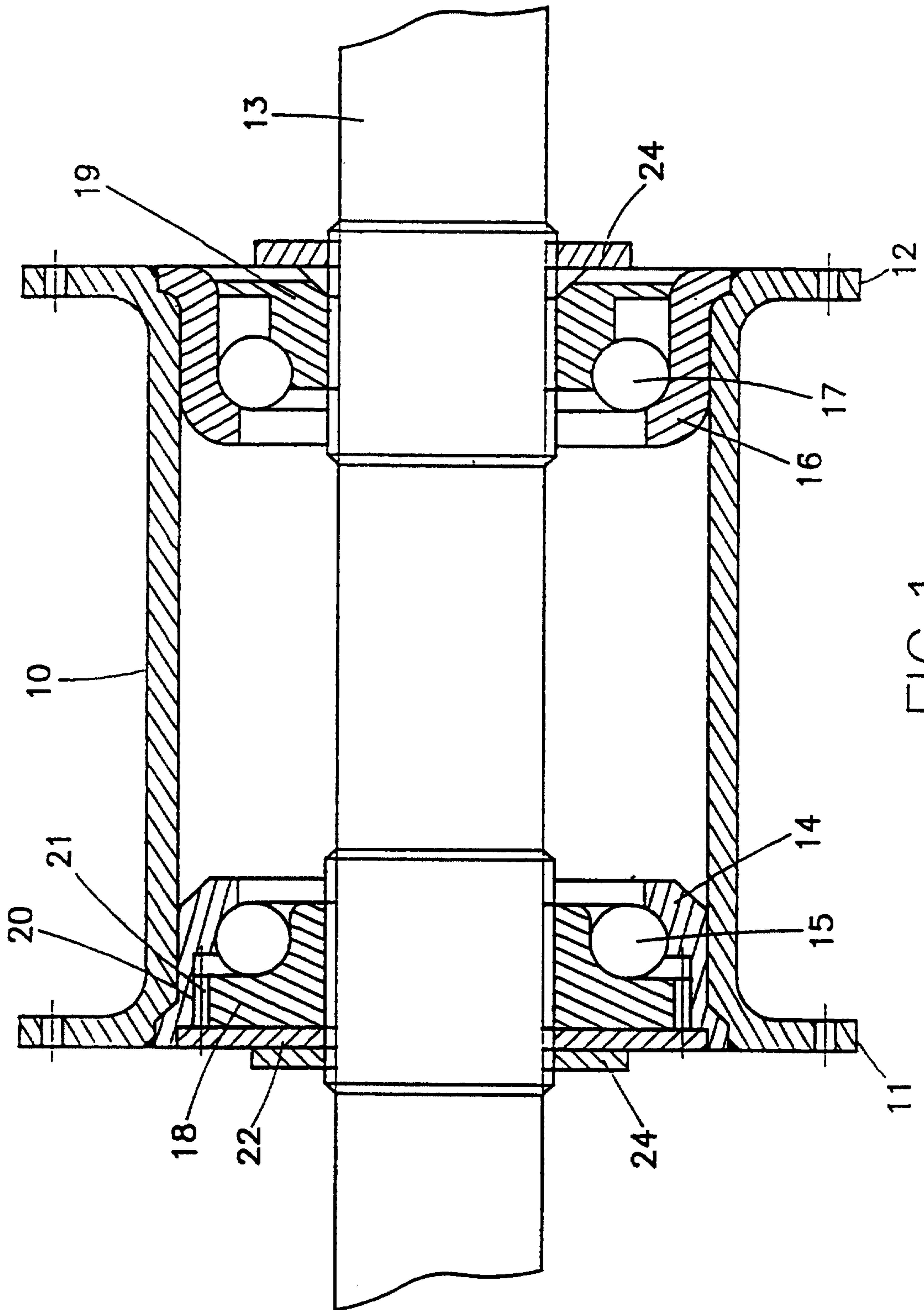


FIG.1

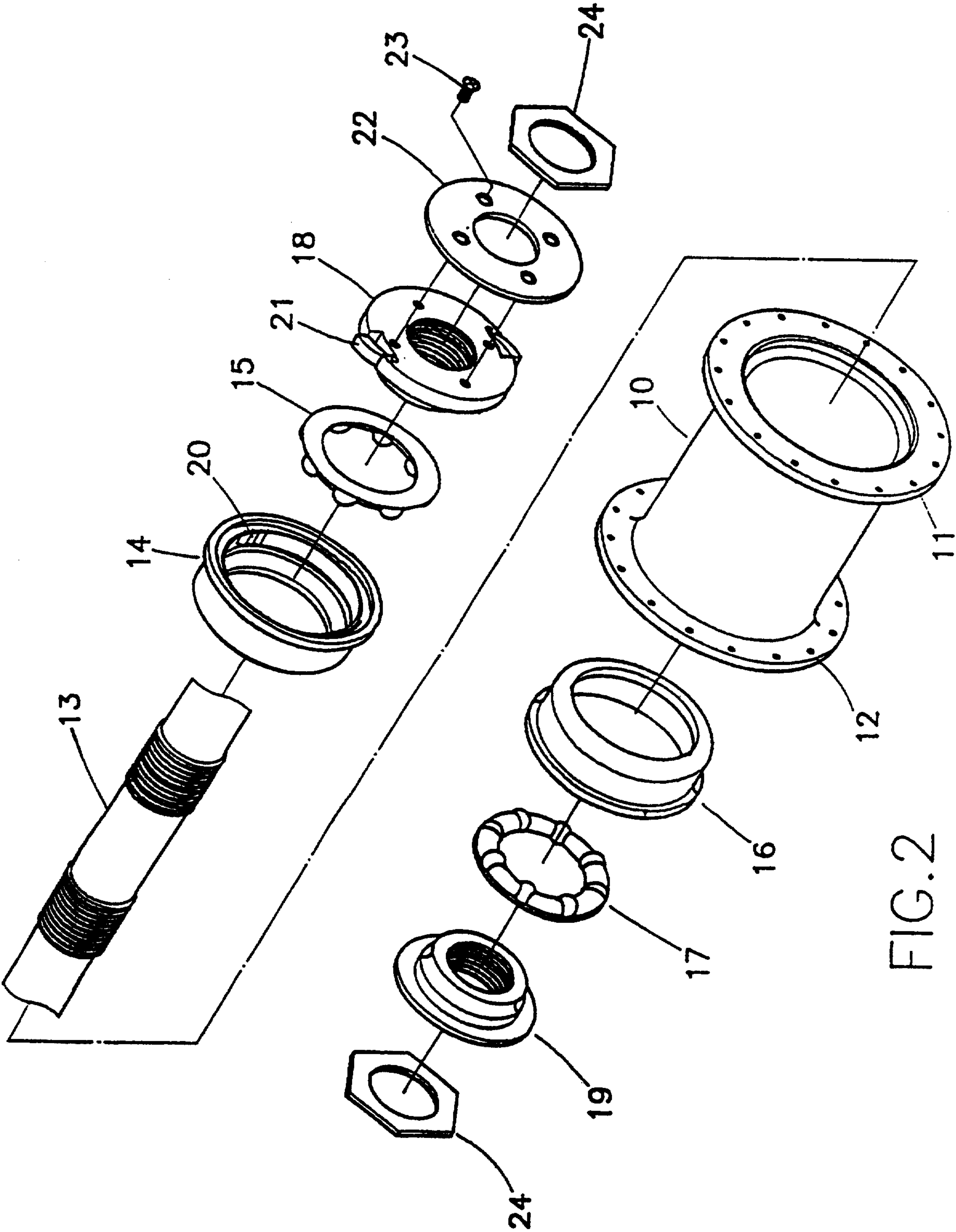


FIG. 2

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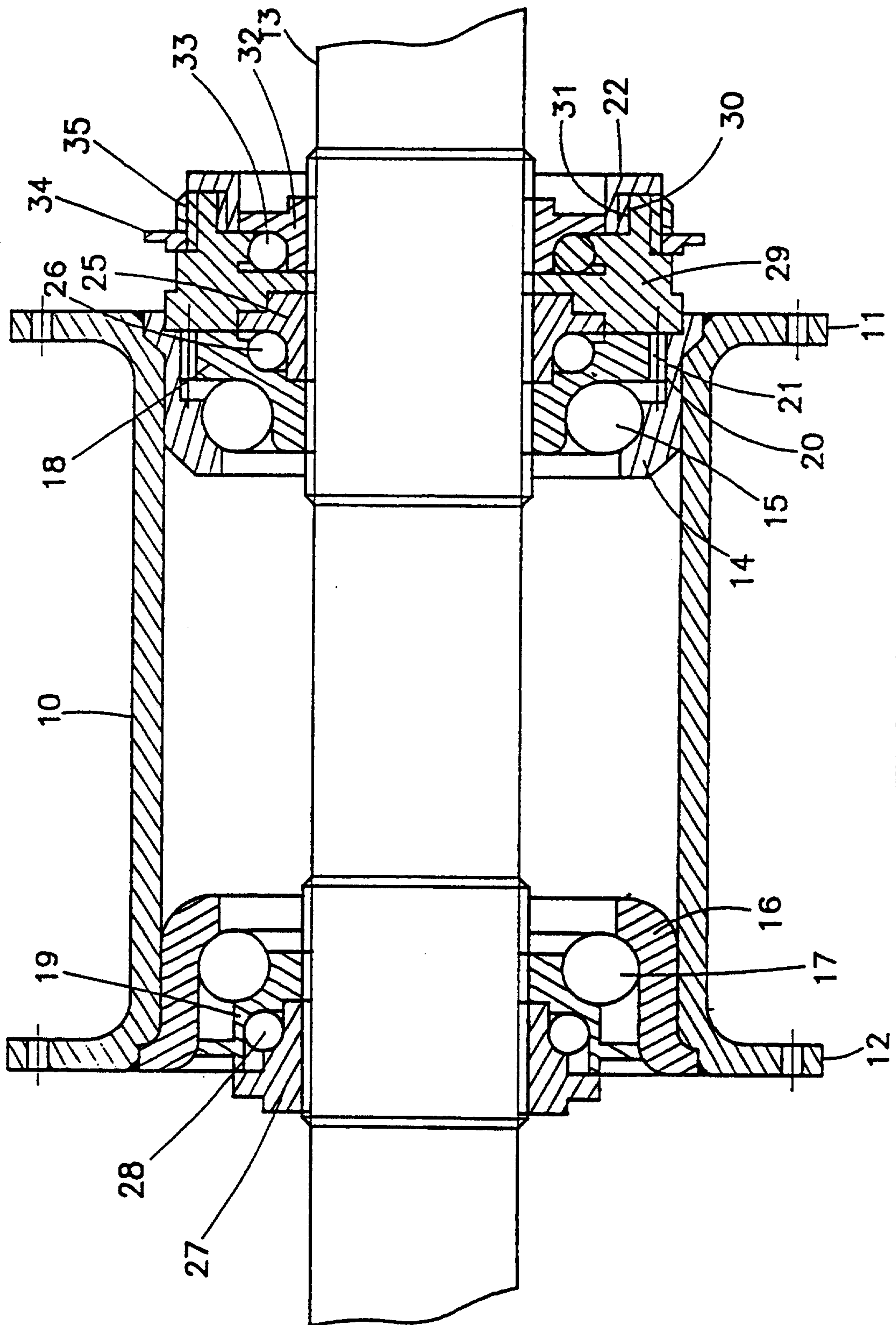


FIG. 3

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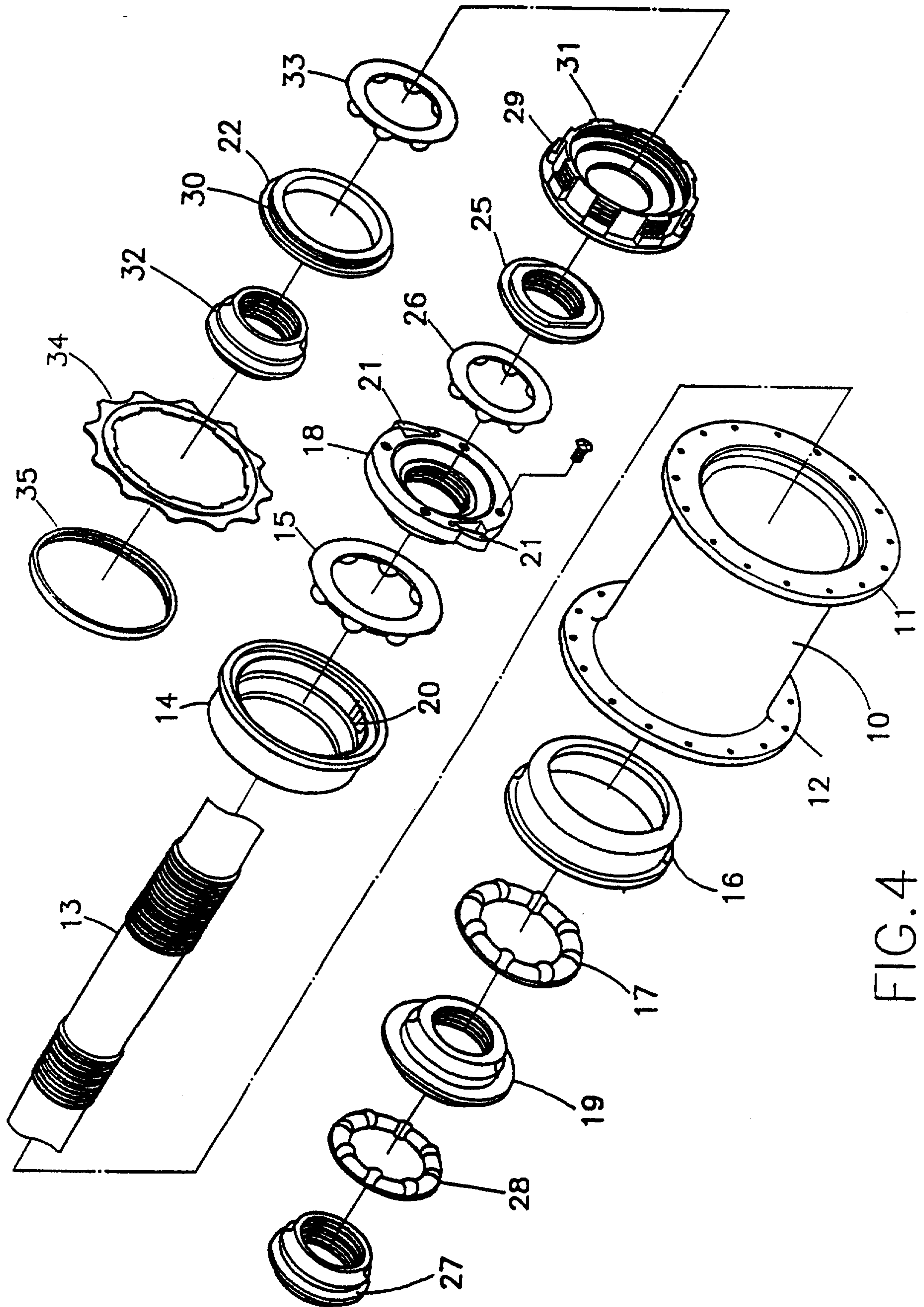


FIG.4

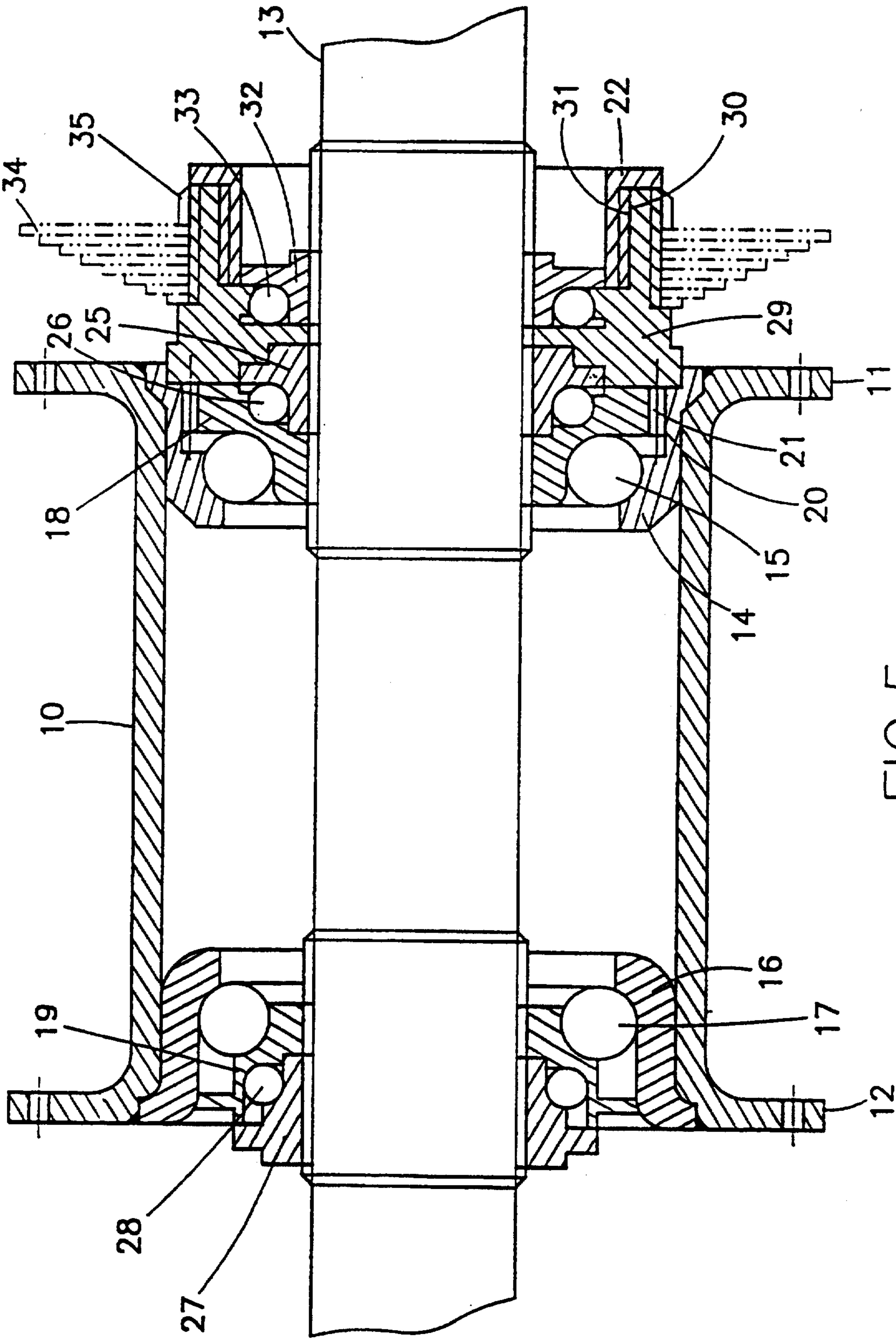


FIG. 5

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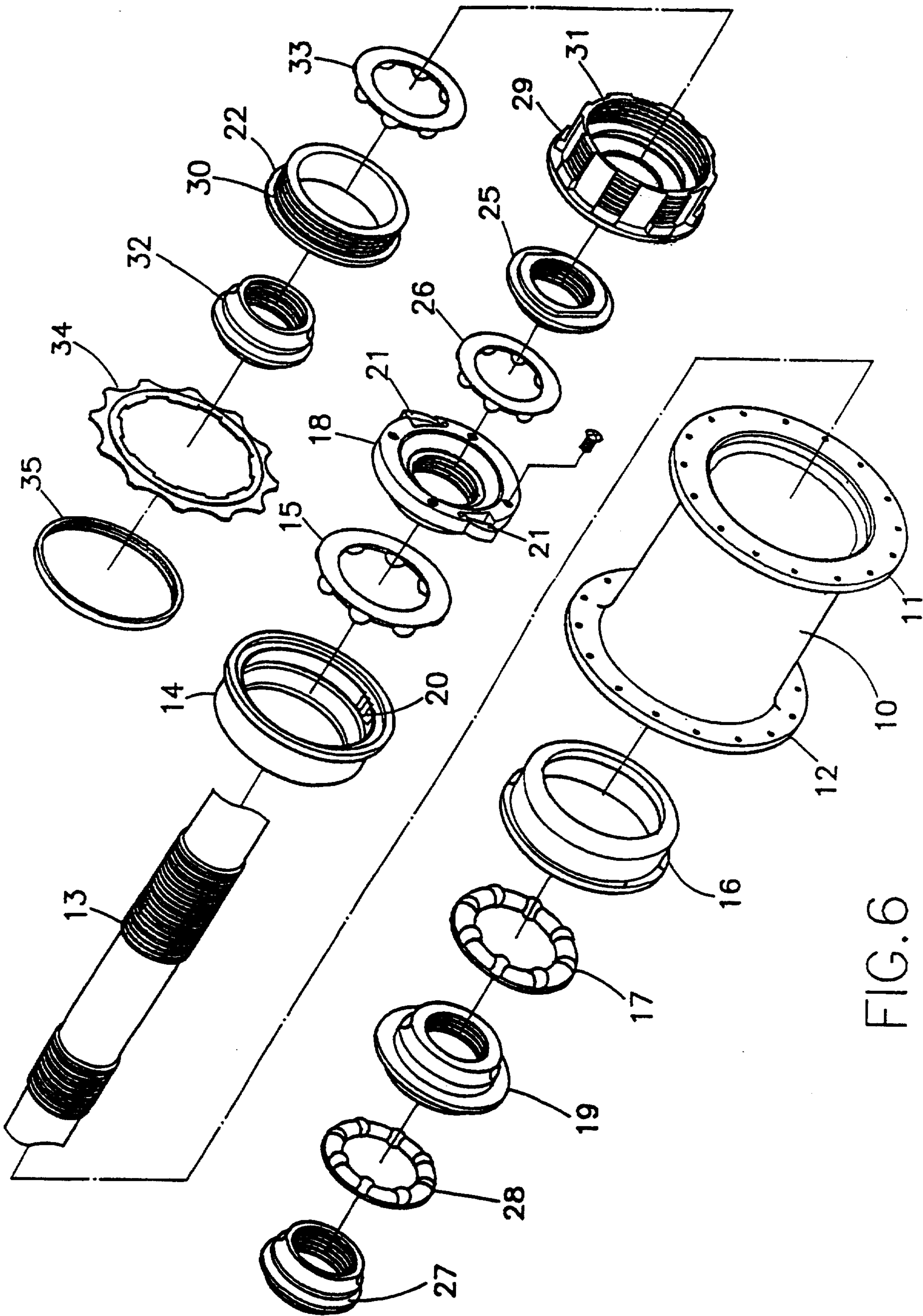


FIG.6