(12) **Oversettelse av europeisk patentskrift**

(11) **NO/EP 3450200 B1**

(19) NO

NORGE

(51) Int Cl.

B60B 27/00 (2006.01)
B60B 27/02 (2006.01)
B60B 27/04 (2006.01)
B60B 1/00 (2006.01)

Patentstyret

(45)	Oversettelse publisert	2022.10.24
(80)	Dato for Den Europeiske Patentmyndighets publisering av det meddelte patentet	2022.06.29
(86)	Europeisk søknadsnr	17188394.5
(86)	Europeisk innleveringsdag	2017.08.29
(87)	Den europeiske søknadens Publiseringsdato	2019.03.06
(84)	Utpekte stater	AL ; AT ; BE ; BG ; CH ; CY ; CZ ; DE ; DK ; EE ; ES ; FI ; FR ; GB ; GR ; HR ; HU ; IE ; IS ; IT ; LI ; LT ; LU ; LV ; MC ; MK ; MT ; NL ; NO ; PL ; PT ; RO ; RS ; SE ; SI ; SK ; SM ; TR
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(54) Benevnelse **WHEEL HUB TRANSMISSION UNIT FOR A WHEEL HUB OF A VEHICLE, WHEEL HUB AND VEHICLE WITH AUXILIARY DRIVE**

(56) Anførte publikasjoner

DE-A1-102012 016 898
DE-A1-102012 016 903
EP-A1- 2 799 327
DE-A1-102012 016 900

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Wheel hub transmission unit for a wheel hub of a vehicle, wheel hub and auxiliary driven vehicle

The invention relates to a wheel hub transmission unit for a wheel hub of a vehicle, the wheel hub with the wheel hub transmission unit and an auxiliary driven vehicle with the wheel hub. A corresponding wheel hub transmission unit is known, for example, from document DE 10 2012 016898 A1.

Due to an increasingly improved infrastructure for cyclists in cities and rural areas, a rising environmental awareness and/or a rising health awareness, the number of cyclists is continuously increasing. A bicycle with an electric auxiliary motor, an electric bicycle, is of particular interest for the realization of desired time advantages or for the achievement of sporting goals. In the electric bicycle, an electric motor generates a torque that moves the bicycle either in addition to a torque generated by muscle power or on its own. In addition to the conventional drive components, such as a crank, a chainring mounted on the crank, a sprocket mounted rigidly on the rear wheel in driving direction, and a chain that transmits the torque from the chainring to the sprocket, the electric bicycle also has an electric motor, accumulator cells, which power the electric motor with energy and a sensor system for determining the required torque provided by the electric motor.

It is known for the determination of the required additional torque to use a torque measuring device on the hub of the rear wheel. The torque measuring device has a measuring sleeve which is made of non-magnetic material and is provided with a corresponding magnetization pattern which changes under the influence of the torque on the measuring sleeve.

This change can be detected by means of an electrically operated pair of coils, which allows conclusions about the required torque. For accurate measurement, the pair of coils must be arranged immediately adjacent to the measuring sleeve, which causes positioning conflicts with other components of the hub, such as a support for the sprocket, the sprocket hub support. In addition, the longest possible measuring distance shall be provided for sufficiently accurate measurement of the torque. This is usually not possible without restrictions due to the bearings required for radial and/or axial support of components. In addition, the measuring range must be cleared of impurities to ensure high detection accuracy for a long time.

It is an object of the invention to provide a wheel hub transmission unit for a wheel hub of a vehicle, a wheel hub having the wheel hub transmission unit, and an auxiliary driven vehicle with the wheel hub, wherein the wheel hub transmission unit is designed to be simple, compact and robust, and a torque can be detected accurately.

The task is solved with the features of patent claims 1, 11 and 13. Preferred embodiments thereof are given in the further patent claims.

The wheel hub transmission unit according to the invention has the features of independent claim 1.

The interior space has a larger axial extension compared to the sprocket hub support. A transmission sleeve mounted inside the interior space can have a greater axial extension than in conventional wheel hub transmission units in which, for example, the transmission sleeve is arranged inside the sprocket support. At the transmission sleeve of the invention with the large axial extension, the torque can advantageously be detected precisely. This means that the torque can be detected particularly accurately at the transmission sleeve, which is arranged in the interior space.

In addition, since the transmission sleeve is arranged inside the interior space, the hub body forms a housing for the transmission sleeve. The transmission sleeve can thus be advantageously protected from exterior impacts, e.g. dirt particles. The housing forms a barrier radially outward that cannot be penetrated by dirt particles. In addition, sealing elements can very easily be arranged at the respective long ends of the hub body to protect the transmission sleeve from axial penetration by dirt particles. If, for example, the sprocket hub support is exchanged, the interior space in which the transmission sleeve is arranged is also protected during exchange. In the case of a conventional transmission sleeve, which is arranged radially inside the sprocket hub support, the transmission sleeve can hardly be protected against exterior impacts during replacement. Since the transmission sleeve is advantageously protected in all operating phases of the wheel hub transmission unit, the transmission sleeve is robust and additionally exhibits a long service life.

The transmission sleeve is torsionally rigidly connected to the hub body, which is why the transmission sleeve rotates at the same speed as the hub body during operation of the wheel hub. For the detection of operating speed, knowledge of the rotational speed is indispensable. Usually, the speed is measured at a position other than the torque of rotation is measured, e.g., when the transmission sleeve is not rigidly connected to the hub body by means of a free wheel. Due to the design according to the invention, the transmission sleeve is torsionally rigidly connected to the hub body, so that the measuring unit detects both the torque and the speed and optionally outputs only one transmission line. In this way, fewer and/or shorter transmission lines are required and, in addition, the speed measurement is protected from more severe influences, since it can also be arranged inside the interior space. The wheel hub transmission unit is thus advantageously compact and simple in design.

The fact that the transmission sleeve is arranged axially next to the sprocket hub support means that the space radially inside the sprocket hub support is free of the transmission sleeve and the measuring unit. If, for example, a sprocket hub support with a smaller diameter is installed, this can be achieved with relatively minor design changes. The transmission sleeve and the measuring unit are hardly affected by the design changes. 15 are hardly affected by the design changes. If the transmission sleeve and the measuring unit were arranged, as is usually the case, for example inside the sprocket support, the entire wheel hub transmission unit had to be redesigned. As a result, the wheel hub transmission unit has an additional advantage of simple design.

The output clutch is preferably fixed in the area of a longitudinal end of the hub body that faces away from the sprocket hub support, for coupling the hub body to the transmission sleeve. Herein, the area of the longitudinal end of the hub body in the axial direction towards the sprocket hub support is separated from an imaginary plane perpendicular to the measuring zone, which rests at the longitudinal end of the measuring range, facing away from the sprocket hub support.

The measuring zone is formed by the magnetically encoded material and extends cylindrically and concentrically to the rotational axis. The output clutch is arranged on that area of the hub body which is axially further away from the sprocket hub support than the measuring zone. As a result, the drive clutch is advantageously fixed on the hub body in that area which is axially further away from the sprocket hub support than the measuring zone, which is why the wheel hub transmission unit has a robust and simple design.

For example, an output clutch can be installed that has a relatively long axial extent, with one longitudinal end of the output clutch being arranged in the area of the longitudinal end of the hub body and the other longitudinal end of the output clutch being arranged on the transmission sleeve. It is thus possible to install different output clutches with different axial extensions.

The output clutch is preferably fixed in the area of a longitudinal end of the transmission sleeve that faces away from the sprocket hub support for coupling the hub body to the transmission sleeve, with the area of the longitudinal end of the transmission sleeve extending in the axial direction towards the sprocket hub support up to the measuring zone.

Due to the fact that the area of the longitudinal end of the transmission sleeve is limited by the measuring zone in the axial direction to the sprocket hub support, the output clutch on the transmission sleeve can only be arranged in that area which is axially further away from the sprocket hub support than the entire measuring zone. As a result, the wheel hub transmission unit has a particularly simple axial design.

The transmission sleeve preferably spans a distance that extends at least from a first linkage plane provided for spokes on one of the longitudinal ends of the hub body to a second linkage plane provided for spokes on the other of the longitudinal ends of the hub body.

The linkage plane provided for spokes is that plane which is arranged perpendicularly to the axial extension of the hub body and intersects a number of linkage points for the spokes in the circumferential direction of the hub body. The hub body usually has two of these planes, each at one of the longitudinal ends. However, it is also conceivable for the hub body to have a plurality of such planes on at least one of the longitudinal ends. This occurs in particular when the spokes are mounted at least partially next to one another on one of the longitudinal ends of the hub body. The linkage points for spokes are, for example, openings or bores on the hub body to which the spokes can be hung.

If one of the longitudinal ends of the hub body has several of these linkage planes, the transmission sleeve preferably spans the distance from a linkage plane arranged centrally between the linkage planes at one longitudinal end of the hub body to a second linkage plane arranged centrally between the linkage planes at the other longitudinal end of the hub body. Another distance, for example between the two outermost or innermost planes, can also be bridged.

Due to the fact that the transmission sleeve spans these distances, it has a particularly large axial extent, as a result of which the axial extent of the measuring zone is also advantageously large. Due to the fact that the axial extent of the measuring zone is advantageously large, it is possible to improve the detection accuracy of the wheel hub transmission unit.

The transmission sleeve is preferably set up such that the axial component of the flux of force points in the same direction along the entire transmission sleeve. The flux of force describes a path of a force and/or a torque in a component from a point of application, a point of initiation, to a point at which the force and/or the torque are absorbed by a reaction force and/or a reaction torque. The axial component of the flux of force describes the component that acts in the orientation of the rotational axis. For example, the sign of the axial component of the flux of force along the entire transmission sleeve is a plus. If the axial component is equal to zero in some areas, this does not correspond to a change in sign.

Since the sign of the axial component of the flux of force remains unchanged along the entire transmission sleeve, the axial orientation of the flux of force does not change along the entire transmission sleeve. However, it is possible, for example, that the radial orientation of the flux of force changes along the transmission sleeve. As a result, the transfer sleeve has a shape that is elongated in only one direction. This can be, for example, a cylindrical shape, a conical shape or a cantilever shape, although meandering shapes and the like would be excluded. Due to the fact that the axial direction of the flux of force does not change, the torque detection is not influenced by changes in direction and the torque can be detected in a particularly advantageous manner. In addition, the transfer sleeve has a simple shape.

The measuring zone is preferably arranged in an area of the interior that is delimited in the axial direction by two imaginary linkage planes, with the first of these linkage planes intersecting the linkage points provided for the spokes at one longitudinal end of the hub body and the second of these linkage planes at the other longitudinal end of the hub body intersects the linkage points provided for the spokes. Due to the fact that the measuring zone is arranged within these two imaginary linkage planes, it has a particularly large axial extension, as a result of which the torque can be detected particularly precisely. In addition, the measuring zone is easily protected against external influences, such as dirt particles, since it is arranged axially relatively centrally within the interior.

The sprocket hub support and the transmission sleeve are preferably arranged at a distance from one another and the drive clutch spans this distance. The distance between the sprocket hub support and the transmission sleeve can be an axial distance or an axial distance and a radial distance, as a result of which the drive clutch spans the radial distance and/or the axial distance.

According to the invention, the drive clutch is a free wheel. The free wheel is a clutch that only has a locking effect in one of the possible directions of rotation. When the speed of the transmission sleeve becomes greater than the speed of the sprocket hub support, a connection between the two components is automatically released, whereby the transmission sleeve continues to rotate freely, even if the sprocket hub support rotates more slowly or not at all.

According to the invention, the drive clutch has a first freewheeling component, which is connected in a torsionally rigid manner to the sprocket hub support, and a second freewheeling component, which is connected in a torsionally rigid manner to the transmission sleeve, the first freewheeling component being arranged axially next to the second freewheeling component. Due to the fact that the first freewheeling component is connected to the sprocket hub support in a torsionally rigid manner and the second freewheeling component is connected to the transmission sleeve in a torsionally rigid manner, the automatically releasing connection can be implemented relatively easily by means of the freewheeling components.

The first freewheeling component and the second freewheeling component of the wheel hub transmission unit are particularly preferably axially displaceable. Because the first freewheeling component is axially displaceable in particular relative to the sprocket hub support and the second freewheeling component is displaceable in particular relative to the transmission sleeve, the automatically releasing connection can be established by means of the axial movement of the freewheeling components relative to one another.

The first freewheeling component and the second freewheeling component are preferably set up to interact in such a way that essentially the entire torque can be transmitted from the sprocket hub support to the transmission sleeve in only one of the directions of rotation of the sprocket hub support. The freewheeling components can, for example, be provided with at least one tooth that has a very steep flank and a very flat flank. If the first freewheeling component rotates in one of the directions of rotation, a self-locking form-fitting connection is formed between the two components by means of the meshing teeth, as a result of which the torque can be transmitted. If the first freewheeling components rotates in the other direction of rotation, no self-locking form-fitting connection can form between the two components, since the teeth slide past one another, as a result of which no torque can be transmitted. A spring can press the freewheeling components together again and again, for example. Other configurations, such as using multiple teeth, balls or other wedge elements, are also conceivable.

The transmission sleeve is preferably cantilevered. Because the transmission sleeve is overhung, the measuring unit can be positioned relatively freely and its wiring is simplified.

According to the invention, the wheel hub has the wheel hub transmission unit and at least one of the sprockets, which is mounted in a torsionally rigid manner on the sprocket hub support, with the hub body being coupled to the sprocket in a torsionally rigid manner by means of the drive clutch in order to transmit the torque in only one direction of rotation. The sprocket can be form-fittingly connected to the sprocket hub support, for example by means of a splined connection. For example, several sprockets can also be arranged on the sprocket hub support.

According to the invention, an auxiliary driven vehicle has the wheel hub, a drive assembly with a control device for metered auxiliary driving of the wheel hub and the measuring unit housed in the interior for tapping the measuring range of the transmission sleeve, with which the control device can be controlled in such a way that the drive torque of the drive assembly is matched to the torque transmitted by the wheel hub transmission unit. The control device controls the drive torque of the drive unit on the basis of the detected torque and/or the detected speed. The drive unit can be arranged, for example, on the hub of the rear wheel of the vehicle, on the hub of the front wheel or on the pedal crank.

The auxiliary vehicle is preferably an electric bicycle. An electric bicycle can also be a pedelec, for example. The pedelec is a version of the electric bicycle in which the electric motor delivers torque when a rider pedals at the same time.

For example, the sprocket hub support is made from an aluminum alloy and the transmission sleeve is made from high-strength non-magnetic steel.

A preferred embodiment of the invention is explained below with reference to the accompanying drawings.

FIG. 1 shows a perspective representation of an embodiment of the wheel hub according to the invention.

FIG. 2 shows an illustration of a longitudinal section of the embodiment from FIG 1.

As can be seen from the figures, a wheel hub 1 has a rotational axis 2, a wheel hub transmission unit 6, a wheel axis 36 and a hub body 3. The hub body 3 and the wheel axis 36 are arranged concentrically around the rotational axis 2. A first wheel hub bearing 4 and a transmission sleeve bearing

12 are arranged on the wheel axis 36 and, together with a second wheel hub bearing 5, support the hub body 3.

The wheel hub transmission unit 6 has a sprocket hub support 7, a drive clutch 26, a transmission sleeve 13 which is arranged within an interior space 31 which is formed by the hub body 3, and an output clutch 14. The transmission sleeve 13 is overhung by means of the transmission sleeve bearing 12 and the second wheel hub bearing 5. The transmission sleeve 13 is coupled to the hub body 3 in a torsionally rigid manner via the output clutch 14. This coupling can be produced, for example, by means of a form-fitting connection 29. The transmission sleeve 13 is also coupled to the sprocket hub support 7 in a torsionally rigid manner at least in one direction of rotation by means of the drive clutch 26. For this purpose, the drive clutch 26 has a first freewheeling component 10 and a second freewheeling component 11. The first freewheeling component 10 is coupled to the sprocket hub support 7 in a torsionally rigid and axially displaceable manner via a first form-fitting connection 27 and the second freewheeling component 11 is coupled to the transmission sleeve 13 in a torsionally rigid and axially displaceable manner via a second form-fitting connection 28. In addition, the drive clutch 26 has a first spring component 24 and a second spring component 25. These two spring components 24, 25 are arranged on the drive clutch 26 in such a way that they press the first freewheeling component 10 and the second freewheeling component 11 against one another. In the present exemplary embodiment, the freewheeling components 10, 11 have a plurality of teeth which have a very steep flank and a very flat flank. Due to the arrangement of the flanks, the teeth only wedge in one direction of rotation, in the other direction of rotation they slide past one another. The freewheeling components 10, 11 are designed as a ring, for example, and have a sawtooth profile at one longitudinal end.

A first sprocket support bearing 8 and a second sprocket support bearing 9 are additionally arranged on the wheel axis 36. The sprocket hub support 7 is mounted axially and radially by means of these bearings 8, 9. The required distance between the first sprocket support bearing 8 and the second sprocket support bearing 9 can be maintained by means of a first spacer sleeve 16. In addition, an axial position of the bearings 8, 9 can be adjusted via a first axis component 17. The required distance between the second sprocket support bearing 9 and the transmission sleeve bearing 12 can be adjusted with a second spacer sleeve 22. At its opposite end, the wheel axis 36 also has a further axis component 20 with which the axial position of the first wheel hub bearing 4 can be adjusted. The axis component 20 also has a through opening 23. A centering pin 21 is provided for centering the axis component 20 with the wheel axis 36. For example, cables can be routed through the through opening 23 into the interior space 31. Wiring is not shown in the present embodiment. In addition, a measuring unit 15 is arranged in the immediate vicinity of the transmission sleeve 13 in the interior space 31. The measuring unit 15 detects a measuring signal in a measuring zone 30 of the transmission sleeve 13. With this measuring signal, a torque applied to the transmission sleeve 13 and/or a prevailing speed can be inferred.

A plane 32 borders on a longitudinal end of the measuring zone 30 which faces away from the sprocket hub support 7. The plane 32 is also arranged perpendicularly to the rotational axis 2. Two further planes, a first linkage plane 33 and a second linkage plane 34, are additionally shown in the figures. The first linkage plane 33 is arranged on that longitudinal end of the hub body 3 that faces the sprocket hub support 7 and the second linkage plane 34 is arranged on that longitudinal end of the hub body 3 that faces away from the sprocket hub support 7. In addition, the linkage planes 33, 34 are arranged perpendicularly to the rotational axis 2 and centrally between linkage points 35 for spokes on one of the longitudinal ends of the hub body 3.

In the present embodiment, a first sealing element 18 and a second sealing element 19 are provided to seal off the interior space 31 from external influences, such as dirt particles. The first sealing element 18 seals between the hub body 3 and the transmission sleeve 13 and the second sealing element 19 seals between the transmission sleeve 13 and the sprocket hub support 7.

To drive the hub body 3, the torque acts on a sprocket (not shown), which is mounted in a torsionally rigid manner on the sprocket hub support 7, and is oriented in accordance with a direction of rotation of the drive. The first freewheeling component 10 and the second freewheeling component 11 of the drive clutch 26 form a form-fitting connection, as a result of which the torque is transmitted from the sprocket to the transmission sleeve 13 via the sprocket hub support 7 and the drive clutch 26. Due to the fact that the transmission sleeve 13 is coupled to the hub body 3 in a torsionally rigid manner via the output clutch 14, the measuring zone 30 of the transmission sleeve 13 is twisted. A magnetization pattern arranged on the measuring zone 30 changes depending on the strength of the torsion. This change is detected by the measuring unit 15 and guided to the outside along the passage opening 23 with the aid of the wiring. The detected signals can also be transmitted wirelessly, for example.

Reference List

1. wheel hub
2. rotational axis
3. hub body
4. first wheel hub bearing
5. second wheel hub bearing
6. wheel hub transmission unit
7. sprocket hub support
8. first sprocket support bearing
9. second sprocket support bearing
10. first freewheel component
11. second freewheel component
12. transmission sleeve bearing
13. transmission sleeve
14. output clutch
15. measuring unit
16. first spacer sleeve
17. first axis component
18. first sealing element
19. second sealing element
20. second axis component
21. centering pin
22. second spacer sleeve
23. through opening
24. first spring component
25. second spring component
26. drive clutch
27. first form-fitting connection
28. second form-fitting connection
29. third form-fitting connection
30. measuring zone
31. interior space

32. plane
33. first linkage plane
34. second linkage plane
35. linkage points
36. wheel axis

Patentkrav

1. Hjulnavtransmisjonsenhet (6) for et hjulnav (1) til et kjøretøy, med en rotasjonsakse (2), en pinjongnavholder (7) anordnet konsentrisk til rotasjonsaksen (2) på hvilken minst én pinjong kan monteres rotasjonsstivt for å drive hjulnavet (1), et navlegeme (3) som er anordnet aksialt ved siden av pinjongnavholderen (7) og har et indre rom (31) anordnet konsentrisk rundt rotasjonsaksen (2), en transmisjonshylse (13) som er anordnet konsentrisk rundt rotasjonsaksen (2) inne i det indre rommet (31) og har et magnetisk kodet materiale som danner et måleområde (30) til transmisjonshylsen (13), og en drivkopling (26) med hvilken pinjongnavholderen (7) er koblet med sin langsgående ende vendt mot navlegemet, (3) og transmisjonshylsen (13) med sin langsgående ende vendt mot pinjongnavholderen (7), samt en utgangskopling (14), med hvilken transmisjonshylsen (13) er koblet til navlegemet (3) med sin andre langsgående ende, slik at et dreiemoment kan overføres fra pinjongnavholderen (7) til navlegemet (3) via drivkoplingen (26), utgangskoplingen (14) og transmisjonshylsen (13), hvor en måleenhet (15) er anordnet i det indre rommet 31, som er innrettet for å detektere et målesignal på transmisjonshylsens (13) måleområde (30), slik at dreiemomentet i det indre rommet (31) kan detekteres med transmisjonshylsens (13) måleområde (30) ved hjelp av det magnetisk kodede materialets magnetiske egenskaper som endrer seg under påvirkning av dreiemomentet, ved at det med målesignalet dras konklusjoner om dreiemomentet som virker på transmisjonshylsen (13), hvor drivkoplingen (26) er et frihjul og drivkoplingen (26) har en første frihjulskomponent (10) som er rotasjonsstivt forbundet med pinjongnavholderen (7), og en andre frihjulskomponent (11) som er rotasjonsstivt forbundet med transmisjonshylsen (13), **karakterisert ved at** den første frihjulskomponenten (10) er anordnet aksialt ved siden av den andre frihjulskomponenten (11).

2. Hjulnavtransmisjonsenhet (6) ifølge krav 1, hvor utgangskoplingen (14) er festet til området til en langsgående ende på navlegemet (3) som vender bort fra pinjongnavholderen, for å koble navlegemet (3) til transmisjonshylsen (13), hvor området til navlegemets (3) langsgående ende er begrenset i aksial retning mot pinjongnavholderen (7) fra et tenkt plan (32) som står vinkelrett på måleområdet (30) og krysser måleområdets (30) langsgående ende som vender bort fra pinjongnavholderen (7).

3. Hjulnavtransmisjonsenhet (6) ifølge krav 1 eller 2, hvor utgangskoplingen (14) er festet til området til en langsgående ende på transmisjonshylsen (13) som vender bort fra pinjongnavholderen (7), for å koble navlegemet (3) til transmisjonshylsen (13), hvor området til transmisjonshylsens (13) langsgående ende strekker seg i aksial retning mot pinjongnavholderen (7) frem til måleområdet (30).

4. Hjulnavtransmisjonsenhet (6) ifølge et av kravene 1 til 3, hvor transmisjonshylsen (13) spenner opp en avstand som rekker minst fra et første tilkoplingsplan (33) tilveiebrakt for eiker på en av navlegemets (3) langsgående ender frem til et andre tilkoplingsplan (34) tilveiebrakt for eiker på den andre av navlegemets (3) langsgående ender.

5. Hjulnavtransmisjonsenhet (6) ifølge et av kravene 1 til 4, hvor transmisjonshylsen (13) er innrettet slik at den aksiale komponenten av kraftstrømmen er i samme retning langs hele transmisjonshylsen (13).

6. Hjulnavtransmisjonsenhet (6) ifølge et av kravene 1 til 5, hvor måleområdet (30) er anordnet i et område til det indre rommet (31) som er begrenset i aksial retning av to tenkte plan, hvor det første av disse planene krysser tilkoplingssteder tilveiebrakt for eiker på den ene langsgående enden på navlegemet (3), og det andre av disse planene krysser tilkoplingssteder tilveiebrakt for eiker på den andre langsgående enden på navlegemet (3).

7. Hjulnavtransmisjonsenhet (6) ifølge et av kravene 1 til 6, hvor pinjongnavholderen (7) og transmisjonshylsen (13) er anordnet i avstand til hverandre og drivkoplingen (26) spenner opp denne avstanden.

8. Hjulnavtransmisjonsenhet (6) ifølge et av kravene 1 til 7, hvor den første frihjulskomponenten (10) og den andre frihjulskomponenten (11) til hjulnavtransmisjonsenheten (6) er aksialt forskyvbare.

9. Hjulnavtransmisjonsenhet (6) ifølge et av kravene 1 til 8, hvor den første frihjulskomponenten (10) og den andre frihjulskomponenten (11) er innrettet for å samhandle på en slik måte at i det vesentlige hele dreiemomentet kan overføres fra pinjongnavholderen (7) til transmisjonshylsen (13) i bare én rotasjonsretning av transmisjonshylsen (7).

10. Hjulnavtransmisjonsenhet (6) ifølge et av kravene 1 til 9, hvor transmisjonshylsen (13) er lagret slik at den henger over.

11. Hjulnav (1) med en hjulnavtransmisjonsenhet (6) ifølge et av kravene 1 til 10 og minst én pinjong som er rotasjonsstivt montert på pinjongnavholderen (7), hvor for å overføre dreiemomentet i kun én rotasjonsretning fra pinjongen til navlegemet (3), er dette rotasjonsstivt koblet med pinjongen ved hjelp av drivkoplingen (26).

12. Kjøretøy med hjelpedriv og et hjulnav (1) ifølge krav 11, et drivaggregat med en styringsinnretning for dosert hjelpedriv av hjulnavet (1) og en måleenhet (15) plassert i det indre rommet (31) for å bestemme transmisjonshylsens (13) måleområde (30), med hvilken måleenhet styringsinnretningen kan styres på en slik måte at drivaggregatets dreiemoment er avstemt til dreiemomentet overført av hjulnavtransmisjonsenheten (6).

13. Kjøretøy med hjelpedriv ifølge krav 12, hvor kjøretøyet med hjelpedriv er et elektrisk kjøretøy.

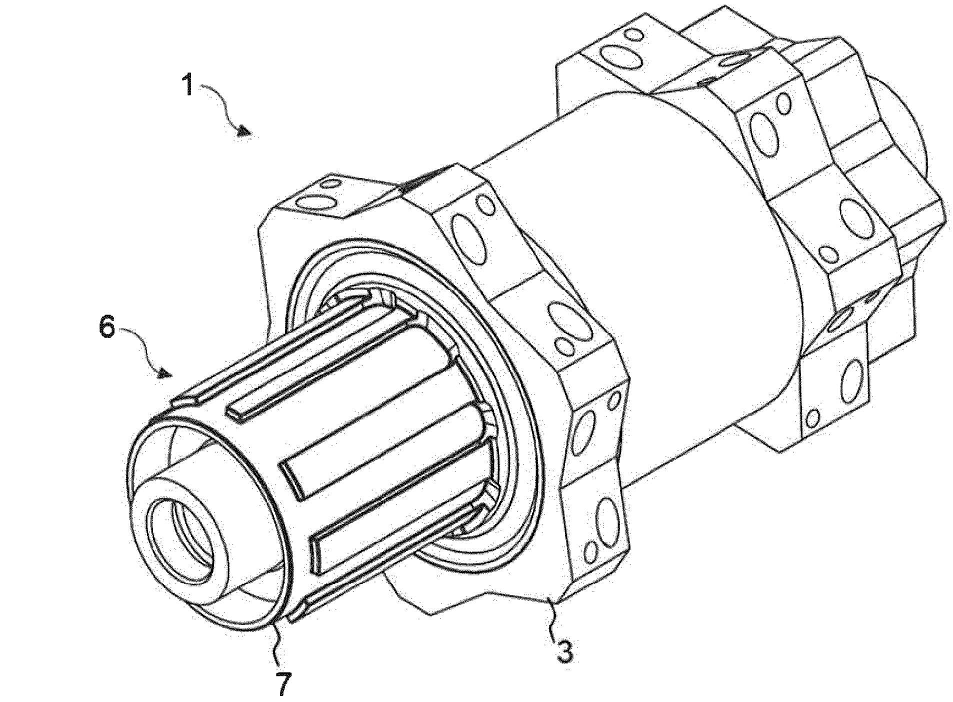
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Fig. 1

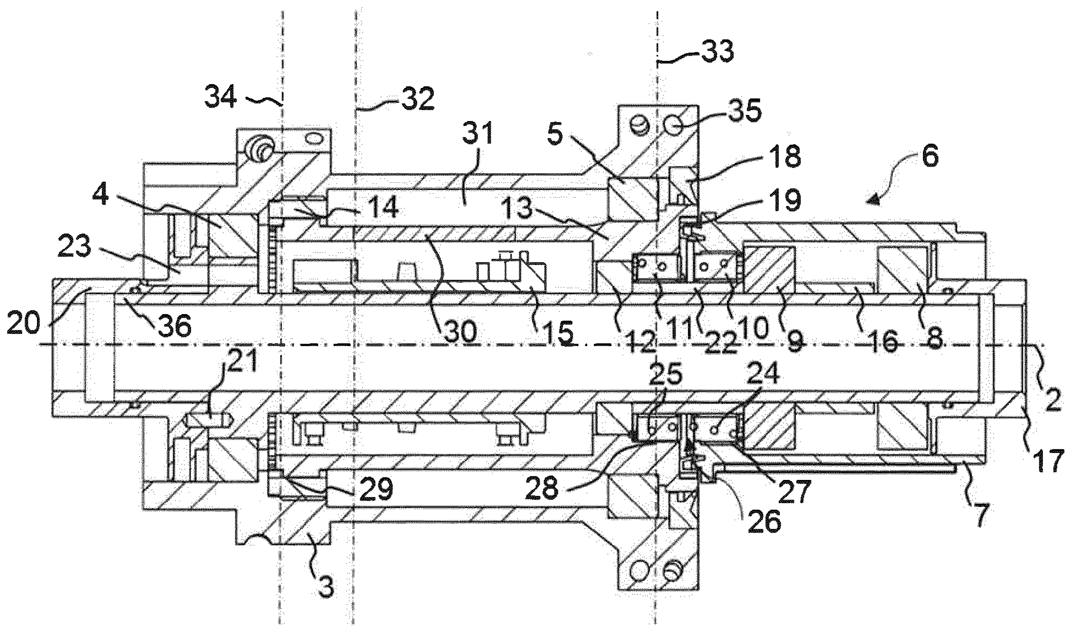
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Fig. 2