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Gerlach

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(54) **METHOD FOR THE ASSEMBLY OF OR FOR PREPARING TO ASSEMBLE A TRACTION DRIVE MODULE AND A TRACTION DRIVE MODULE**

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(51) **Int. Cl.**

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F16H 57/00	(2012.01)
F02B 67/04	(2006.01)
F02B 67/06	(2006.01)

(52) **U.S. Cl.**

CPC ***F16H 57/0031*** (2013.01); ***F02B 67/04*** (2013.01); ***F02B 67/06*** (2013.01); *F16H 57/02004* (2013.01); *F16H 2057/0056* (2013.01); *F16H 2057/02043* (2013.01)

(58) **Field of Classification Search**

CPC F16H 7/08; F16H 2057/0056; F16H 57/0031; F02B 67/06; F02B 67/04

See application file for complete search history.

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(57) **ABSTRACT**

The present invention relates to a method for the assembly of or for preparing to assemble a traction drive module (**10**) in a drivetrain (**2**) with the method steps: providing a traction drive module (**10**) having a transmission housing (**18**) in which are arranged a first gear wheel (**40**) rotatably mounted on the transmission housing (**18**), a second gear wheel (**48**) arranged at a center-to-center distance (**58**) to the first gear wheel (**40**), and a traction means (**46**) via which the first and second gear wheel (**40**, **48**) are in rotary driving connection with one another; attaching an assembly aid (**16**) acting between the second gear wheel (**48**) and the transmission housing (**18**) and detachable from the traction drive module (**10**); and changing the center-to-center distance (**58**) by moving the second gear wheel (**48**) relative to the transmission housing (**18**) while adjusting a predetermined tension of the traction means (**46**) by means of the detachable assembly aid (**16**). In addition, the present invention relates to a traction drive module (**10**).

16 Claims, 7 Drawing Sheets

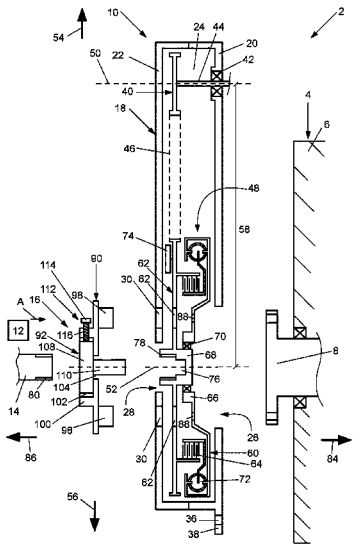

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Fig. 1

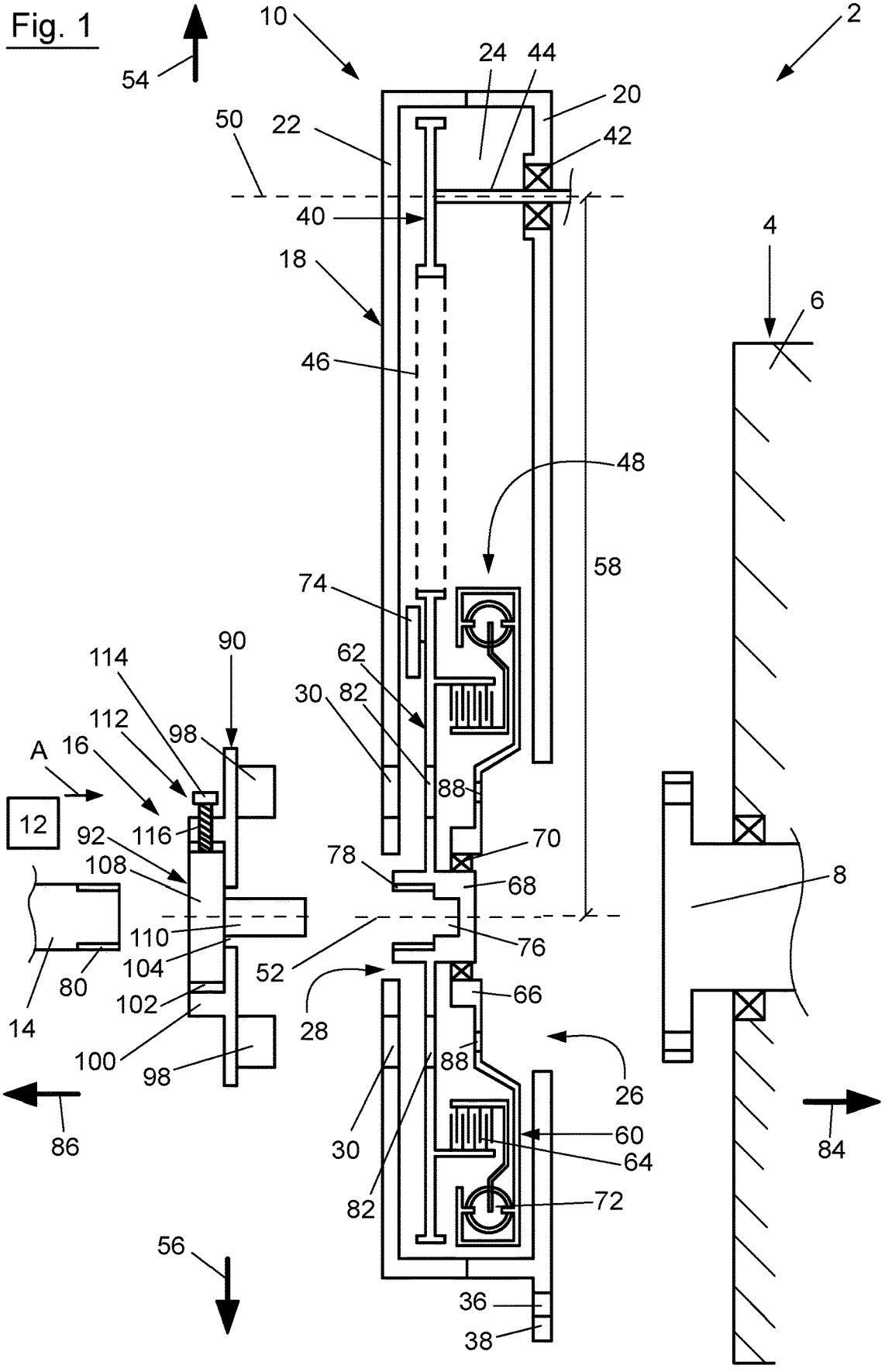
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Fig. 2

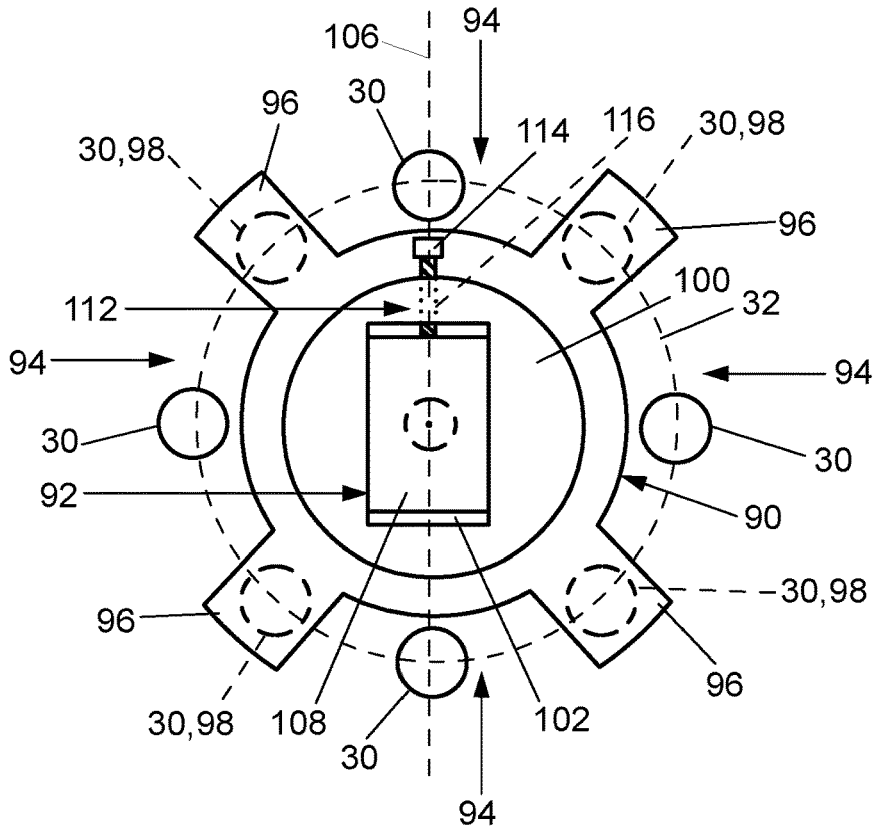
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Fig. 3

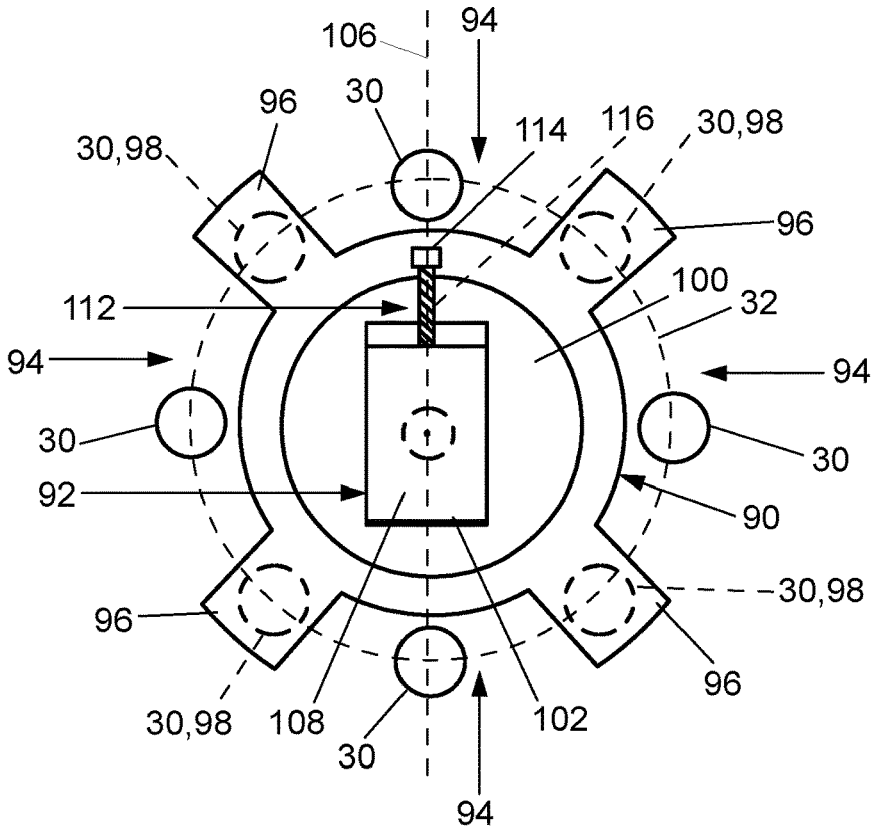
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Fig. 4

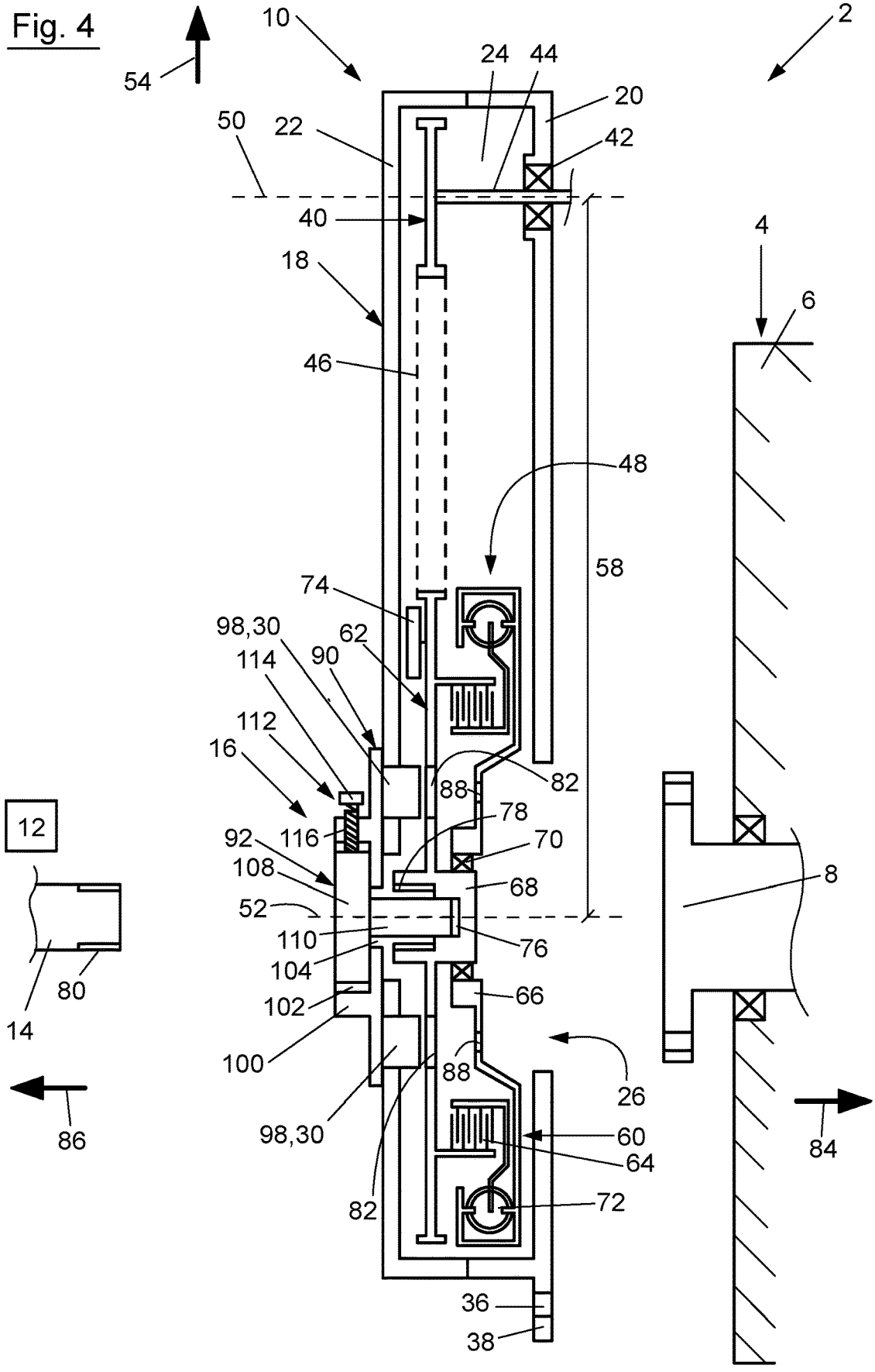
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Fig. 5

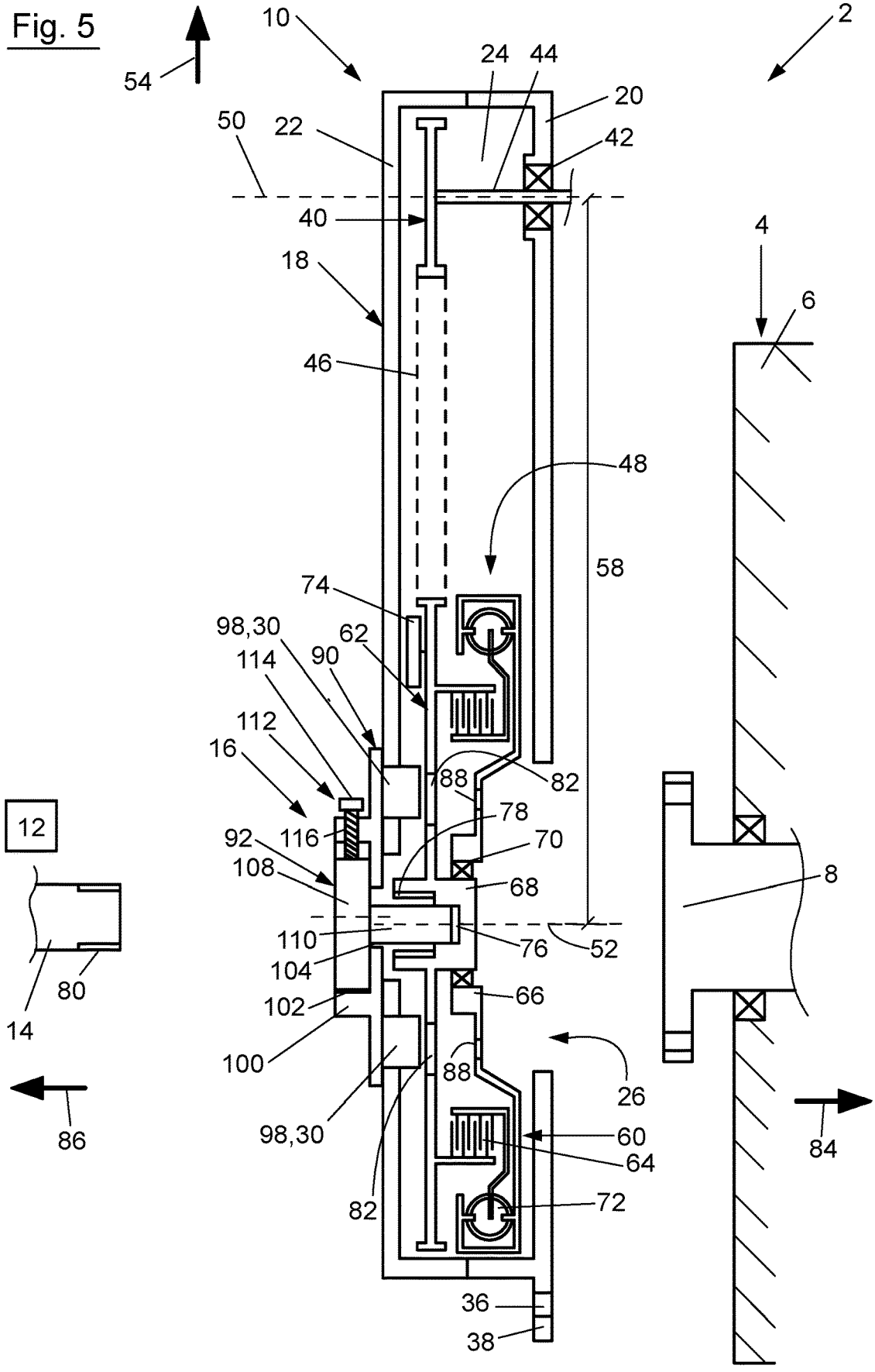
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Fig. 6

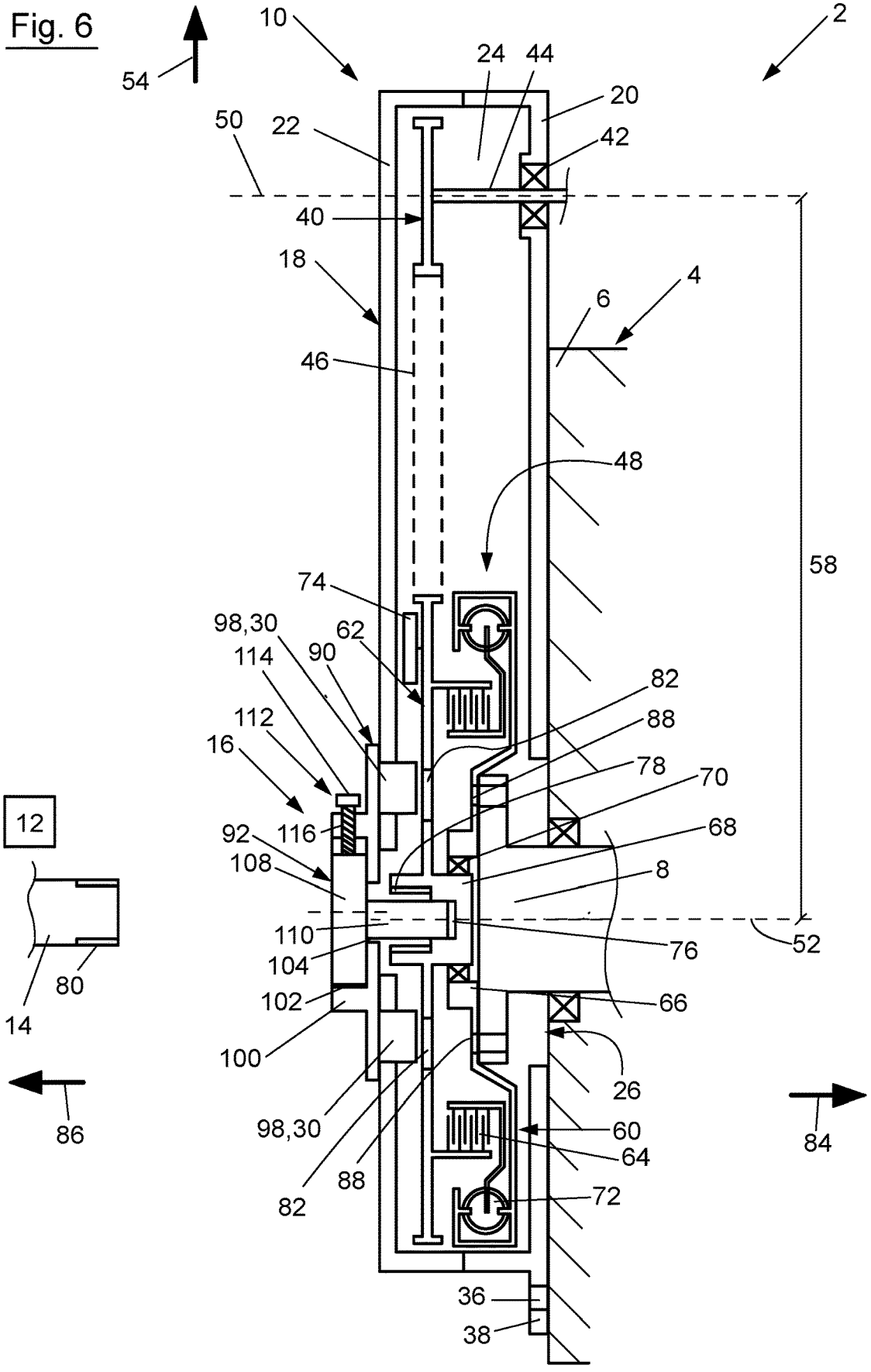
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Fig. 7

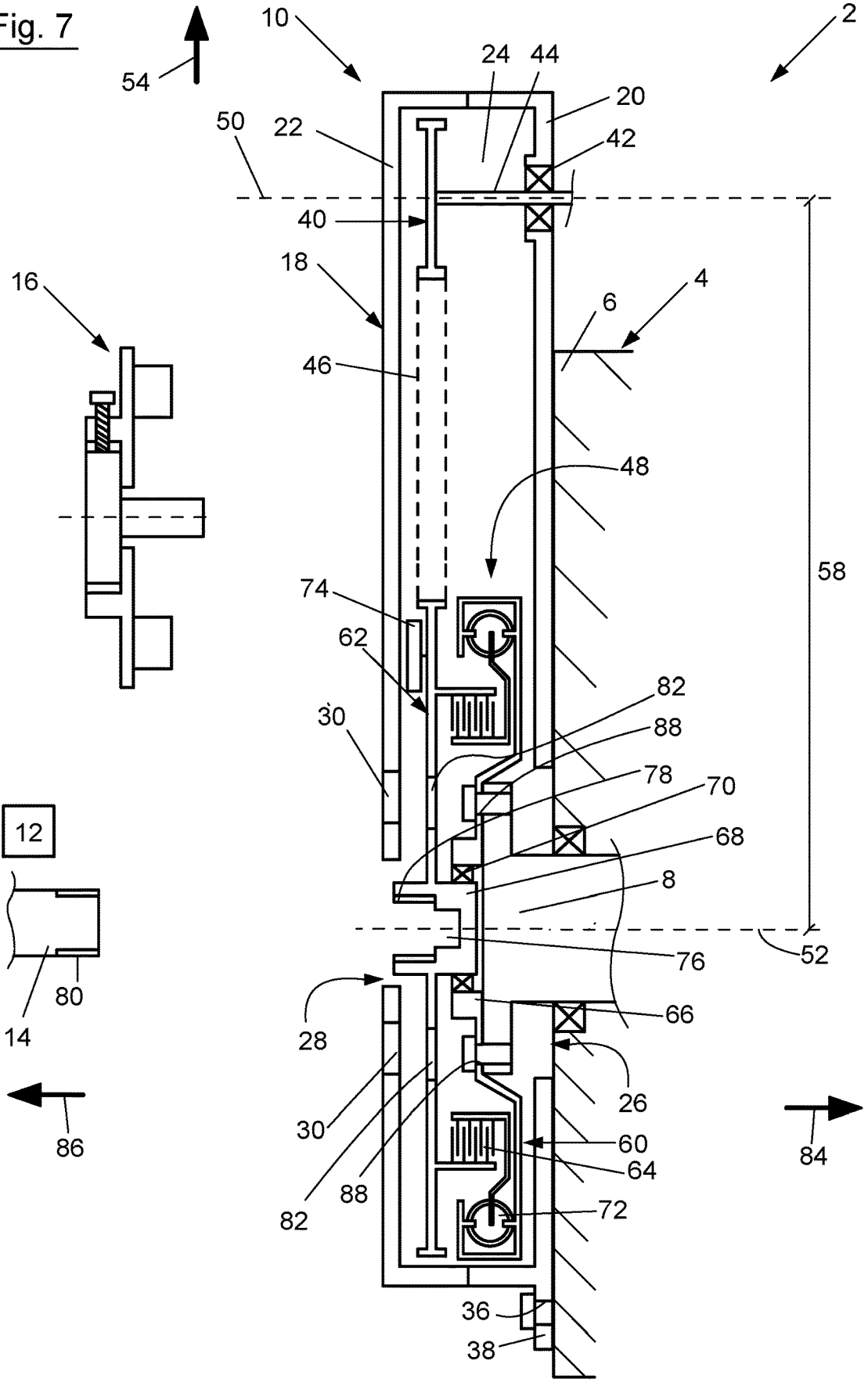
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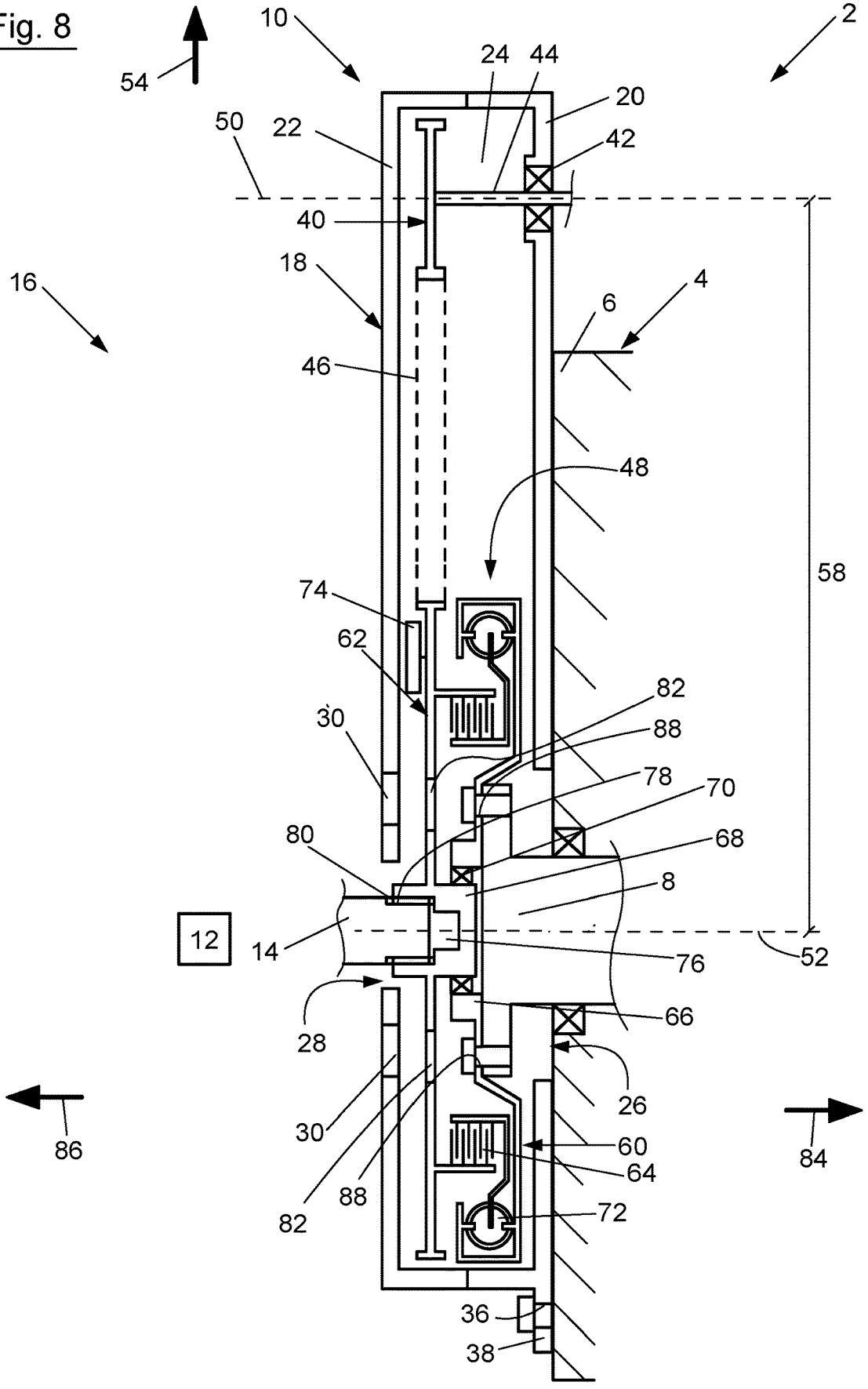
Fig. 8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METHOD FOR THE ASSEMBLY OF OR FOR PREPARING TO ASSEMBLE A TRACTION DRIVE MODULE AND A TRACTION DRIVE MODULE

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of German Patent Application No. 102018001400.3 filed Feb. 22, 2018 the disclosure of which is herein incorporated by reference in its entirety

DESCRIPTION

The present invention relates to a method for the assembly of or for preparing to assemble a traction drive module in a drivetrain and a traction drive module suitable for this purpose.

An arrangement for a drive connection of a starter generator to an internal combustion engine crankshaft is known from DE 10 2008 037 057 A1, wherein a traction drive in the form of a chain drive is disclosed. The known traction drive is composed essentially of a first gear wheel, which is in rotary driving connection with the input side of the starter generator via additional gears, a second gear wheel arranged at a center-to-center distance with respect to the first gear wheel, and a traction means via which the first and second gear wheels are in rotary driving connection with one another. In contrast, the second gear wheel is in rotary driving connection with the crankshaft of an internal combustion engine, wherein the described components are generally covered by a transmission housing. To achieve the desired or necessary tension of the traction means in the known traction drive, at least one tensioning device is additionally arranged permanently in the housing, which may be pressed laterally against the traction means in order to correspondingly increase the tension. During the assembly of such a traction drive within the drivetrain, the listed components of the traction drive are generally fixed successively on the engine block or on an adjacent housing of the engine block in order to subsequently generate the necessary tension of the traction means via the tensioning device.

Said method for the assembly of the traction drive in a drivetrain is relatively time intensive. In addition, the tensioning device within the traction drive not only has the disadvantage that this increases the weight and the necessary installation space, but also the tensioning of the tensioning device against the traction means additionally has the effect that friction is generated between the tensioning device and the traction means, which in turn has an influence on the operating behavior of the traction drive. Furthermore, precautions must be undertaken at this point to prevent wear on the tensioning device and/or the traction means.

It is therefore the object of the present invention to specify a method for the assembly of or for preparing to assemble a traction drive module in a drivetrain which may be carried out quickly and easily and additionally makes a tensioning device of the type described at the outset dispensable. In addition, the underlying object of the present invention is to create a traction drive module which facilitates the assembly of the same within the drivetrain and makes a tensioning device of the type described at the outset dispensable.

This problem is solved by the features listed in Patent claim **1** or **3**. Advantageous embodiments of the invention are the subject matter of the subclaims.

The method according to the invention functions for the assembly of or at least the preparation for the assembly of a traction drive module in a drivetrain, preferably a drivetrain of a motor vehicle or hybrid vehicle, and has the method steps subsequently described in greater detail. First, a traction drive module is provided. The traction drive module provided has a transmission housing, in which are arranged a first gear wheel rotatably mounted on the transmission housing, a second gear wheel arranged at a center-to-center distance to the first gear wheel, and a traction means, via which the first and second gear wheel are in rotary driving connection. The traction drive module provided is thereby preferably designed in such a way that the listed components are connected in a captive manner to one another to guarantee a simple assembly. Subsequently an assembly aid, detachable from the traction drive module, is applied to the traction drive module provided in this way. The assembly aid is thereby applied to the traction drive module in such a way that this acts, preferably directly, between the second gear wheel and the transmission housing. Thus, the assembly aid, detachably applied to the traction drive module, may be, for example, supported or supportable indirectly on the second gear wheel on the one side and on the transmission housing on the other. Subsequently, the center-to-center distance between the first and second gear wheels is changed by moving the second gear wheel relative to the transmission housing while adjusting a predetermined tension of the traction means by means of the detachable assembly aid. In other words, the first gear wheel maintains its position relative to the transmission housing due to its mounting on the transmission housing, while the second gear wheel is moved relative to the transmission housing with the aid of the detachable assembly aid so that the center-to-center distance and thus also the tension of the traction means changes upon reaching a predetermined tension. It is hereby preferred if the assembly aid acts between the transmission housing and the second gear wheel in such a way that the changed center-to-center distance and thus also the adjusted predetermined tension of the traction means are maintained by the applied assembly aid. One advantage of the described method consists in that the traction drive module prepared for the assembly in this way may be installed particularly easily in the drivetrain in a subsequent assembly step, particularly as the traction means of the traction drive already has the desired tension before the traction drive is installed in the drivetrain. In addition, it is clear from the preceding description that such a traction drive module requires no additional tensioning device within the transmission housing as, after the assembly within the drivetrain, the predetermined tension of the traction means is already present and the assembly aid may be released again and removed.

One preferred embodiment of the method according to the invention for the assembly of the traction drive module prepared in the previously described way in a drivetrain additionally has the following method steps. Thus, the second gear wheel is connected to a rotatable hub of a drivetrain while establishing a rotary driving connection between the second gear wheel and the hub and while maintaining the center-to-center distance and the predetermined tension. The hub of the drivetrain may be, for example, an output hub of a drive unit, preferably of an internal combustion engine. The connection between the second gear wheel and the hub of the drivetrain may be achieved, for example, by a screw connection. The transmission housing is subsequently fixed within the drivetrain, wherein this in turn is preferably carried out by a screw

connection. It is also thereby preferred if the transmission housing is fixed on an adjacent housing of the drivetrain, for example, the housing of the drive unit or the housing of a transmission. Due to the two previously described method steps, it is ensured that the relative arrangement between the transmission housing on the one side and the second gear wheel on the other is set or fixed. Consequently, the center-to-center distance between the first and second gear wheels, and thus the previously adjusted predetermined tension, is also set or fixed, particularly as the first gear wheel is mounted or supported on the transmission housing so that its relative arrangement with respect to the transmission housing also has not changed in the context of the assembly. Consequently, the assembly aid may be subsequently detached and removed from the traction drive module so that a traction drive has been created within the drivetrain that does not have nor does it need any additional tensioning device acting directly on the traction means.

The traction drive module according to the invention has a transmission housing. In the transmission housing, there is a first gear wheel rotatably mounted on the housing, a second gear wheel arranged in a center-to-center distance to the first gear wheel, and a traction means via which the first and second gear wheel are in rotary driving connection with one another. The listed components of the traction drive module are preferably arranged on one another in a captive manner in order to facilitate a simple assembly in a drivetrain of a motor vehicle. The traction drive module is also preferably designed in such a way that it is usable in an embodiment of the previously described method. Even if a transmission housing accommodating the listed components is consistently discussed here, the transmission housing need not completely surround the listed components. As the first gear wheel is rotatably mounted on the transmission housing, its relative arrangement with respect to the transmission housing is not changeable, or only within certain tolerances of the mounting. In contrast, the second gear wheel is moveable relative to the transmission housing while changing the center-to-center distance between the first gear wheel and the second gear wheel and while adjusting a predetermined tension of the traction means, wherein this movement is preferably a movement in the radial direction of the second gear wheel. Consequently, a traction drive module is created in which the predetermined tension of the traction means may be easily adjusted by changing the center-to-center distance between the first and second gear wheels, as a result of which both an additional tensioning device that acts directly on the traction means may be omitted, and also said traction drive module may additionally be assembled particularly easily in a drivetrain without requiring a subsequent tensioning of the traction means via a tensioning device acting directly on the traction means.

In one preferred embodiment of the of the traction drive module according to the invention, an assembly aid is provided, which acts between the second gear wheel and the transmission housing and by means of which the second gear wheel may be moved relative to the transmission housing to change the center-to-center distance between the first and second gear wheel, and consequently to change the tension of the traction means. The assembly aid is thereby detachably and removably applied to the traction drive module so that it is not only removed after the assembly, but it may also be used for another traction drive module.

In one particularly preferred embodiment of the traction drive module according to the invention, the assembly aid has a first retaining part which is mounted or mountable on the transmission housing, and a second retaining part which is mounted or mountable on the second gear wheel, optionally on a hub of the second gear wheel. The first and second retaining parts may thereby be moved relative to one another so that a corresponding relative movement may also be carried out between the transmission housing and the second gear wheel upon actuating the assembly aid in order to change the center-to-center distance between the first and second gear wheels and to adjust the tension of the traction means.

Basically, the tension adjusted by the assembly aid might be maintained by an additional aid, in that this is arranged, for example, supportingly between the transmission housing and the second gear wheel. However, in one advantageous embodiment of the traction drive module according to the invention, the first and second retaining parts of the assembly aid are fixable or fixed in their respective positions relative to one another so that the transmission housing and the second gear wheel are also fixed or fixable in their relative arrangement respectively achieved by the assembly aid.

In another advantageous embodiment of the traction drive module according to the invention, the one of the two retaining parts is guided in a guide in the other of the two retaining parts in order to enable a previously determinable or targeted movement of the one retaining part relative to the other retaining part. It is hereby preferred if the guide is designed in such a way that the retaining parts are moved in a straight line movement relative to one another, wherein a linear guide may also be discussed here.

To simplify the operability and adjustability of the assembly aid, a drive device for moving the first and second retaining parts relative to one another is provided in one particularly advantageous embodiment of the traction drive module according to the invention. The drive device is preferably designed in such a way that a stepless movement of the first and second retaining parts relative to one another is possible. The drive device may also be designed in such a way that the first and second retaining parts may be moved manually or electrically toward one another. In this context, drive devices have proven advantageous that are designed as screw drives, cam drives, eccentric drives, or spindle drives.

According to another preferred embodiment of the traction drive module according to the invention, multiple assembly openings are provided in the transmission module. The assembly openings may thereby function exclusively for mounting the assembly aid; however, it is also possible that said assembly openings, through which, for example, screws or tools may be guided, may also be used for fixing the second gear wheel on a hub of the drivetrain. The first retaining part has at least two protruding projections which are introduced or introducible into the assembly openings when mounting the first retaining part on the transmission housing. Due to the at least two protruding projections introduced into the assembly opening, both a support on the transmission housing is ensured and also a securing against rotation of the first retaining part relative to the transmission housing is guaranteed.

According to another preferred embodiment of the traction drive module according to the invention, the previously mentioned assembly openings in the transmission housing are arranged in alignment with fixing openings in the second gear wheel, which function for fixing the second gear wheel on a hub of the drivetrain. Here as also previously, it is preferred if the assembly openings are arranged distributed across a common diameter and in the circumferential direction, which also preferably applies for said fixing openings in the second gear wheel.

In another particularly preferred embodiment of the traction drive module according to the invention, when a first retaining part is mounted on the transmission housing, at least two assembly openings in the transmission housing remain accessible, and thus are not covered or occupied by the first retaining part or its protruding projections. By this means it is ensured that the second gear wheel may be fixed via the two assembly openings in the transmission housing on the one hand, and on the other hand on the hub of the drivetrain via the fixing openings in the second gear wheel arranged aligned with said assembly openings before—as previously described—the transmission housing is fixed in the drivetrain and the assembly aid is loosened and removed. In connection with this, those assembly openings, which were previously covered or occupied by the first retaining part, are used for the additional fixing of the second gear wheel on the hub of the drivetrain. The preadjusted tension of the traction means or the center-to-center distance between the first and second gear wheels is retained by this means. In this embodiment, it is additionally preferred if those at least two assembly openings, which remain accessible when a first retaining part is mounted on the transmission housing, are accessible via recesses on the first retaining part, wherein the recesses may be windows or notches in the first retaining part. In this way, both a lightweight assembly aid is created, and also the assembly openings as a whole may be arranged on a common circumferential circle, as already previously indicated.

If the first retaining part of the assembly aid is introduced with its protruding projections into the assembly openings, and if the first retaining part is offset relative to the second retaining part to generate the desired tension of the traction means, then, it is already largely ensured due to the tension that the first retaining part may not fall off again from the transmission housing in a direction opposite to the insertion direction of the protruding projections. However, to increase the safety and to be able to easily transport the traction drive module prepared in such a way, at least one fixing means for fixing the first retaining part in the direction opposite to the insertion direction of the protruding projections is provided on the first retaining part in another advantageous embodiment of the traction drive module according to the invention.

To simplify the handling of the at least one fixing means provided on the first retaining part for fixing the first retaining part in the direction opposite the insertion direction of the protruding projections, the fixing means is moveable from an insertion position, in which the fixing means is insertable into one of the assembly openings, into a fixing position, in which the fixing means engages behind the edge of the assembly opening in another advantageous embodiment of the traction drive module according to the invention. The fixing means may thereby be inserted preferably into the same assembly openings as one of the protruding extensions of the first retaining part. This is preferred insofar as the other assembly openings, which are not covered by the retaining part when the first retaining part is mounted on the transmission housing and thus are accessible, may be employed for the previously described fixing of the second gear wheel on the hub of the drivetrain. However, it is likewise possible that the fixing means are insertable into an assembly opening which is not used or occupied by the retaining part.

In another preferred embodiment of the traction drive module according to the invention, at least one frontal indentation is provided in the second gear wheel whereas the second retaining part of the assembly aid has at least one protruding projection which is insertable or inserted into the indentation during the mounting of the second retaining part on the second gear wheel. The indentation is preferably designed as a central indentation and particularly preferably designed in a hub of the second gear wheel. Both have the advantage that the protruding projection on the second retaining part may be guided, for example, through an already present opening in the transmission housing onto the central indentation, optionally onto the central indentation in the hub of the second gear wheel, via which the second gear wheel may later be connected to another hub of the drivetrain, for example, the hub of a transmission.

According to another advantageous embodiment of the traction drive module according to the invention, the second gear wheel has a first gear wheel section and a second gear wheel section rotatable relative to the first gear wheel section, wherein the second gear wheel section is in rotary driving connection with the first gear wheel via the traction means. In addition, a clutch is provided, via which the first and second gear wheel sections may be selectively brought into rotary driving connection with one another. The clutch is preferably a disk clutch. This embodiment of the traction drive module is particularly suited for the drivetrain of hybrid vehicles in which the traction drive module couples an electric machine to the output side of an internal combustion engine, wherein the clutch may be separated if the drivetrain is to be driven solely electrically.

In another advantageous embodiment of the traction drive module according to the invention, the first gear wheel section has an input hub which is mounted on the output hub of the second gear wheel section. Thus, in this embodiment, the assembly aid may interact, for example, with the second gear wheel section of the second gear wheel, wherein a relative movement of the second gear wheel section with respect to the transmission housing due to the mounting likewise causes a relative movement of the first gear wheel section with respect to the transmission housing.

In another advantageous embodiment of the traction drive module according to the invention, the first gear wheel section has a torsional vibration damper to damp torsional vibrations.

In another advantageous embodiment of the of the traction drive module according to the invention, a centrifugal force pendulum is arranged on the second gear wheel section to cancel rotary vibrations.

In another preferred embodiment of the traction drive module according to the invention, the traction means is designed as a chain, while the first and second gear wheels, preferably the second gear wheel section of the second gear wheel, is/are designed as sprockets. Consequently, the traction drive in this embodiment of the traction drive module is designed as a chain drive which guarantees a particularly secure torque transmission between the first and second gear wheels.

The present invention is subsequently described in greater detail by way of an exemplary embodiment with reference to the appended drawings. As shown in:

FIG. **1** a partial side view of a drivetrain of a hybrid vehicle with one embodiment of a traction drive module before the assembly of the same in the drivetrain in a sectional depiction,

FIG. **2** a view of the assembly aid from FIG. **1** in the direction of arrow A with the retaining parts in a first relative arrangement,

FIG. **3** the assembly aid from FIG. **2** with the retaining parts in a second relative arrangement,

FIG. **4** the drivetrain from FIG. **1** with the assembly aid mounted on the traction drive module and the retaining parts in the first relative arrangement according to FIG. **2**,

FIG. **5** the drivetrain from FIG. **4** with the two retaining parts in the second relative arrangement according to FIG. **3**,

FIG. **6** the drivetrain from FIG. **5** after a first fixing of the second gear wheel on an output hub of the internal combustion engine and the fixing of the transmission housing on the engine housing,

FIG. **7** the drivetrain from FIG. **6** after the loosening and removal of the assembly aid and after a second fixing of the second gear wheel on the output hub of the internal combustion engine, and

FIG. **8** the drivetrain from FIG. **7** after coupling the transmission input shaft to the second gear wheel.

FIG. **1** shows a drivetrain **2** for a hybrid vehicle before its assembly, which has an internal combustion engine **4**, of which housing **6** and output hub **8** of the crankshaft are shown, a traction drive module **10**, and a transmission **12**, wherein only an input hub **14** is shown of the latter. In addition, an assembly aid **16** is assigned to traction drive module **10**, is detachably mountable on traction drive module **10**, and is used in the context of the assembly of drivetrain **2**.

Traction drive module **10** has a transmission housing **18**, wherein transmission housing **18** is substantially composed from two transmission housing parts **20**, **22**. Transmission housing **18** surrounds an interior **24**, which is accessible on the one side via an opening **26** in transmission housing part **20**, and on the other side via an opposite opening **28** in transmission housing part **22**. Opening **28** is surrounded by multiple assembly openings **30**, which are arranged on a common circumferential circle **32**—as is clear from FIG. **2**. In the embodiment shown, for example, eight assembly openings **30** are provided. Transmission housing **18** additionally has multiple fixing openings **36**, in this case on flange sections **38**, via which fixing openings transmission housing **18** is fixable on housing **6** of internal combustion engine **4**, which will be discussed again later in greater detail.

A first gear wheel **40** of a traction drive is arranged in interior **24** of transmission housing **18**, wherein the traction drive is designed as a chain drive. Consequently, first gear wheel **40** is designed as a sprocket. First gear wheel **40** is rotatably mounted on transmission housing **18**, stated more precisely on transmission housing part **20**, via a radial bearing **42**, wherein the mounting is carried out via a shaft **44** which leads out of transmission housing **18** in order to be connected or connectable to an output or input of an electric machine, not depicted here in greater detail. Due to the mounting of first gear wheel **40** on transmission housing **18** via radial bearing **42**, first gear wheel **40** is indeed rotatable, however, not moveable in the radial direction of shaft **44** relative to transmission housing **18**, at most within the context of the low play of radial bearing **42**.

In addition, a traction means **46**, which is designed as an endless circulating traction means, extends in interior **24** of transmission housing **18**. First gear wheel **40** is in rotary driving connection via traction means **46** with second gear wheel **48**, which is likewise arranged within transmission housing **18** or its interior **24**. Because it is a chain drive, traction means **46** is designed as a chain, while second gear wheel **48** is designed, at least in parts, as a sprocket. A center-to-center distance **58** is formed in transverse directions **54**, **56** between axis of rotation **50** of first gear wheel **40** and axis of rotation **52** of second gear wheel **48**, indicated in FIG. **1**, wherein second gear wheel **48** is moveable in indicated transverse directions **54**, **56** relative to transmission housing **18** while changing center-to-center distance **58** and while adjusting a predetermined tension of traction means **46**, for example, wherein this will be discussed again later in greater detail.

Second gear wheel **48** is composed of a first gear wheel section **60** and a second gear wheel section **62**, wherein the two gear wheel sections **60**, **62** are rotatable relative to one another about axis of rotation **52** when clutch **64**, to be described later in greater detail, is open. First gear wheel section **60** has an input hub **66** via which a torque of output hub **8** of internal combustion engine **4** is transmittable to first gear wheel section **60** within a completely mounted drivetrain **2**. In contrast, second gear wheel section **62** has an output hub **68**, wherein input hub **66** is rotatably mounted on output hub **68** via a radial bearing **70**.

Furthermore, first gear wheel section **60** has a torsional vibration damper **72**, which acts between input hub **66** and clutch **64**. Clutch **64** acts in turn between first gear wheel section **60** and second gear wheel section **62** in such a way that first gear wheel section **60** may be selectively brought into rotary driving connection with second gear wheel section **62**, wherein clutch **64** in the embodiment depicted is designed by way of example as a disk clutch. A depiction of the actuating device for clutch **64** was omitted for reasons of clarity.

Second gear wheel section **62** has the toothing of second gear wheel **48** designed as a sprocket so that second gear wheel section **62** is in rotary driving connection with first gear wheel **40** via traction means **46**, whereas this is indirectly the case for first gear wheel section **60** via clutch **64**, when clutch **64** is closed. In addition, at least one centrifugal force pendulum **74** is arranged on second gear wheel section **62**, which is merely indicated schematically in FIG. **1**.

Input hub **66** is arranged on the side of second gear wheel **48** facing opening **26**, while output hub **68** is arranged on the side of second gear wheel **48** facing opening **28**. In addition, it is clear from FIG. **1** that a central, frontal indentation **76** is provided in the side of output hub **68** facing opening **28**, which functions for the subsequent mounting of assembly aid **16**. In addition, an inner toothing **78** is designed in a front section of indentation **76**, which functions for the subsequent rotary driving connection with an outer toothing **80** on input hub **14** of transmission **12**. Inner toothing **78** thereby has an inner diameter, which is larger than the inner diameter in the rear section of indentation **76**.

Assembly openings **82** are arranged distributed in the circumferential direction in second gear wheel section **62**, which are arranged aligned with assembly openings **30** in transmission housing **18** in the indicated longitudinal directions **84**, **86** of drivetrain **2** or of traction drive module **10** in a corresponding rotational position of second gear wheel **48**. Furthermore, multiple fixing openings **88** are arranged distributed in the circumferential direction in first gear wheel section **60**, wherein fixing openings **88** are arranged aligned with assembly openings **82** in longitudinal direction **84**, **86** in the corresponding rotational position of first gear wheel section **60** to second gear wheel section **62**. In addition, fixing openings **88** are arranged aligned with assembly openings **30** within transmission housing **18** in longitudinal directions **84**, **86** in a corresponding rotational position of second gear wheel **48** relative to transmission housing **18**.

Fixing openings **88** function for fixing first gear wheel section **60** on output hub **8** of internal combustion engine **4**, wherein, for example, a screw may be guided through assembly openings **30** and **82** into respective fixing opening **88**. In a corresponding way, a tool may also be guided

through assembly openings **30**, **82** to the screw in respective fixing opening **88** to actuate said screw, in order to facilitate screwing in of the screw through fixing opening **88** into corresponding openings in output hub **8** of internal combustion engine **4**.

Assembly aid **16**, which is subsequently described with reference to FIGS. **1** through **3**, is assigned to traction drive module **10**. Assembly aid **16** has a first retaining part **90** mounted or mountable on transmission housing **18** and a second retaining part **92**, mounted or mountable on second gear wheel **48**, stated more precisely on output hub **68** of second gear wheel section **62**.

First retaining part **90** is designed as substantially disk shaped and has recesses **94** on its circumferential edge, which are spaced apart from one another in the circumferential direction in such a way that first retaining part **90** has arms **96** spaced apart from one another in the circumferential direction, wherein recesses **94** are designed in this case as notches. On the side of first retaining part **90** facing in longitudinal direction **84**, at least two, in the present example four protruding projections **98** are provided, in this case on arms **96**. Said protruding projections **98** may be inserted into assembly openings **30** within transmission housing **18** in longitudinal direction **84** when mounting first retaining part **90** on transmission housing **18**.

As is clear from FIGS. **2** and **3**, in which assembly openings **30** in transmission housing **18** are additionally indicated, in the case of a first retaining part **90** mounted on transmission housing **18**, at least two of assembly openings **30**, in the present example four assembly openings **30**, remain accessible via recesses **94** in first retaining part **90**, whereas protruding projections **98** extend into four other assembly openings **30**, which are consequently covered by first retaining part **90** or its arms **96** and protruding projections **98**.

On the side facing in longitudinal direction **86**, first retaining part **90** has an elevated section **100**, in which an indentation is provided in the form of a guide **102**. In the bottom of said guide **102**, a recess **104** is provided in turn. Guide **102** functions for guiding second retaining part **92** relative to first retaining part **90**, so that first and second retaining part **90**, **92** are moveable relative to one another, in this case along a straight line movement path **106**.

In order to be able to be moved along straight line movement path **106** relative to first retaining part **90**, second retaining part **92** has a guide section **108** guided in guide **102**, which is supported transverse to movement path **106** on the wall of the guide and is displaceable in the direction of movement path **106**. A protruding projection **110** of second retaining part **92** connects to the side of guide section **108** facing in longitudinal direction **84**, said projection being insertable into frontal indentation **76** of output hub **68** when mounting second retaining part **92** on second gear wheel **48**, stated more precisely, on output hub **68** of second gear wheel section **62**. For this purpose, protruding projection **110** extends in longitudinal direction **84** through recess **104**, wherein protruding projection **110** is designed as substantially cylindrical in order to be able to be inserted into likewise cylindrical indentation **76**. This additionally has the advantage that second gear wheel **48** may itself be rotated about axis of rotation **52** by mounted assembly aid **16** relative to transmission housing **18** in order for assembly openings **30** to be able to be arranged in alignment, optionally retroactively, with assembly openings **82** and fixing openings **88**. Generally stated, assembly aid **16** is mountable on traction drive module **10** in such a way that second gear wheel **48** remains rotatable.

As already indicated, two retaining parts **90**, are moveable relative to one another along movement path **106**. Thus, FIGS. **1** and **2** show a first relative arrangement between first and second retaining parts **90**, **92**, while FIGS. **3** and **5** show a second relative arrangement between first and second retaining parts **90**, **92**. To simplify the handling of assembly aid **16**, this has a drive device **112** which functions for driving or moving first and second retaining parts **90**, **92** relative to one another. Drive device **112** is thereby designed in such a way that two retaining parts **90**, **92** may be moved steplessly relative to one another. In the figures, drive device **112** is exemplarily designed as a screw drive, in which a screw **114** is screwable into a threaded hole **116** on first retaining part **90** in order to thereby act on second retaining part **92** or its guide section **108**. In addition, drive device **112** may alternatively be designed as a cam drive, eccentric drive, or spindle drive. Drive device **112** is also to be designed in such a way that first and second retaining parts **90**, **92** are fixed or fixable in the respective relative positions to one another, preferably by drive device **112** itself, in order to achieve a simple structure of assembly aid **16** and to simplify handling of the same.

Subsequently, the preparation for the assembly of traction drive module **10** is described initially with reference to FIGS. **1** through **5**, before the completed assembly in drivetrain **2** is described with reference to FIGS. **6** through **8**.

In the context of the preparation for the assembly, initially traction drive module **10** and assembly aid **16**, which is designed separately from traction drive module **10**, are provided. Subsequently, assembly aid **16** is mounted on traction drive module **10** in order to be able to act between second gear wheel **48** and transmission housing **18**, wherein the mounting is carried out in such a way that assembly aid **16** is detachable and removable from traction drive module **10**.

As shown in FIG. **4**, assembly aid **16** is guided in longitudinal direction **84** on traction drive module **10**. Protruding projections **98** on first retaining part **90** thereby plunge into assigned assembly openings **30** in transmission housing **18**. Due to this positive locking, it is ensured that assembly aid **16** or its first retaining part **90** is no longer displaceable in transverse directions **54**, **56** relative to transmission housing **18** nor rotatable relative to transmission housing **18**. As already previously depicted with reference to FIG. **2**, some assembly openings **30** in transmission housing **18** thereby remain accessible via recesses **94** between arms **96** of first retaining part **90**.

In addition, protruding projection **110** of second retaining part **92** plunges in longitudinal direction **84** into frontal indentation **76** of output hub **68** so that protruding projection **110** of second retaining part **92** is arranged coaxial to second gear wheel **48**. Consequently, an operative connection is established between transmission housing **18** and second gear wheel **48** via assembly aid **16** or its retaining parts **90**, **92**.

In connection to this, center-to-center distance **58** between first gear wheel **40** and second gear wheel **48** is changed in order to achieve a predetermined tension of traction means **46**. For this purpose, second gear wheel **48** is moved relative to transmission housing **18**, for example, in one of transverse directions **54**, **56**. This movement is carried out with the aid of assembly aid **16**, in that second retaining part **92** is moved from the first relative position according to FIG. **2** with the aid of drive device **112** into the second relative position, which is shown in FIG. **3**. Because first retaining part **90** is fixed on transmission housing **18**, while

output hub **68** of second gear wheel **48** is fixed on second retaining part **92**, second gear wheel **48** is also moved in transverse direction **56** relative to transmission housing **18**, as is shown in FIG. **5**. Because a corresponding movement of first gear wheel **40** is inhibited by its radial mounting on transmission housing **18**, this leads to a change, in this case an increase, of the tension of traction means **46**.

If the desired tension of traction means **46** is generated, wherein this may be monitored, for example, by means of a measuring device on drive device **112**, on assembly aid **16**, or elsewhere, then traction drive module **10**, along with assembly aid **16**, is prepared for assembly within drivetrain **2**. Thus, prepared traction drive module **10**, including assembly aid **16**, may be particularly easily transported or delivered in order to be able to provide it for the further assembly of drivetrain **2**.

Due to the tension adjusted for traction means **46**, assembly aid **16** is already held relatively securely on traction drive module **10**. However, in order to establish a particularly secure fixing, at least one fixing means for fixing first retaining part **90** may be supplementally provided on first retaining part **90** of assembly aid **16** in the direction opposite the insertion direction of protruding projections **98**, in this case, previously mentioned longitudinal direction **86**. Even if not depicted in greater detail, it is preferred in this case if the corresponding fixing means is displaceable from an insertion position, in which the fixing means may be inserted into one of assembly openings **30**, into a fixing position, in which the fixing means engage behind the edge of assembly opening **30**. Thus, for example, a corresponding pivotable tab or a corresponding pivotable latch may be provided on first retaining part **90**. Said fixing means may thereby also be inserted into the same assembly opening **30** as one of protruding projections **98** in order to not cover the previously described, still accessible assembly openings **30**; however, it is just as possible that such fixing means use one of those assembly openings **30** that is not covered by first retaining part **90**.

In the context of the assembly of traction drive module **10** prepared in such a way within drivetrain **2**, traction drive module **10** is initially guided onto internal combustion engine **4**. Output hub **8** of internal combustion engine **4** thereby plunges through opening **26** in transmission housing **18** into interior **24** of transmission housing **18** in order to be able to be connected to second gear wheel **48**, as this is shown in FIG. **6**. Connection means, screws in the present example, are thereby inserted through accessible assembly openings **30** in transmission housing **18**, shown in FIG. **2**, and through assembly openings **82** in second gear wheel section **62** arranged aligned with said assembly openings, into fixing openings **88** within first gear wheel section **60** in order to connect or to screw first gear wheel section **60** rotatably fixedly to output hub **8** of internal combustion engine **4**. If this is carried out, then assembly aid **16** initially remains on traction drive module **10** to maintain the tension of traction means **46** or center-to-center distance **58**.

Transmission housing **18** is subsequently fixed on housing **6** of internal combustion engine **4**, thus within drivetrain **2**, via fixing openings **36**, for example, by means of screws, wherein fixing openings **36** in flange sections **38** are used for this.

Due to the fixing of second gear wheel **48** on output hub **8** of internal combustion engine **4** on the one side, and the fixing of transmission housing **18** on housing **6** on internal combustion engine **4** on the other side, the predetermined tension of traction means **46**, previously maintained solely by assembly aid **16**, is now fixed so that assembly aid **16** may be loosened and removed from traction drive module **10**, as this is indicated in FIG. **7**. Thus, neither the continuous mounting of assembly aid **16** nor an additional tensioning device within transmission housing **18** that acts on traction means **46** is required in order to achieve the predetermined tensioning of traction means **46**. For this reason, a corresponding tensioning device for traction means **46** continuously provided in traction drive module **10** is omitted. In addition, loosened and removed assembly aid **16** may be used for preparing another traction drive module **10**.

Subsequently, connection means or screws are also inserted via assembly openings **30** previously covered by assembly aid **16**, by means of which assembly openings another fixing of second gear wheel **48** on output hub **8** is carried out via fixing openings **88**.

Subsequently input hub **14** of transmission **12** may be inserted through opening **28** in transmission housing **18** in order to achieve a rotary driving connection between input hub **14** and output hub **68** of second gear wheel **48**, which is achieved via inner toothing **78** and outer toothing **80**, as this is indicated in FIG. **8**. Sealing means may still be introduced between transmission housing **18** and output hub **68** or input hub **14** which seal opening **28** and/or compensate for any eccentricity of output hub **68** or of input hub **14** with respect to opening **28**.

LIST OF REFERENCE NUMERALS

2 Drivetrain
4 Internal combustion engine
6 Housing
8 Output hub
10 Traction drive module
12 Transmission
14 Input hub
16 Assembly aid
18 Transmission housing
20 Transmission housing part
22 Transmission housing part
24 Interior
26 Opening
28 Opening
30 Assembly openings
32 Circumferential circle
36 Fixing openings
38 Flange sections
40 First gear wheel
42 Radial bearing
44 Shaft
46 Traction means
48 Second gear wheel
50 Axis of rotation
52 Axis of rotation
54 Transverse direction
56 Transverse direction
58 Center-to-center distance
60 First gear wheel section
62 Second gear wheel section
64 Clutch
66 Input hub
68 Output hub
70 Radial bearing
72 Torsional vibration damper
74 Centrifugal force pendulum
76 Indentation
78 Inner toothing
80 Outer toothing

82 Assembly openings
84 Longitudinal direction
86 Longitudinal direction
88 Fixing openings
90 First retaining part
92 Second retaining part
94 Recesses
96 Arms
98 Protruding projections
100 Elevated section
102 Guide
104 Recess
106 Movement path
108 Guide section
110 Protruding projection
112 Drive device
114 Screw
116 Threaded hole

The invention claimed is:

1. A method for the assembly of a traction drive module (10) in a drivetrain (2) comprising the following steps:
- providing a traction drive module (10) having a transmission housing (18) comprising: a first sprocket (40) rotatably mounted on the transmission housing (18), a second sprocket (48) arranged at a center-to-center distance (58) to the first sprocket (40), and a chain (46) via which the first and second sprockets (40, 48) are in rotary driving connection with one another;
- mounting an assembly aid (16) acting between the second sprocket (48) and the transmission housing (18) and detachable from the traction drive module (10);
- while adjusting a predetermined tension of the chain (46) by the detachable assembly aid (16), changing the center-to-center distance (58) by moving the second sprocket (48) relative to the transmission housing (18);
- while establishing a rotary driving connection between the second sprocket (48) and the hub (8), and, while maintaining the predetermined tension, connecting the second sprocket (48) to a rotatable hub (8) of a drivetrain (2),
- fixing the transmission housing (18) within the drivetrain (2) and on a housing (6) of the drivetrain (2), and
- loosening and removing the assembly aid (16) from the traction drive module (10).

2. The method of assembly of claim 1, wherein the second sprocket (48) is moveable relative to the transmission housing (18) while changing the center-to-center distance (58) and while adjusting the predetermined tension of the chain (46).

3. The method of assembly of claim 2, wherein the second sprocket (48) has a first section (60) and a second section (62) rotatable relative to the first section (60), the second section (62) in rotary driving connection with the first sprocket (40) via the chain (46), the first section (60) and the second section (62) being able to be selectively brought into rotary driving connection with one another via a clutch (64),
- wherein the first section (60) comprises: an input hub (66) which is mounted on an output hub (68) of the second section (62) and a torsional vibration damper (72).

4. The method of assembly of claim 3, further comprising a centrifugal force pendulum (74) arranged on the second section (62).

5. The method of assembly of claim 2, wherein the second sprocket (48) is moveable relative to the transmission housing (18), by the assembly aid (16) detachably and removably mounted on the traction drive module (10).

6. The method of assembly of claim 5, wherein the assembly aid (16) comprises:
- a first retaining part (90) mounted on the transmission housing (18), and
- a second retaining part (92) mounted on the second sprocket (48),
- such that the first retaining part (90) and the second retaining part (90, 92) are moveable relative to one another and are fixed in respective positions relative to one another, and the first retaining part (90) or the second retaining part (92) is guided in a guide (102) in the other of the first retaining part (90) or the second retaining part (92).

7. The method of assembly of claim 6, wherein the assembly aid (16) further comprises a drive device (112) for moving the first retaining part (90) and the second retaining part (92).

8. The method of assembly of claim 7, wherein the first retaining part (90) and the second retaining part (92) are moved stepless relative to one another.

9. The method of assembly of claim 7, wherein the drive device (112) is selected from a group consisting of: screw drive, cam drive, eccentric drive and spindle drive.

10. The method of assembly of claim 6, further comprising assembly openings (30) in the transmission housing (18), such that at least two protruding projections (98) of the first retaining part (90) has at least two protruding projections (98) which are inserted into the assembly openings (30) during mounting of the first retaining part (90) on the transmission housing (18),
- wherein the assembly openings (30) are arranged and aligned with fixing openings (88) in the second sprocket (48) for fixing the second sprocket (48) on a hub (8) of the drivetrain (2).

11. The method of assembly of claim 10, wherein the assembly openings (30) in the transmission housing (18) are accessible via recesses (94) on the first retaining part (90).

12. The method of assembly of claim 10, wherein the first retaining part (90) further comprises at least one fixing means for fixing the first retaining part (90) in the direction opposite to an insertion direction of the at least two protruding projections (98), the fixing means movable from an insertion position, in which the fixing means is inserted into one of the assembly openings (30), into a fixing position, in which the fixing means engages behind an edge of the assembly openings (30).

13. The method of assembly of claim 12, wherein the fixing means is insertable into same assemble openings (30) as the protruding projections (98).

14. The method of assembly of claim 6, further comprising at least one frontal indentation (76) in the second sprocket (48) and the second retaining part (92) has at least one protruding projection (110) which is inserted into the indentation (76) during mounting of the second retaining part (92) on the second sprocket (48).

15. The method of assembly of claim 14, wherein the frontal indentation (76) is centrally located in the hub (68) of the second sprocket (48).

16. The method of assembly of claim 6, wherein the second retaining part (92) is mounted on the hub (68) of the second sprocket (48).

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