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(54) **DRIVE MOTOR WITH A CONNECTION DEVICE**

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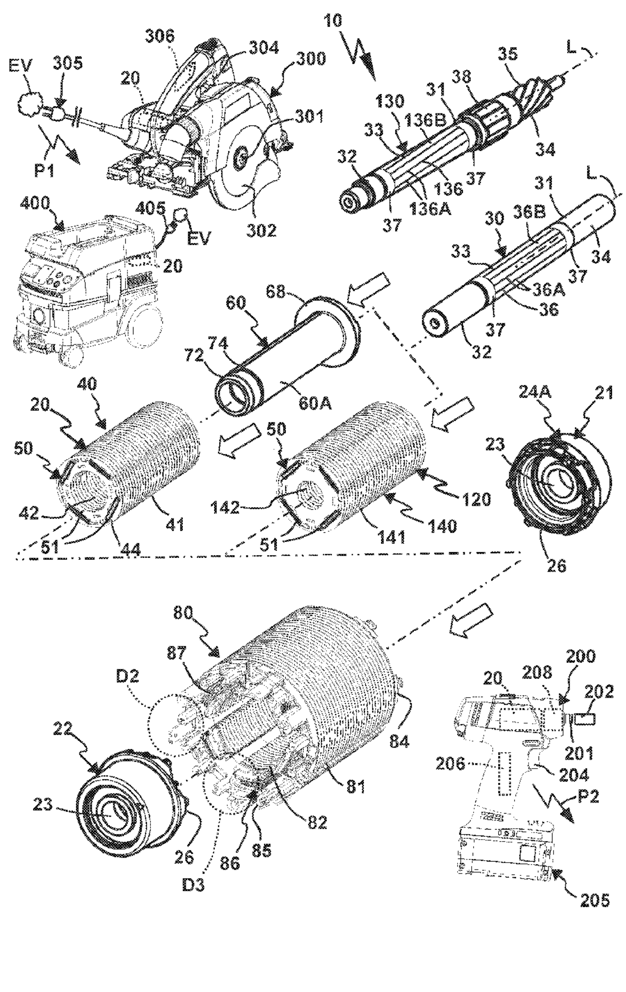
(57) **ABSTRACT**

A drive motor for a suction tool (**400**) or a machine tool in the form of a hand-held power tool (**200**, **300**) or a semi-stationary machine tool. The drive motor (**20**, **120**) has a stator (**80**) with an excitation coil assembly (**86**) and a rotor (**40**, **140**) with a motor shaft (**30**, **130**) which is rotatably mounted on the stator or relative to the stator (**80**) about a rotational axis (D) by means of a bearing assembly (**24**A), and the drive motor (**20**, **120**) has a connection device (**100**) for electrically connecting the drive motor to an energizing device (**206**, **306**) for energizing the excitation coil assembly (**86**). The connection device (**100**) has a main part (**103**) for securing to the stator (**80**) and a receiving arm (**108**) which protrudes from the main part (**103**), a conductor receiving area (**107**) being formed between the main part and the receiving arm for at least one electric coil conductor (**88**) of an excitation coil (**87**) of the excitation coil assembly (**86**). The connection device (**100**) has a connection contact region (**101**) for electrically connecting a connection line (**15**) for connecting to the energizing device (**206**, **306**).



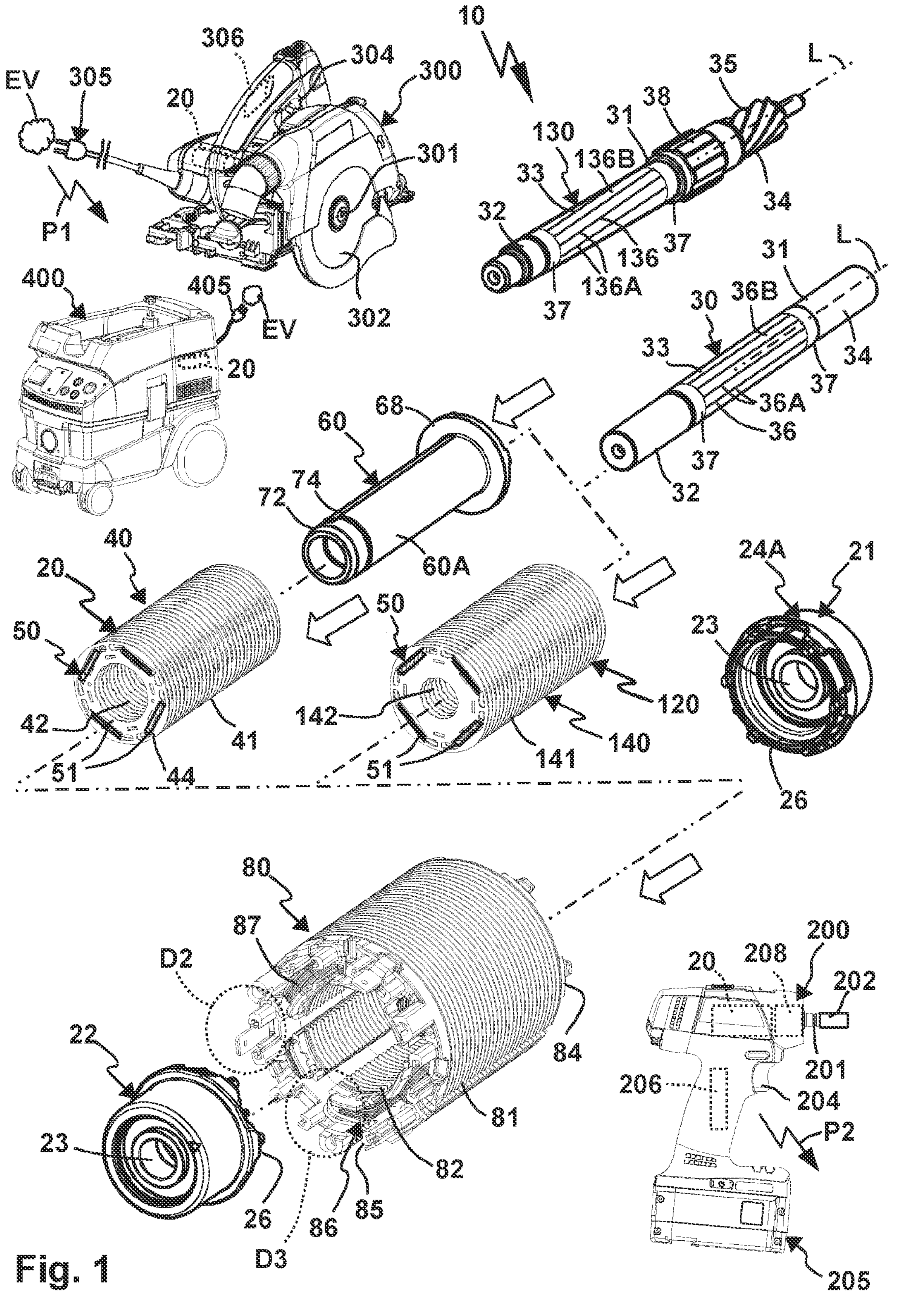

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Fig. 1

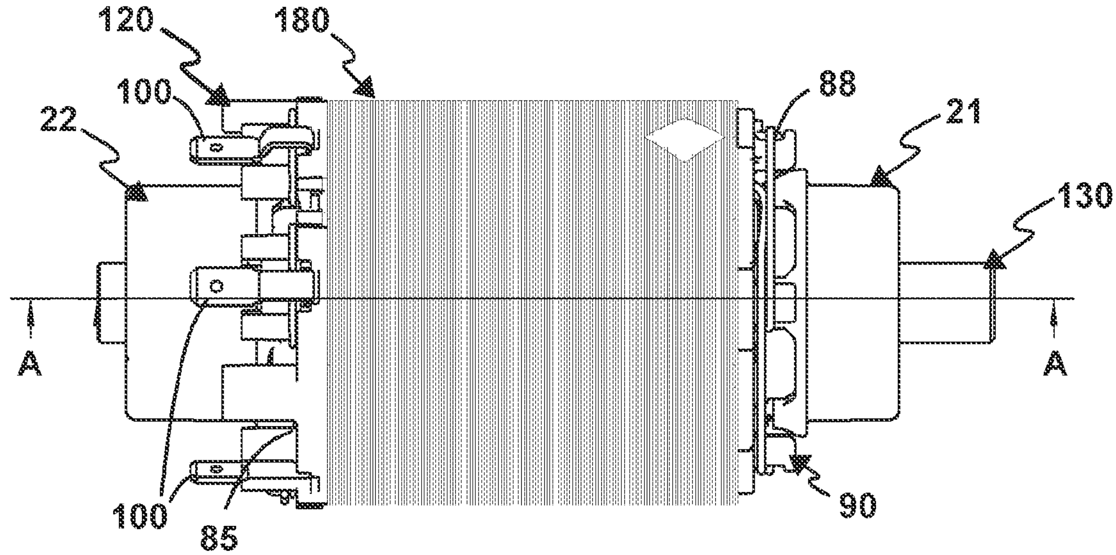


Fig. 2

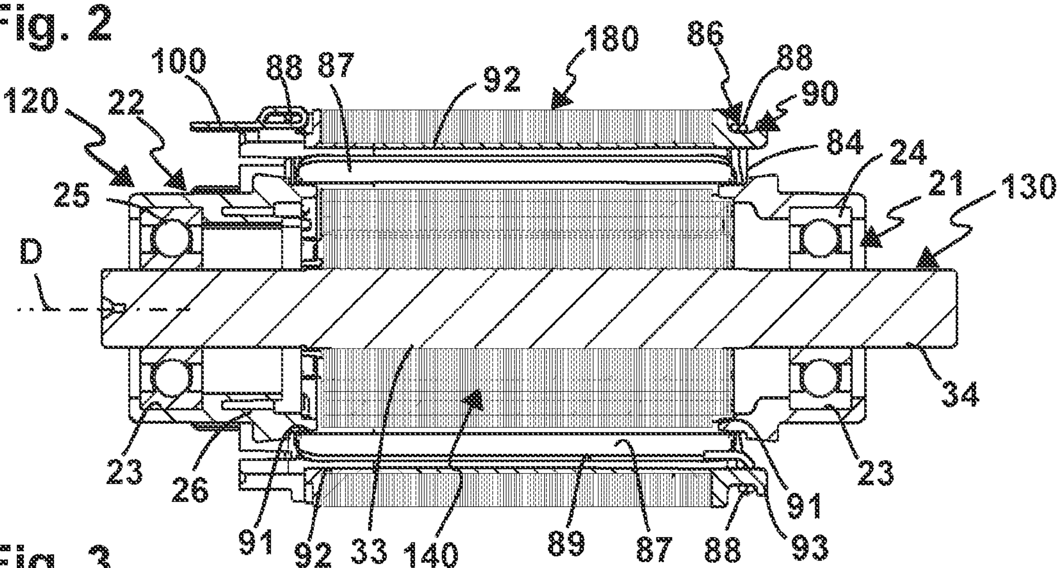


Fig. 3

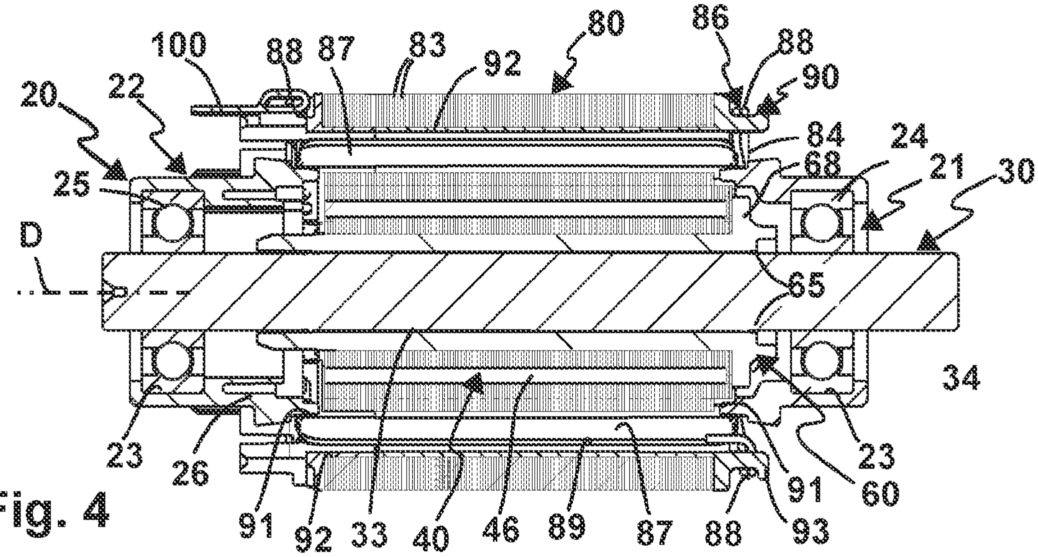
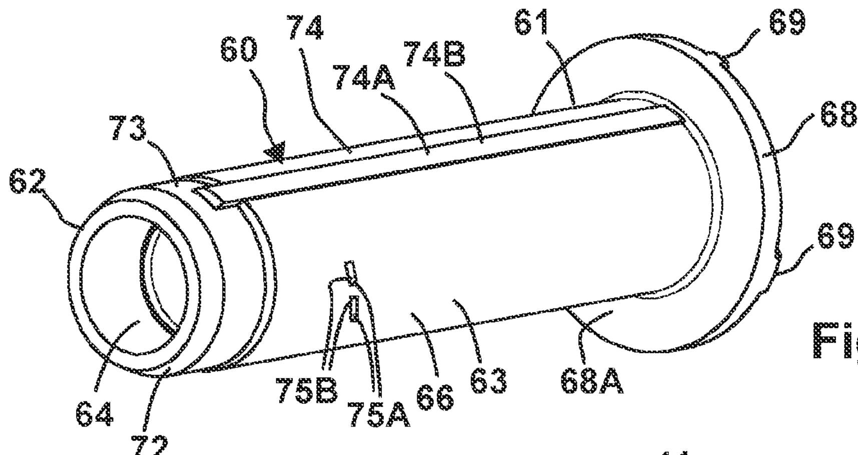


Fig. 4



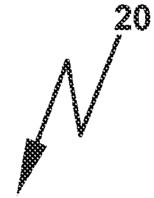
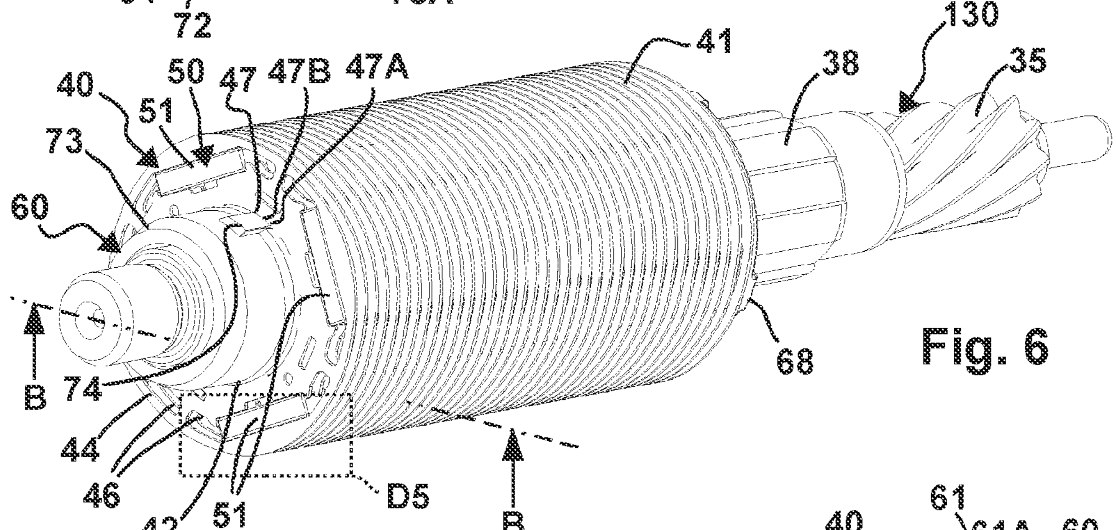


Fig. 5



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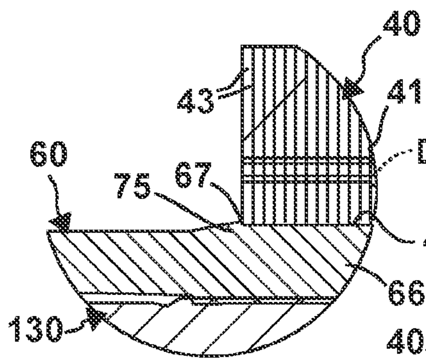
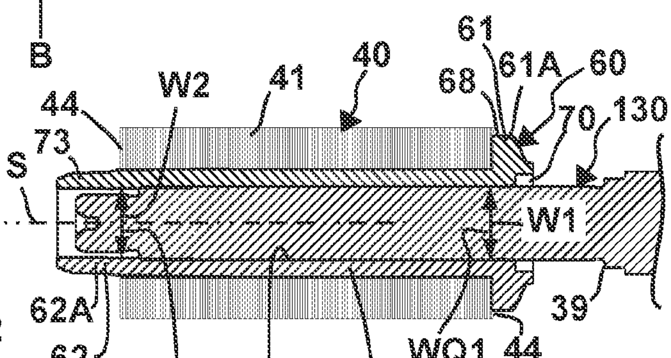


Fig. 9



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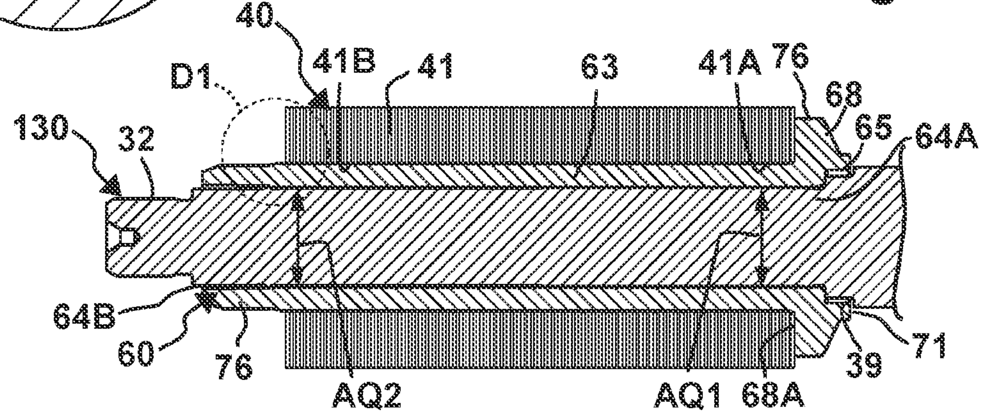


Fig. 8

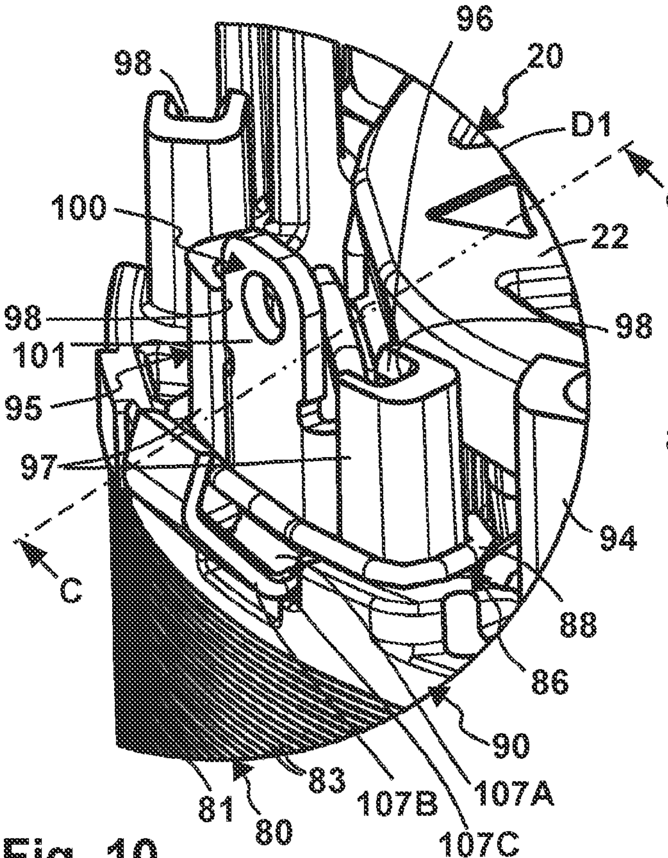


Fig. 10

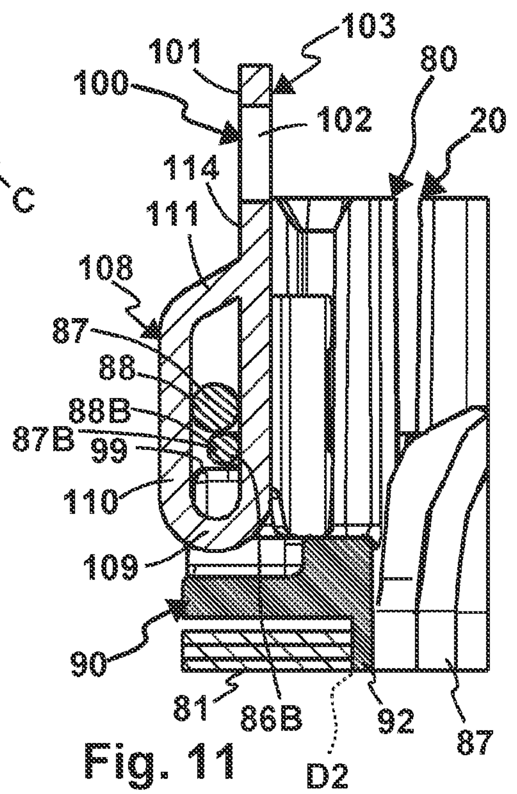
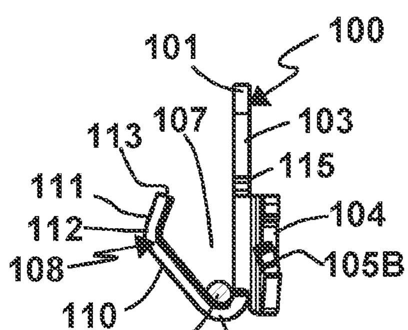


Fig. 11



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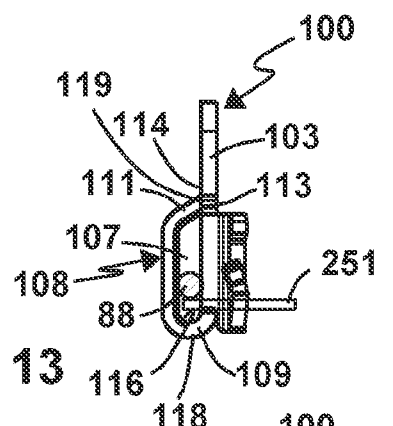


Fig. 13

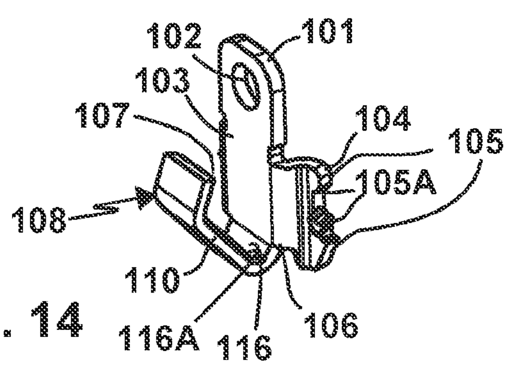


Fig. 14

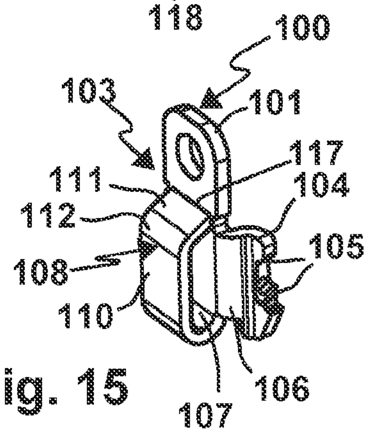


Fig. 15

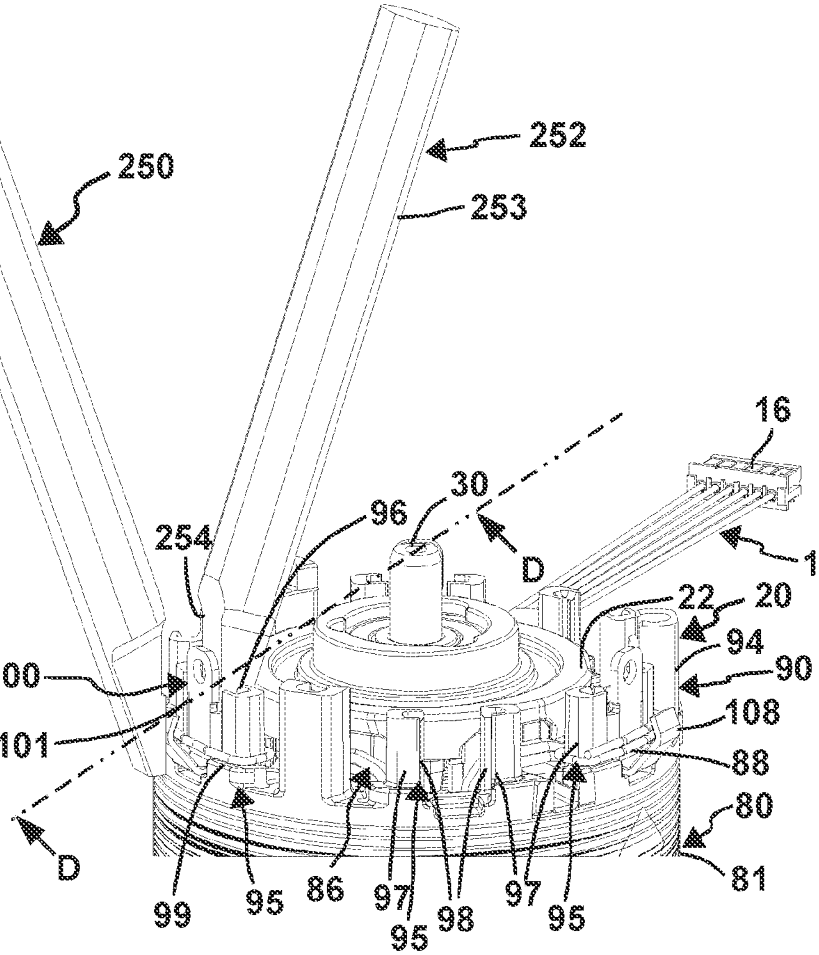


Fig. 16

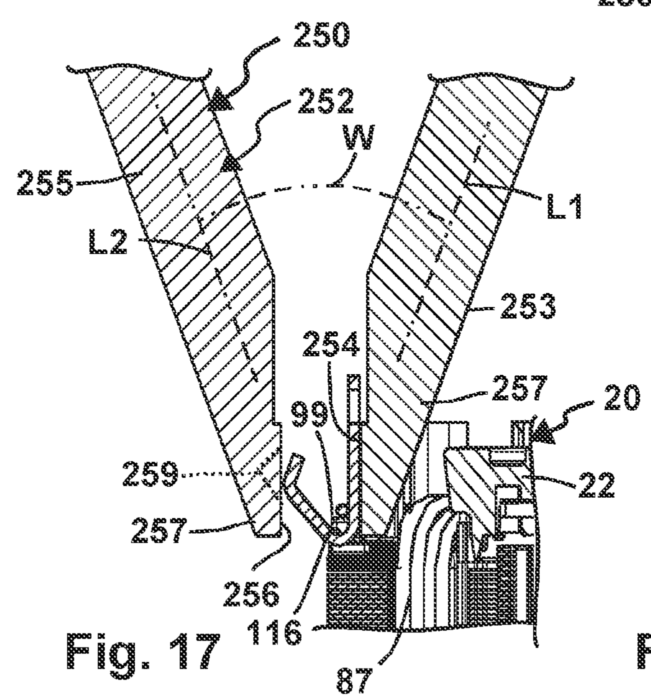


Fig. 17

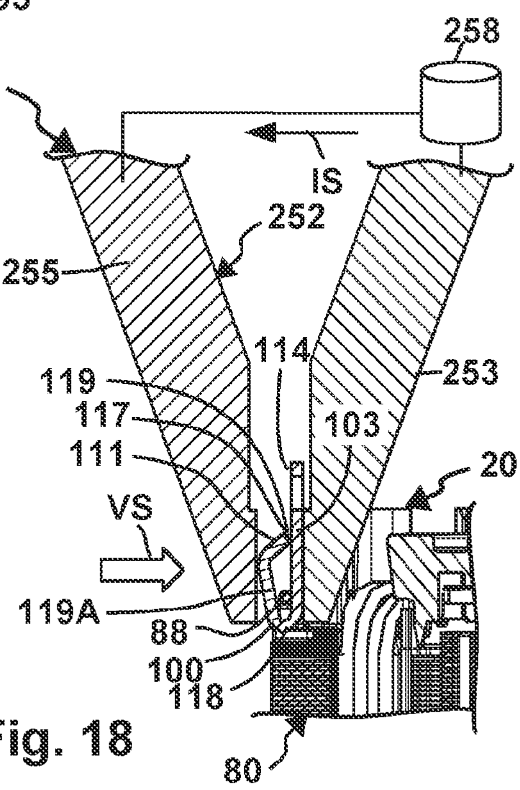
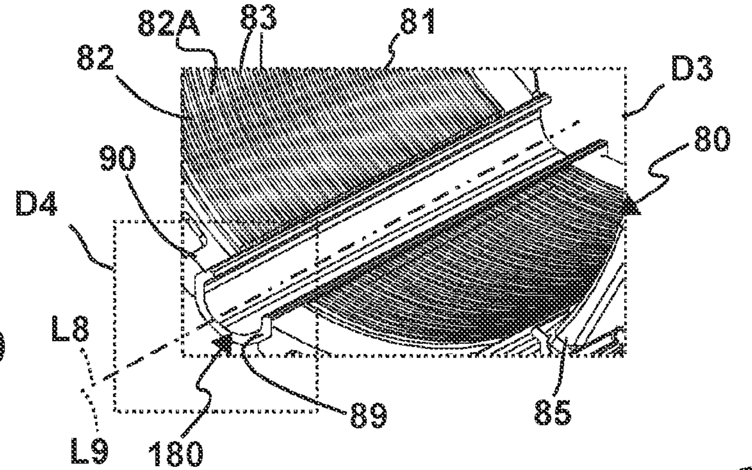


Fig. 18



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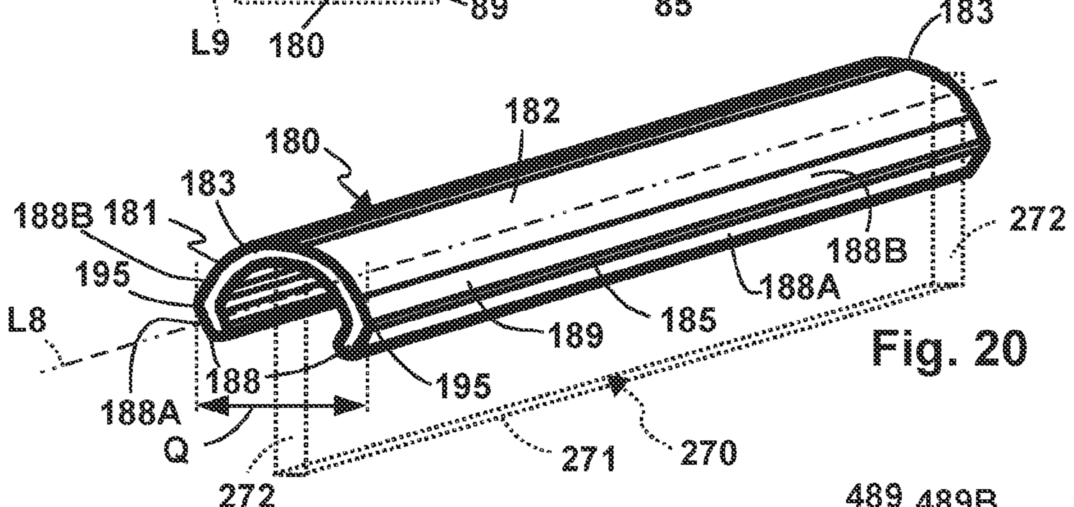

Fig. 20

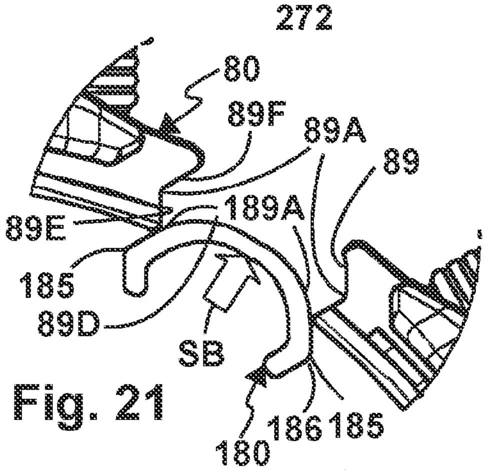

Fig. 21

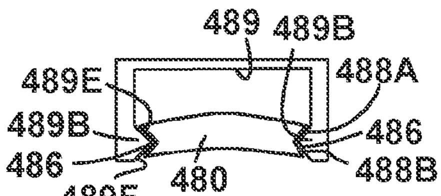

Fig. 23B

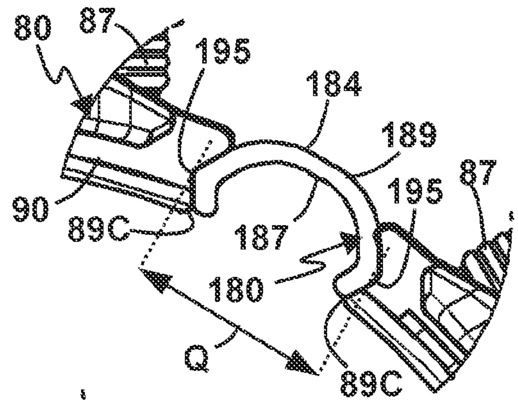

Fig. 23

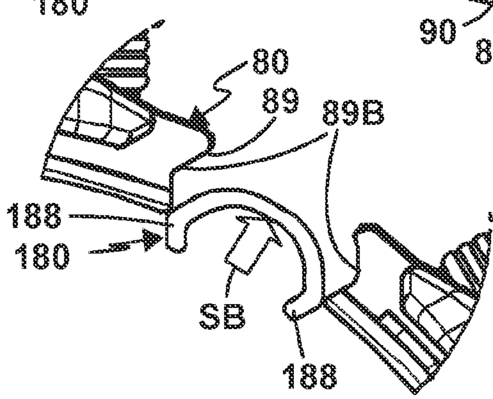

Fig. 22

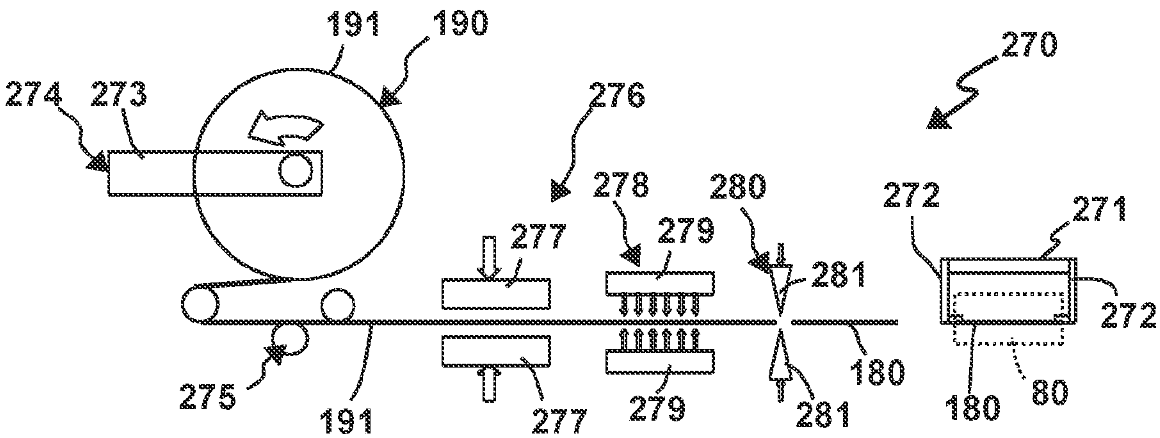
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Fig. 24

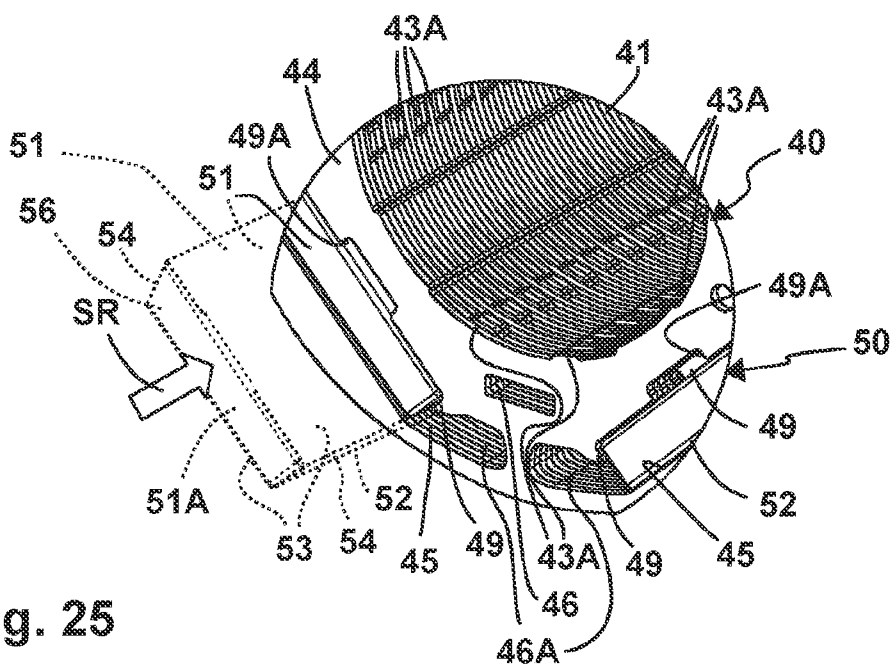
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Fig. 25

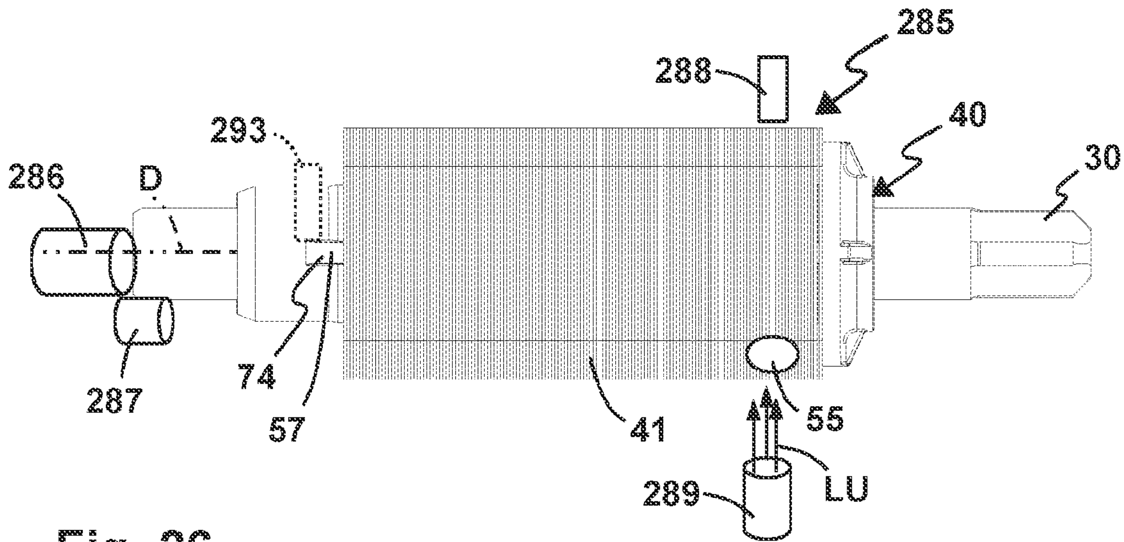
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Fig. 26

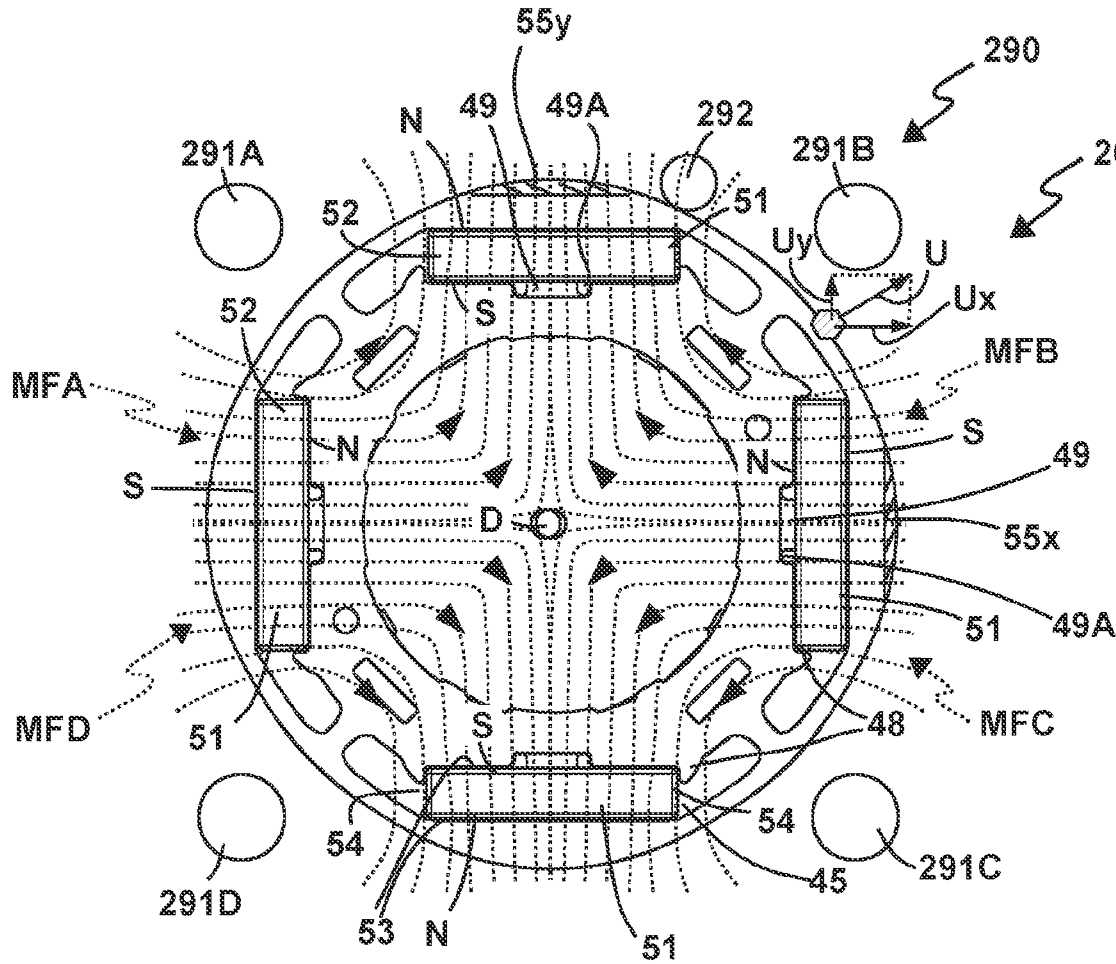
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Fig. 27

DRIVE MOTOR WITH A CONNECTION DEVICE

[0001] The invention relates to a drive motor for a suction device or a machine tool in the form of a handheld power tool or a semi-stationary machine tool, wherein the drive motor includes a stator having an excitation coil assembly and a rotor having a motor shaft, which is rotatably mounted around a rotational axis on the stator or with respect to the stator by means of a bearing assembly, wherein the drive motor includes a connecting unit for electrically connecting the drive motor to an energizing unit for energizing the excitation coil assembly, wherein the connecting unit includes a base body for fastening on the stator and a receptacle arm protruding from the base body, between which a conductor receptacle for at least one electrical coil conductor of an excitation coil of the excitation coil assembly is formed, and wherein the connecting unit includes a connecting contact region for electrically connecting a connecting line for connection to the energizing unit. The invention furthermore relates to a method for installing such an electrical connecting unit of such a drive motor.

[0002] Such a connecting unit can also be referred to as a terminal. The electrical connecting line is, for example, plugged or soldered onto the terminal to electrically connect an excitation coil to the energizing unit in this way.

[0003] A receptacle arm typically protrudes obliquely at an angle from a plate-shaped base body, which is used for the connection to the connecting line, so that the conductor receptacle is laterally open to insert the coil conductor or the coil conductors into the conductor receptacle. A curved bottom region is provided between the receptacle arm and the base body, on which the coil conductor rests. The receptacle arm is subsequently moved toward the base body, for example bent. Finally, a welding current is introduced into the connecting unit via welding electrodes, which in particular flows through the bottom region and ensures significant heating there, so that, for example, a protective lacquer of the coil conductor melts and an electrical connection is established between the coil conductor and the connecting unit.

[0004] However, the great heat in the region of the bottom of the conductor receptacle has the result in some cases that the coil conductor is changed there to such an extent that it breaks in operation of the drive motor.

[0005] It is therefore the object of the present invention to provide an improved connecting unit.

[0006] To achieve the object, it is provided in the drive motor of the type mentioned at the outset that the receptacle arm and the base body are connected to one another by means of two electrically conductive connection regions and form a receptacle eye enclosing the conductor receptacle in a ring shape, so that the conductor receptacle has a closed state and a welding current between the base body and the receptacle arm can flow past the conductor receptacle via the electrical connection regions.

[0007] The receptacle eye is closed in a ring shape around the conductor receptacle, so that the welding current flows or can flow around the conductor receptacle.

[0008] The receptacle arm and the base body form a receptacle eye enclosing the conductor receptacle in a ring shape to receive the at least one coil conductor, which receptacle eye includes two electrically conductive connection regions between the base body and the receptacle arm, between which the conductor receptacle is arranged.

[0009] It is a basic concept here that the current not only flows via an electrical connection section, for example the transition region or connection section between base body and receptacle arm, but rather via a second connection region, so that the welding current quasi-flows through the conductor receptacle between the connection regions. Furthermore, the two electrical connection sections ensure that the welding current does not partially heat the connecting unit to a great extent, but rather that two connection sections are used so that the heat distribution is more favorable. The coil conductor thus becomes less hot and less negatively affected, for example.

[0010] A connecting unit for electrically connecting a drive motor for a suction device or a machine tool in the form of a handheld power tool or a semi-stationary machine tool to a power supply unit is also capable of achieving the object, wherein the drive motor includes a stator having an excitation coil assembly and a rotor having a motor shaft, which is rotatably mounted around a rotational axis on the stator or with respect to the stator by means of a bearing assembly, wherein the connecting unit includes a base body for fastening on the stator and a conductor receptacle for at least one electrical coil conductor of an excitation coil of the excitation coil assembly, wherein the conductor receptacle is formed between the base body and a receptacle arm, and wherein the connecting unit includes a connecting contact region for electrically connecting a connecting line for the power supply of the drive motor. It is provided that the receptacle arm and the base body are connected to one another by means of two electrically conductive connection regions and form a receptacle eye enclosing the conductor receptacle in a ring shape, so that the conductor receptacle has a closed state and a welding current between the base body and the receptacle arm can flow past the conductor receptacle via the electrical connection regions.

[0011] A method of the type mentioned at the outset provides the following to achieve the object:

- **[0012]** inserting the at least one coil conductor into the conductor receptacle
- **[0013]** connecting the receptacle arm and the base body while forming two electrically conductive connection regions, so that the receptacle arm and the base body form a receptacle eye enclosing the conductor receptacle in a ring shape and the conductor receptacle has a closed state, and
- **[0014]** applying welding electrodes to the base body and the connecting arm and energizing using a welding current, which flows via the electrical connection regions past the conductor receptacle between the base body and the receptacle arm.

[0015] In particular, it is advantageous if the method includes adjusting, in particular bending, the receptacle arm, in particular by means of at least one welding electrode, from a position spaced apart from the base body, in which the conductor receptacle has an open state and is open for insertion of the coil conductor on one side, into a position adjusted toward the base body, in which the conductor receptacle has the closed state. The receptacle arm is thus first adjusted away from the base body, so that the at least one coil conductor is easily insertable into the conductor receptacle. The receptacle arm is then moved toward the base body, the conductor receptacle is thus closed. A bending unit separate from the welding electrode can be used for this adjusting or bending, for example a pressure ram or the like.

However, it is advantageous if the welding electrodes simultaneously provide the positioning unit or bending unit.

[0016] It is to be noted here that advantageously at least one of the electrodes includes a point or tapers off narrowly at its free end, so that it is insertable into an intermediate space between the stator supporting the connecting unit, in particular a carrier body of the stator, and the connecting unit. This welding electrode is preferably a welding electrode which supports the connecting unit, in particular its base body, in a stationary manner. A welding electrode opposite to this welding electrode is used for adjusting the receptacle arm toward the base body.

[0017] The material of the connecting unit in the region of the receptacle eye, thus, for example, the base body and the receptacle arm protruding from the base body, is preferably a metal material, in particular a soft metal material, for example copper, aluminum, or the like. A hardness of the material of the connecting unit in the region of the receptacle eye corresponds, for example, to a Mohs hardness of 2.5 to 3 or a Vickers hardness (VHN) of 77-99 at a testing force of 100 g.

[0018] It can be provided that the receptacle arm is more or less mechanically prepared or designed for the electrical contact or to produce the electrical connection region with the main body, for example in that a closing leg protrudes from an arm section of the receptacle arm in the direction of the base body. However, it is also possible that, for example, the welding electrode(s) or a pressure ram processes the receptacle arm, in particular deforms it. A partial deformation of an end region of the receptacle arm is advantageously provided, in particular by means of at least one welding electrode, in the direction of the base body in such a way that a free end of the receptacle arm, in particular an end side or narrow side of the receptacle arm, is in touch contact with the base body to form one of the electrical connection regions before and during the energizing using the welding current. For example, the welding electrode or the pressure ram can form the closing leg by deformation of the receptacle arm.

[0019] The receptacle arm is advantageously adjustable from a position spaced apart from the base body, in which the receptacle arm has an open state and is open on one side for inserting the at least one coil conductor, into a position adjusted toward the base body, in which the receptacle arm has the closed state. For example, the receptacle arm forms a hook projection, which protrudes in front of the base body in the open state of the conductor receptacle. The conductor receptacle thus includes an insertion opening in the open state. For example, the receptacle arm protrudes in a V-shape from the base body in the open position of the conductor receptacle.

[0020] It is advantageously provided that a free end of the receptacle arm, in particular an end side or narrow side of the receptacle arm, is in touch contact with the base body to form one of the electrical connection regions before and during the energizing using the welding current. The touch contact is maintained, for example, in that the welding electrodes which press against the receptacle arm and base body keep the free end of the receptacle arm in touch contact an electrical contact with the base body. In particular in the touch contact region, such a heat arises upon application of welding current to the connecting unit that the initially still free end of the receptacle arm fuses or welds with the base body.

[0021] It is advantageously possible that the receptacle arm is welded at one or both electrical connection regions to the base body, in particular by means of an electrical weld. However, it is advantageous if the receptacle arm is only welded to the base body at one of the electrical connection regions, namely at its initially still free end region. However, the receptacle arm can also be a component which is initially separate from the base body and is welded to the base body at the connection regions. For example, the receptacle arm can be designed in the manner of a hasp.

[0022] As explained, it is possible that the receptacle arm and the base body are two separate components from one another. However, it is advantageous if the receptacle arm is fixedly connected to or integral with the base body by means of a connection portion.

[0023] The connection portion can form one of the electrical connection regions, for example. The welding current can flow from the base body to the receptacle arm via the connection portion.

[0024] The connection portion in particular has an arched or curved profile.

[0025] For example, the connection region forms a receptacle groove or a bottom of the conductor receptacle.

[0026] It is possible that the connection portion is V-shaped or U-shaped.

[0027] The receptacle arm can have, for example, an elongated formation. However, the receptacle arm can also have an arched, U-shaped, or V-shaped profile.

[0028] It is advantageous if the receptacle arm includes an arm portion which is opposite to a front side of the base body in the region of the conductor receptacle in the closed state of the conductor receptacle at a distance suitable to receive the at least one coil conductor, in particular a parallel distance. The arm portion is connected, for example, via the connection portion to the base body. The arm portion and the base body in the region of the conductor receptacle preferably have a longitudinal formation. For example, a series arrangement or a stack of coil conductors, thus at least two coil conductors, can be received in the parallel distance between base body and arm section.

[0029] It is advantageously provided that the arm portion in the open state of the conductor receptacle protrudes at a larger angle from the front side of the base body than in the closed state of the conductor receptacle. For example, the arm portion protrudes in the open state obliquely at an angle from the base body and extends in the closed state in parallel to the front side of the base body.

[0030] It is advantageous if the receptacle arm includes a closing leg protruding from the arm portion in the direction of the front side of the base body. The closing leg protrudes at an angle from the arm portion. The closing leg can protrude at a right angle from the arm portion, for example. However, an oblique inclination of the closing leg from the arm portion in a direction away from the conductor receptacle is preferably provided.

[0031] A length of the closing leg and its angular positions with respect to the arm portion are preferably designed so that the arm portion, on its longitudinal end regions, at which the closing leg and the connection portion are provided, has the same distance or approximately the same distance to the front side of the base body in the closed state of the conductor receptacle.

[0032] It is advantageous in any case if the arm portion extends essentially in parallel to the front side of the base body in the closed state of the conductor receptacle.

[0033] It is furthermore preferably provided that the conductor receptacle includes a longitudinal formation in the region of the arm portion to receive multiple coil conductors in a series arrangement in parallel to the longitudinal extension of the arm portion.

[0034] A plug installation is advantageous. In particular, it is provided that the base body includes at least one insertion projection to be plugged into a socket of the stator.

[0035] The insertion projection can extend in parallel to the longitudinal extension of the conductor receptacle, for example. It is possible, for example, that the connecting contact region and the insertion projection are provided on opposing longitudinal end regions of the base body.

[0036] However, it is preferred if the at least one insertion projection protrudes laterally from the base body and/or the receptacle arm. For example, the insertion projection forms a lateral leg protruding laterally from the base body. In contrast, the receptacle arm preferably forms a front leg protruding frontally from the base body.

[0037] It is preferably provided that an insertion projection protrudes in each case from the base body on opposing sides. The insertion projections and the connecting contact region can form a T-shaped configuration, for example.

[0038] It is advantageous if the at least one insertion projection, on its free end region protruding from the base body, includes at least one formfitting contour for formfitting engagement in the socket of the stator, in particular a toothing. However, the formfitting contour can also include, for example, a barb, rounded sections, or the like. When welding current flows through the connecting unit, it heats up, so that the material of the stator in the region of the socket, preferably a plastic material, becomes soft and fuses with the at least one formfitting contour. Of course, it is also possible that the at least one formfitting contour includes one or more sharp edges which cut into the socket of the stator and ensure a hold of the connecting unit there.

[0039] It is expediently provided that the at least one insertion projection is arranged on a portion of the base body delimiting the conductor receptacle. In this configuration, the insertion projection ensures a hold of the connecting unit in the region of the conductor receptacle. For example, the above-mentioned T-shaped formation thus results.

[0040] It is furthermore advantageous if a free end region of the at least one insertion projection and the base body lie in planes parallel to one another and spaced apart from one another. The insertion projection and the base body are connected to one another by means of a step, for example.

[0041] In particular, it is advantageous if a step is present between the at least one insertion projection and the base body.

[0042] It is preferably provided that, on at least one of the electrical connection regions between the base body and the receptacle arm, a support contour is arranged to support the at least one coil conductor at a distance to an inner surface, in particular a bottom, of the conductor receptacle on the connection region, so the at least one coil conductor is not in touch contact with the connection region during energizing using the welding current. The at least one support contour, preferably multiple support contours, ensure that heat generated by the welding current does not act or acts to a lesser extent from the connection region on the at least one coil conductor.

[0043] In principle, it is possible that the at least one support contour forms a component of the connecting unit. For example, a support contour can be arranged on the base body, for example a depression, which supports the coil conductor at a distance to the connection region between base body and receptacle arm. If the connecting unit provides the support contour, it is advantageous if a thermal insulation is present between the support contour and the connection region. For example, a carrier body made of plastic or the like can be arranged on the base body, which provides the support contour of the connecting unit.

[0044] It is advantageously provided that the support contour is arranged on a component separate from the connecting unit, in particular the stator or an installation unit. In particular, it is advantageous if a carrier body of the stator, for example a plastic carrier body of the stator, which carries and/or encloses a laminated core of the stator, provides the support contour. It is also possible that the support contour does not form a component of the drive motor, but rather is arranged on the installation unit. The installation unit can include, for example, support projections, which support the at least one coil conductor during the welding process and hold it at a distance to the electrical connection region adjacent to the conductor receptacle. When the welding process is completed, the support is no longer necessary. The coil conductor can then, for example, already be partially fused with the material of the connecting unit, so that it is held fixed in place with respect to the conductor receptacle.

[0045] An arrangement of the connecting unit between two support contours is advantageous.

[0046] It is advantageously provided that an electrical connection region between the base body and the receptacle arm is arranged between two support contours of the stator, in particular two support contours on an electrically insulating carrier body of the stator, wherein the support contours support the at least one coil conductor at a distance to the in particular trough-shaped connection region. For example, support shoulders can be provided on the carrier body of the stator, on which the at least one coil conductor rests.

[0047] Further measures can be provided for mechanically protecting the coil conductor. For example, it is advantageous if the connecting unit includes an elongated support surface and a lateral narrow side angled thereto in the region of the conductor receptacle, wherein an oblique surface obliquely inclined to the support surface and to the narrow side for supporting the at least one coil conductor is arranged between the support surface and the narrow side. The support surface is provided, for example, on a bottom of the bearing receptacle. However, the term support surface is not to be understood to mean that the coil conductor rests or has to rest on the support surface, but rather that it is held, for example, by the above-mentioned support contour or the support contours at a distance to this support surface.

[0048] The connecting contact region of the connecting unit contains, for example, an insertion projection or a socket for plugging on the connecting conductor, which is provided for the connection to the energizing unit. Furthermore, the connecting contact region advantageously includes a solder surface and/or a hole for soldering on a connecting conductor.

[0049] A magnet assembly arranged on the rotor comprises magnets, in particular permanent magnets.

[0050] For example, magnet bodies of the magnets which are magnetized or suitable for magnetization on the laminated core of the rotor consist of aluminum-nickel-cobalt, Bismanol, thus an alloy made up of bismuth, manganese, and iron, of a ferrite, for example a hard-magnetic ferrite, for example based on barium, strontium, of neodymium-iron-boron (NdFeB), advantageously with an additive of dysprosium, of samarium-cobalt (SmCo), advantageously having 20-25% iron component, e.g., $SmCo_5$, Sm_2Co_{17}, $Sm(Co,Cu,Fe,Zr)_z$, or the like. Rare-earth magnets or plastic magnets are also suitable. Furthermore, AlNiCo alloys, PtCo alloys, CuNiFe and CuNiCo alloys, FeCoCr alloys, martensitic steels, or MnAlC alloys are suitable for the magnet bodies.

[0051] The drive motor is preferably a brushless motor or electronically commutated motor. In particular, it is advantageous if the respective stator of the drive motor includes permanent magnets or is excited by permanent magnets.

[0052] Laminated cores of the rotor and/or the stator are preferably produced from layered electrical sheets or transformer sheets.

[0053] A stator of the drive motor expediently comprises a carrier body made of plastic, in particular made of polyamide. The carrier body is produced, for example, by potting and/or extrusion coating the laminated core of the stator. It is also possible that the carrier body comprises one or more plug bodies or plug carrier bodies, which are plugged onto the laminated core. For example, such a plug carrier body can be plugged onto one or both end sides of the laminated core. The carrier body preferably covers the laminated core in the region of the rotor receptacle and/or in the region of one or both end sides of the laminated core. Supports, support projections, winding heads, and the like for accommodating coil conductors of the excitation coil assembly are preferably provided on the carrier body. Furthermore, the carrier body preferably includes electrical connecting contacts or connecting units for connecting a connecting line, using which the drive motor is connectable or connected to an energizing unit.

[0054] Exemplary embodiments of the invention are explained hereinafter on the basis of the drawings. In the figures:

[0055] FIG. **1** shows a perspective diagonal illustration of a system of two electric drive motors and hand-held power tools which include these drive motors,

[0056] FIG. **2** shows a side view of the one drive motor of the system according to FIG. **1**, of which in

[0057] FIG. **3** a section is shown along a section line A-A FIG. **2**,

[0058] FIG. **4** shows a section through the other drive motor of the system according to FIG. **1**, approximately along the same section line A-A corresponding to FIG. **2**,

[0059] FIG. **5** shows an insulation sleeve of the drive motor according to FIG. **4** in a perspective illustration,

[0060] FIG. **6** shows a perspective illustration of a rotor of the drive motor according to FIG. **4**,

[0061] FIG. **7** shows a sectional illustration through the rotor according to FIG. **6** during its production, approximately along a section line B-B in FIG. **6**,

[0062] FIG. **8** shows the view approximately corresponding to FIG. **7**, wherein the motor shaft is inserted completely into the rotor laminated core, however,

[0063] FIG. **9** shows a detail D**1** from FIG. **8**,

[0064] FIG. **10** shows a perspective diagonal view of the stator according to FIG. **1**, approximately corresponding to a detail D**2** in FIG. **1**,

[0065] FIG. **11** shows a section along a section line C-C through the stator according to FIG. **10** to illustrate a connecting unit, which in

[0066] FIG. **12** is shown laterally in the open state and in

[0067] FIG. **13** is shown laterally in the closed state,

[0068] FIG. **14** shows a perspective illustration of the connecting unit according to FIG. **12**, and

[0069] FIG. **15** shows a perspective illustration of the connecting unit according to FIG. **13**,

[0070] FIG. **16** shows a perspective diagonal illustration to illustrate an installation and processing of the connecting unit according to FIGS. **10** to **14** in a perspective diagonal illustration, approximately corresponding to FIG. **10** with a welding gun,

[0071] FIG. **17** shows a section through the arrangement according to FIG. **16** approximately along a section line D-D,

[0072] FIG. **18** shows the image according to FIG. **17**, but with welding gun arms moved toward one another,

[0073] FIG. **19** shows a detail D**3** of the stator according to FIG. **1** with a groove cover, which in

[0074] FIG. **20** is shown diagonally in perspective,

[0075] FIG. **21** shows a detail D**4** from FIG. **19** during an installation of the groove cover according to FIG. **17** in a stator groove,

[0076] FIG. **22** shows detail D**4**, but with groove cover adjusted further in the stator groove, and

[0077] FIG. **23** shows detail D**4** with fully installed groove cover,

[0078] FIG. **23**B shows alternative embodiments of a groove cover and a groove, approximately corresponding to the view according to FIG. **23**,

[0079] FIG. **24** shows a schematic illustration of an installation unit for producing the groove cover according to FIG. **19** and its installation on the stator according to FIGS. **21** to **23**,

[0080] FIG. **25** shows a perspective diagonal view of a detail of a rotor of the above-mentioned motor, approximately corresponding to a detail D**5** in FIG. **6**, and

[0081] FIG. **26** shows a schematic illustration of a balancing unit for balancing the rotor according to the above figure, and

[0082] FIG. **27** shows a schematic frontal view of the rotor according to the above figure with a magnetizing device.

[0083] FIG. **1** shows a system illustration comprising a hand-held power tool **300**, for example a saw, in which a drive motor **20** drives a tool receptacle **301** for a working tool, for example directly or via a gearing (not visible in the drawing). A working tool **302**, for example a cutting tool, sawing tool, or the like is arrangeable or arranged on the tool receptacle **301**. The drive motor **20** is accommodated in a housing **303** of the power tool **300** and can be switched on and switched off by means of a switch **304**. A speed of the drive motor **20** is preferably also adjustable using the switch **304**.

[0084] A connecting cable **305** for connection to a power supply grid EV is used for the electrical power supply of the hand-held power tool **300**. The power supply grid EV provides a supply voltage P**1**, for example 110 V AC voltage, 230 V AC voltage, or the like. The hand-held power tool **300** can include an energizing unit **306** connected between the switch **304** and the drive motor **20**.

[0085] The drive motor **20** can also be provided to operate a suction device **400**, in particular to drive a suction turbine of the suction device **400**. The suction device **400** includes the drive motor **20** and is connectable, for example, by means of a connecting cable **405** to the power supply grid EV.

[0086] The voltage P**1** is in any case significantly greater, for example at least four times to five times greater, than a voltage P**2**, which an energy accumulator **205** of a hand-held power tool **200** provides. The voltage P**2** is, for example, a DC voltage of 14 V, 18 V, or the like.

[0087] The hand-held power tool **200** is, for example, a power screwdriver, drill, or the like. A drive motor **120**, which is suitable for the lower voltage P**2**, is accommodated in a housing **203** of the hand-held power tool **200**. The drive motor **120** is energized by an energizing unit **206**, which is supplied with electrical energy by the energy accumulator **205**. The drive motor **120** drives a tool receptacle **201** for a working tool **202**, for example a drilling tool or screwing tool, directly or via a gearing **208**. The energizing unit **206** can be switched on, switched off, and/or designed for adjusting a speed of the drive motor **120** by way of a switch **204**.

[0088] The drive motors **20**, **120** include partially identical or similar components.

[0089] For example, motor shafts **30** and **130** alternately usable in the drive motors **20**, **120** each include bearing portions **31**, **32**, between which a holding portion **33** is provided. The bearing portion **32** is located adjacent to an output portion **34**, which is used to drive the tool receptacle **201** or **301**. For example, a gearwheel can be arranged or arrangeable on the output portion **34**. Alternatively, gear teeth **35** are provided as indicated in the case of a motor shaft **130**. The holding portion **33** preferably includes a formfitting contour **36**, which extends between planar portions **37**, which thus do not include a formfitting contour.

[0090] The formfitting contour **36** comprises, for example, grooves and/or projections **36**A extending in parallel to a longitudinal axis L of the motor shaft **30**. However, a fluting, a honeycomb-like structure, or the like can also be provided as the formfitting contour **36**.

[0091] A formfitting contour **136** of the motor shaft **130** comprises, for example, formfitting projections **136**A inclined obliquely to the longitudinal axis L. The formfitting projections **136**A have a slight oblique inclination, however, for example between 5 and 15°, so that the formfitting projections **136**A extend essentially in parallel to the longitudinal axis L.

[0092] The formfitting contours **36**, **136** form, for example, formfitting contours **36**B, **136**B. The output portion **34** can be provided to drive a fan wheel. For example, a fan wheel holder **38** is provided on the motor shaft **130**, which is arranged, for example, between the gear teeth **35** and the bearing portion **32**.

[0093] The motor shaft **30** or **130** is connectable in a rotationally-fixed manner to a laminated core **41** or **141** of a rotor **40**, **140**. The laminated cores **41**, **141** include sheets **43** arranged adjacent to one another in a series arrangement transverse to the longitudinal axis L, for example electrical sheets or transformer sheets, in a way known per se.

[0094] The laminated cores **41**, **141** include shaft through-openings **42**, **142**, which have different diameters. The shaft through-opening **42** has a larger diameter than the shaft through-opening **142**. The motor shaft **30** or **130** can be inserted by means of an insulation sleeve **60** into the shaft through-opening **42**, while the motor shafts **30** or **130** can be inserted directly into the shaft through-opening **142**, i.e., an insulation sleeve or similar other body is not necessary.

[0095] The insulation sleeve **60** forms an insulation body **60**A, by means of which the laminated core **41** is electrically insulated from the respective motor shaft **30** or **130** carrying it.

[0096] Magnet assemblies **50** are arranged on the laminated cores **41** and **141**. The laminated cores **41** or **141** include holding receptacles **45** for magnets **50** of the magnet assemblies **50**. For example, four holding receptacles **45** and associated magnets **51** are provided, so that the rotor **40**, **140** forms a total of four magnetic poles. The magnets **51** are, for example, permanent magnets.

[0097] The magnets **51** have, for example, a plate-shaped design. The magnets **51**, for example, magnet plates or plate bodies **56**. The holding receptacles **45** are accordingly suitable for accommodating plate-shaped, thus flat rectangular, cubic plate bodies or magnet plates and include corresponding inner circumferential contours.

[0098] The holding receptacles **45** and the magnets **51** extend in parallel to the longitudinal axis L of the motor shaft **30**, **130** or in parallel to the rotational axis D of the motor **20**, **120**.

[0099] Furthermore, the rotor **40**, in particular as the laminated core **41**, **141**, is penetrated by air ducts **46**, which extend in parallel to the longitudinal axis L of the motor shaft **30**, **130** and are open at the end sides **44** of the rotor **40**, **140**, so that air can flow through the laminated cores **41**, **141**.

[0100] The shaft through-opening **42**, **142** does have an essentially circular inner circumferential contour, but advantageously additionally also has a twist-lock contour **47**, in particular a twist-lock receptacle **47**A. The twist-lock contour **47** is, for example, a longitudinal groove **47**B, which extends in parallel to the rotational axis D or longitudinal axis L.

[0101] Both motor shafts **30**, **130** can each be inserted into the laminated cores **41**, **141**.

[0102] In the laminated core **141**, the shaft through-opening **142** of which has a smaller diameter than the shaft through-opening **42** of the other laminated core **41**, the respective motor shaft **30**, **130** can be inserted directly into the shaft through-opening **142**, for example pressed in.

[0103] The narrow sides or end sides of the sheets **43**, which delimit the inner circumference of the shaft through-opening **42** or protrude into it, advantageously claw together with the motor shaft **30**, **130**, so that it is accommodated non-displaceably in the laminated core **141** in a first direction parallel to the rotational axis D or to its longitudinal axis L. An electrical conductivity of the laminated core **141** and the motor shaft **30**, **130**, which preferably consists of metal, is possible in spite of the direct contact between the laminated core **141** and the motor shaft **30**, **130**, because the rotor **140** is provided for use with the drive motor **120** and thus for the lower voltage P**2**.

[0104] In contrast, insulation measures are taken in the rotor **40**, so that in spite of the electrical conductivity of the motor shaft **30**, **130** and of the associated laminated core **41**, electrical safety is provided.

[0105] Specifically, the motor shaft **30**, **130** is accommodated by means of an insulation sleeve **60** in the laminated core **41**. The insulation sleeve **60** thus more or less forms a protective jacket or an outer envelope of the motor shaft **30**, **130** in the section which is accommodated in the shaft through-opening **42**.

[0106] The insulation sleeve **60** includes a tube portion **63** between its longitudinal ends **61**, **62**, which is arranged in a sandwiched manner between the laminated core **41** and the motor shaft **30**, **130** and electrically insulates it from the laminated core **41**.

[0107] The tube portion **63** includes a socket **64** for inserting through the motor shaft **30**, **130**, which extends from the longitudinal end **61** to the longitudinal end **62**. In the region of the longitudinal end **61**, the socket **64** has an insertion opening **64**A, through which the motor shaft **30** is insertable into the socket **64**. The motor shaft **30** exits from the socket **64** at an exit opening **64**B.

[0108] In the region of the longitudinal end **61**, i.e., a longitudinal end region **61**A, the socket **64** has a larger diameter W**1** and thus a larger inner cross section WQ**1** than in the region of the longitudinal end **62**, i.e., a longitudinal end region **62**A, where a smaller diameter W**2** and thus a smaller inner cross section WQ**2** is provided. For example, the diameter of the motor shaft **30**, **130** is approximately 10 mm in the region of the longitudinal ends **61**, **62**. In contrast, the diameter W**2** is smaller by approximately 0.2 mm to 0.3 mm than the diameter W**1** before the motor shaft **30**, **130** is inserted into the socket **64**. Thus, when the motor shaft **30**, **130** is inserted along an insertion axis S into the insulation sleeve **60** from the longitudinal end **61** to the longitudinal end **62**, as indicated in FIG. **7**, it first penetrates slightly or with transverse play with respect to the insertion axis S into the insertion opening **64**A at the longitudinal end **61**, where the socket **64** has the diameter W**1**. The diameter W**1** is advantageously somewhat larger than the diameter of the motor shaft **30**, **130** at its free longitudinal end provided to be inserted into the socket **64**. The region of the insertion opening **64**A forms a centering section, in which the motor shaft **30**, **130** is centered with respect to the insulation sleeve **60** or the rotational axis D. For example, the motor shaft **30** has the same outer cross section or outer diameter both in the region of the diameter W**1** and also in the region of the diameter W**2**.

[0109] Alternatively or additionally, it is possible that, for example, the motor shaft **30** includes a first outer cross section AQ**1** and a second outer cross section AQ**2**, which are associated with the longitudinal ends **61**, **62** of the socket **64**, wherein the first outer cross section AQ**1** is smaller than the second outer cross section AQ**2**. In this design of the motor shaft **30**, it is also possible that the diameters W**1** and W**2** and thus the inner cross sections of the socket **64** are identical or approximately equal in the region of the longitudinal ends **61** and **62**.

[0110] The socket **64** becomes narrower from the diameter W**1** to the diameter W**2**, preferably continuously, between the longitudinal ends **61**, **62**. However, it would also be possible that at least one step is provided between the diameter W**1** and the diameter W**2**. The socket **64** advantageously includes a plug cone, which becomes narrower from the longitudinal end **61** to the longitudinal end **62**.

[0111] Insertion bevels **65**, for example an insertion cone, are advantageously provided at the longitudinal end **61** in order to facilitate the insertion process of the motor shaft **30**, **130** into the socket **64**.

[0112] When the motor shaft **30**, **130** is inserted along the insertion axis S into the socket **64**, it penetrates further and further in the direction of the longitudinal end **62**, wherein it more or less widens the tube portion **63**, which becomes narrower toward the longitudinal end **62**.

[0113] The installation is structured as follows:

[0114] First the insulation sleeve **60** is inserted into the shaft through-opening **42** of the laminated core **41**.

[0115] It is advantageously provided that the insertion cross section or inner cross section of the shaft through-opening **42** is equal or approximately equal over its entire length provided for the insertion of the insulation sleeve **60**.

[0116] However, it is also possible that the shaft through-opening **42** has a larger inner cross section at a longitudinal end region **41**A provided for inserting the insulation sleeve **60** than at a longitudinal end region **41**B opposite to this longitudinal end region.

[0117] The motor shaft **30**, **130** is then inserted into the socket **64**. Therefore, when is inserted along the insertion axis S into the socket **64**, the motor shaft **30**, **130** presses the radial outer circumference of the tube portion **64** in the direction of the radial inner circumference of the shaft through-opening **42**. The sheets **43** preferably engage with their narrow sides facing toward the shaft through-opening **42** like teeth into the circumferential wall **66**.

[0118] The socket **64** has the narrower diameter W**2** up into a region in front of the laminated core **41**, so that the motor shaft **30**, **130**, when it reaches this region of the socket **64**, then widens the circumferential wall **66** of the tube portion **63** radially outward with respect to the insertion axis S and thus more or less stretches the tube or the tube portion **63**. A formfitting section **75** having a step **67** thus forms on the outer circumference of the circumferential wall **63**, which directly engages in or engages behind the end side **44** of the laminated core **41**. The step **63** thus holds the insulation sleeve **60** with a force direction opposite to the insertion direction, in which the motor shaft **30**, **130** is insertable into the socket **64**, on the laminated core **41**.

[0119] At the other longitudinal end region, the longitudinal end **61**, the insulation sleeve **63** includes a flange body **68**, which protrudes radially outward from the tube portion **63** with respect to the insertion axis S or the longitudinal axis L.

[0120] The flange body **68** forms a longitudinal stop **68**A with respect to the insertion axis S and is supported, for example, on the end side **44** of the laminated core **41** in the region of the longitudinal end **61**. The flange body **68** includes, for example, reinforcing ribs **69**, which extend from its radial circumference in the direction of the socket **64**, i.e., radially inward toward the insertion axis S. The reinforcing ribs **69** are arranged, for example, on an end side **71** of the flange body **68** facing away from the laminated core **41**.

[0121] Furthermore, a support stop **70** for the motor shaft **30**, **130** is provided on the insertion opening **64**A, on which a support stop **39**, for example a step, of the motor shaft **30**, **130** can strike with a force direction parallel to the insertion axis S. The support stop **70** is formed, for example, by a step between the end side **71** of the insulation sleeve **60** and the socket.

[0122] The insulation sleeve **60** preferably has a smaller outer circumference or diameter in the region of the longitudinal end **62** or on the outlet opening **64**B than in the region of the longitudinal end **61**. For example, insertion bevels **72** are provided on the longitudinal end **62**, which facilitate the insertion of the insulation sleeve **60** into the shaft through-opening **42** of the laminated core **41**. The longitudinal end **62** is designed, for example, as an insertion projection.

[0123] Preferably, the insulation sleeve **60** protrudes at the longitudinal end **62** with a tube portion **73** forming an insulation portion **76** from the end side **44** of the laminated core **41**, so that electrical insulation is provided there between the motor shaft **30**, **130**, on the one hand, and the sheets **43**, on the other hand.

[0124] In contrast, at the other longitudinal end **61**, the flange body **68**, which more or less protrudes or projects laterally from the shaft through-opening **42**, ensures electrical insulation and also forms an insulation portion **76**. Therefore, for example, an electrical insulation distance of, for example, approximately 8 mm to 10 mm, for example an air and creep distance, which is capable of electrical insulation with respect to the voltage P**1**, results both in the region of the flange body **68** and also on the tube portion **73**.

[0125] A twist-lock contour **74** to engage in the twist-lock contour **47** of the laminated core **41** is preferably arranged on the radial outer circumference of the insulation sleeve **60**, in particular over the entire longitudinal extension of the tube portion **63**. The twist-lock contour **74** is designed, for example, as a twist-lock projection **74**A, in particular as a longitudinal projection or a longitudinal rib **74**B, which extends in parallel to the insertion axis S or rotational axis D.

[0126] The insulation sleeve **60** is accommodated in a clamp fit or press fit between the motor shaft **30**, **130** and the laminated core **41**. A friction lock is thus implemented.

[0127] In addition, a form fit is also provided by the twist-lock contours **47**, **74**, by means of which the insulation sleeve **60** is held in a formfitting manner on the laminated core **41** with respect to and/or transversely to the rotational axis D.

[0128] The formfitting contour **36**, **136** of the motor shaft **30**, **130** engages like teeth in the inner circumference of the tube portion **63**, so that the motor shaft **30**, **130** is also accommodated in the insulation sleeve **60** twist-locked with respect to its rotational axis D or longitudinal axis L and/or displacement-fixed with respect to the rotational axis D or the longitudinal axis L. The formfitting contour **36**, **136** advantageously forms a counter formfitting contour on the inner circumference of the tube portion **36**, thus, for example, plastically deforms the inner circumference of the tube portion **63**, so that the formfitting contour **36**, **136** is engaged in a formfitting manner with this counter formfitting contour. The plastic deformation or embossment of the counter formfitting contour results or forms, for example, during the insertion of the motor shaft **30**, **130** into the insulation sleeve **60**.

[0129] The insulation sleeve **60** thus enables the motor shafts **30**, **130**, which can be inserted directly without additional measures into the laminated core **141**, to also be readily usable with the laminated core **41**. Different motor shafts thus do not have to be constructed. The motor shafts **30**, **130** are geometrically identical at the holding portions **33**, which are provided for the connection to the laminated cores **41** or **141**. For example, length and diameter of the holding portions **33** are identical. However, it is possible that different surfaces and/or surface contours are provided in the region of the holding portions **33** of the motor shaft **30** and **130** for the respective optimum hold of the laminated core **41** or **141**.

[0130] Buttress projections **43**A protruding in the shaft through-opening **42** or **142** preferably penetrate into the radial outer circumference of the tube portion **63** of the insulation sleeve **60** or the radial outer circumference of the holding portion **33** of the motor shaft **30**, **130**. For example, formfitting sections **75**A, thus, for example, formfitting receptacles **75**B, form on the insulation sleeve **60**, in which the buttress projections **43**A engage, schematically indicated in FIG. **5**. The radial outer circumference of the tube portion **63** is displaced radially outward with respect to the insertion axis S or the rotational axis D, for example, by the motor shaft **30**, wherein the buttress projections **43**A penetrate into the tube portion **63** and preferably claw themselves therein.

[0131] The buttress projections **43**A are provided, for example, on the end sides of the sheets **43** facing toward the shaft through-opening **42** or **142**. Intervals, for example angular intervals and/or longitudinal intervals, are preferably provided between the buttress projections **43**A, in particular between groups of buttress projections **43**A, with respect to the rotational axis D. The buttress projections **43**A hold the insulation sleeve **60** in the shaft through-opening **42** or the motor shaft **30**, **130** in the shaft through-opening **142** in parallel to the rotational axis D and/or in the circumferential direction with respect to the rotational axis D. Multiple buttress projections **43**A are preferably provided at angular intervals around the rotational axis D. The insulation sleeve **60** is displaced radially outward by the motor shaft **30** inserted therein, so that the buttress projections **43**A penetrate, in particular penetrate in a claw-like manner, into the outer circumference or the jacket or the circumferential wall **66** of the insulation sleeve **60**.

[0132] The rotors **40**, **140** of the drive motors **20**, **120** can be used together with a stator **80**, which includes an excitation coil assembly **86**. The excitation coil assembly **86** can include differently designed excitation coils **87**, for example excitation coils **87** having more or fewer turns, having different conductor cross sections, or the like, in order to be suitable for the different voltages P**1** and P**2** and/or amperages of currents which flow through the excitation coils **87**.

[0133] The stator **80** includes a laminated core **81** having a rotor receptacle **82** designed as a through-opening for the rotor **40**, **140**. The rotor **40**, **140** is rotatably accommodated in the rotor receptacle **82**, wherein a narrow air gap is provided in a way known per se between the laminated core **81** and the laminated core **41**, **141**.

[0134] The laminated core **81** includes sheets **83**, for example electrical sheets or transformer sheets, the plate plane of which extends transversely to the rotational axis D of the drive motor **20**, **120**. The respective motor shaft **30**, **130** protrudes from end sides **84**, **85** of the laminated core **81**, where it is rotatably mounted on bearings **24**, **25** of a bearing assembly **24**A.

[0135] The bearings **24**, **25** are held on bearing receptacles **23** by bearing covers **21**, **22**, which frontally close the stator **80**.

[0136] The bearings **24**, **25** can be inserted, in particular pressed, into the bearing receptacles **23** of the bearing covers **21**, **22**. However, it is also possible that the bearings **24**, **25** are extrusion coated or potted using the material of the bearing covers **21**, **22**.

[0137] For example, the bearing covers **21**, **22** are permanently connected to the laminated core **41** or a carrier body **90** carrying the laminated core **41**, for example screwed on, adhesively bonded, or preferably welded.

[0138] The bearing covers **21**, **22** and the carrier bodies **90** are preferably made of plastic, in particular of a thermoplastic. The same plastic, for example the same thermoplastic, is preferably used for the bearing covers **21**, **22** and the carrier bodies **90**.

[0139] For example, the carrier body **90** is produced in a casting method, during which the laminated core **81** is potted.

[0140] The carrier body **90** includes bearing cover receptacles **91** for the bearing covers **21**, **22**. For example, circumferential walls **26** of the bearing covers **21**, **22** are insertable, for example with their end sides, into the bearing cover receptacles **91**. The bearing cover **21** is arranged closer to the output portion **34** of the motor shaft **30**, **130**. The bearing cover **22** on the region more remote therefrom. The bearing covers **21**, **22** close the laminated core **81** on longitudinal end regions opposite to one another. The bearing cover **21** protrudes less from the end side of the laminated core **41**, **141** than the bearing cover **22**. The bearing cover **21** includes a receptacle space **21**A for the flange body **68**.

[0141] The bearing **24** is closer to the potentially current-conducting laminated cores **41**, **81** than the bearing **25**.

[0142] The bearing **24** and the bearing **25** are electrically conductively connected to the bearing portion **31** and thus the motor shaft **30**, **130**, so that as such the hazard exists that a voltage from the excitation coil assembly **86** will jump over to the motor shaft **30**, **130**.

[0143] However, a sufficient electrical insulation distance is provided by the electrically insulating flange body **68**, so that this hazard no longer exists.

[0144] The bearing **25**, in contrast, has a greater longitudinal distance with respect to the rotational axis D to the end side of the laminated cores **41**, **81**, so that the hazard of an electrical flashover from, for example, the excitation coil assembly **86** to the motor shaft **30**, **130** also does not threaten here in the region of the bearing **25**. Moreover, the electrically insulating tube portion **73** of the insulation sleeve **60**, which protrudes from the laminated core **41** in the direction of the bearing cover **22**, ensures sufficient electrical insulation.

[0145] The coil conductors **88** of the excitation coils **87** extend in the laminated core **81** through grooves **89**, which are arranged, for example, in parallel to the rotational axis D or obliquely inclined thereto. The grooves **89** have insertion openings **89**D, which are open to an inner circumference **82**A of the rotor receptacle **82**. The grooves **89** extend between the end sides **84**, **85**. The coil conductors **88** can be introduced into the grooves **89** through the insertion openings **89**D and, for example, wound around winding heads or winding hammers of the laminated core **81**.

[0146] The portions of the laminated core **81** facing toward the rotor receptacle **82** of the stator **80**, which are located between the grooves **89**, are covered by an inner lining **92**, for example extrusion coated using plastic, but the grooves **89** are initially open, so that the coil conductors **88** can be laid therein.

[0147] The excitation coils **87** are furthermore wound around support projections **93** on the end side **84** of the stator **80**, which more or less form winding heads.

[0148] On the opposite end side **85**, support projections **94** are provided, which are also suitable for wrapping with coil conductors of excitation coils, but in some embodiments are not wrapped.

[0149] The end side **85** more or less represents the connection side of the drive motor **20**, **120**. Electrical connecting units **100** are provided there, to which, for example, connecting lines **15** for the electrical connection to the energizing unit **206**, **306** are connectable or connected. The connecting lines **15** include a plug connector for plugging onto an energizing unit **206**, **306**. The connecting units **100** can also be referred to as terminals.

[0150] The connecting lines **15** can, for example, be plugged onto the connecting units **100** or also directly soldered thereon. The connecting units **100** include, for example, connecting contact regions **101** designed as contact projections, on which connecting plugs, which are connected to the connecting lines, can be plugged on. Furthermore, holes **102** are provided on the connecting contact regions **101**, through which, for example, a connecting conductor of the connecting lines **15** can be led through and soldered to the connecting unit **100** or electrically connected in another way. For example, welding of such a connecting conductor to the connecting unit **100** would also be readily possible.

[0151] The connecting units **100** can be arranged using a plug installation on the carrier body **90**. The carrier body **90** includes holders **95** for the connecting units **100**. The holders **95** comprise sockets **96**, into which the connecting units are insertable. The sockets **96** are provided between receptacle projections **97**, which protrude from the end side **85** of the carrier body **90**. For example, the receptacle projections **97** have grooves **98** opposite to one another, into which insertion projections **104** protruding laterally from the connecting units **100** are insertable, for example like a tongue-and-groove connection.

[0152] The insertion projections **104** protrude laterally from a base body **103** of a respective connecting unit **100**. The insertion projections **103** protrude transversely to the longitudinal extension of the connecting contact region **101** from the base body **103**. The insertion projections **104** and the connecting contact region **101** overall form an approximately T-shaped configuration. For example, the base body **104** more or less forms a base leg, from which the insertion projections **104** protrude laterally like lateral legs. However, the base planes of the insertion projections **104** and the base body **103** are different. A transition section **106**, which includes, for example, S-shaped curves or arc sections or curves or arc sections opposite to one another, is provided between the base body **103** and the insertion projections **104**. Therefore, the insertion projections **104** thus protrude from a rear side **115** of the base body **103**.

[0153] At the free end regions protruding from the base body **103**, the insertion projections **104** have formfitting contours **105**, in particular gear teeth **105**A, barbs, or the like, using which a formfitting hold in the socket **96** is possible. The insertion projections **104** can preferably more or less claw into the socket **96** of the carrier body **90** by means of the formfitting contours **105**. In particular, melting of the carrier body **90** in the region of the sockets **96**, in particular the grooves **98**, upon heating of the connecting unit **100**, which is also described hereinafter, has the result that a formfitting connection is established, on the one hand, between the insertion projections **104**, in particular the formfitting contours **105** thereof, and, on the other hand, the material of the carrier body **90** in the region of the socket **96**, in particular in the region of the grooves **98**.

[0154] The gear teeth **105**A include, for example, an interlacing, i.e., for example, a tooth **1058** protrudes from the insertion projection transversely to the main plane of the insertion projection **104**.

[0155] The connecting units **100** include conductor receptacles **107** for accommodating the respective portion of a coil conductor **88** to be connected. The conductor receptacles **107** are formed between, on the one hand, the front side **114** of the base body **103** and, on the other hand, a receptacle arm **108** of the connecting unit **100**, which is connected by means of a connection portion **109** to the base body **103**. In particular, it is advantageous if the base body **103**, the connection portion **109**, and the receptacle arm **108** are integral. The lateral legs or insertion projections **104** of the base body **103** are preferably also integral with it. An inside of the connection portion **109** facing toward the conductor receptacle **107** forms a receptacle section or a receptacle trough **116**A of the conductor receptacle **107**.

[0156] The conductor receptacle **107** includes a support surface **107**A and a narrow side **1078** angled thereto in the region of the receptacle trough **116**A. An oblique surface **107**C obliquely inclined to the support surface **107**A and to the narrow side **107**B for supporting the at least one coil conductor **88** is arranged between the narrow side **1078** and the large support surface **107**A. The oblique surface **107**C can be, for example, a chamfer, a curved or arched surface, or the like. In any case, the oblique surface **107**C prevents the coil conductor **88** from resting on a sharp edge.

[0157] The connecting unit **100** is advantageously embodied as a stamped-bent part, which is first stamped out of a base material and then brought into the above-described form by corresponding shaping.

[0158] The installation and/or fastening and/or electrical contacting of the coil conductor **88** in the conductor receptacle **107** is structured as follows:

[0159] The conductor receptacle **107** is initially open, specifically in that the receptacle arm **108** still protrudes far from the base body **103**, see, for example, FIGS. **12** and **14**. The coil conductor **88** can move down to the bottom **116**, i.e., the inner circumference of the connection portion **109**, of the conductor receptacle **107**, see, for example, FIG. **12**. However, this configuration is rather undesired, so that the coil conductor **88** is held in a position remote from the bottom **116** of the conductor receptacle **107** by additional support measures, for example by a support **251** of an installation unit **250**.

[0160] However, the configuration is preferably made so that the carrier body **90** includes a support contour **99**, on which the coil conductor **88** is supported during the installation or during the closing of the connecting unit **100**, see FIGS. **10** and **11**. The coil conductor **88** thus rests on the support contour **99**, so that it does not touch the bottom **116**. The support contour **99** is provided, for example, on an outside of the receptacle projections **97** facing away from the grooves **98**. For example, the support contour **99** is embodied as a step between the respective receptacle projection **97** and the section of the carrier body **90** from which the receptacle projection **97** protrudes.

[0161] The position of the coil conductor **88** raised off of the bottom **116** is advantageous for the following closing and welding operation. It is advantageous in particular if coil conductors having smaller cross section are used, for example a coil conductor **88**B (FIG. **11**). This coil conductor **88**B can then itself have a distance from the bottom **116**, which heats up significantly during the welding process described hereinafter, if the receptacle arm **108** is moved toward the base body **103**, so that it presses with its free end **113** against the front side **114** of the base body **103**.

[0162] The coil conductor **88**B forms, for example, a component of an excitation coil **87**B of an excitation coil assembly **86**B.

[0163] The receptacle arm **108** has a closing leg **111**, which protrudes at an angle from a middle arm portion **110** of the receptacle arm **108**, on its end region facing away from the connection portion **109**. For example, a curved portion or connection portion **112** is provided between the middle arm portion **110** and the closing leg **111**. The closing leg **111** protrudes from the middle arm portion **110** in the direction of the front side **114** of the base body **103**, so that its free end **113** touches the front side **114** in the closed state of the conductor receptacle **107**, while a distance, which defines the conductor receptacle **107**, is provided between the middle arm portion **110** and the front side **114** of the base body **103**.

[0164] A welding gun **252** of the installation unit **250** is used for closing the connecting units **100** and welding. The welding gun **252** includes gun arms **253**, **255**, on the free end regions of which, which are provided for the contact with the connecting unit **100**, support surfaces **254**, **256** are provided. The free end regions of the gun arms **253**, **255**, which are provided to engage with the connecting unit **100**, taper to a point, thus form points **257**. In particular in the case of the gun arm **253**, which has a supporting effect with its support surface **254** on the rear side **115** of the connecting unit **100**, this pointed, narrow design of the gun arm **253** is advantageous.

[0165] The gun arms **253**, **254** are arranged in a V shape, so that the points **257** engage from sides opposite to one another on the connecting unit **100** (see FIG. **16**), close it, and subsequently weld it.

[0166] Longitudinal axes L**1**, L**2** of the gun arms **253**, **255** preferably extend at an angle W, in particular approximately 20° to 40°. Thus, in particular the point **257** of the gun arm **253** can enter the intermediate space between bearing cover **22** and rear side **115** of the connecting unit **100** and support the base body **103** there with its support surface **254**.

[0167] The gun arm **254** acts in terms of closing the conductor receptacle **107** on the receptacle arm **108**. For example, the curved portion **112** presses against the support surface **256** of the gun arm **255**. The support surfaces **254**, **256** are oriented in parallel or essentially in parallel to one another when the support surface **254** moves toward the support surface **256**, which is shown as the feed movement VS in the drawing. Therefore, the gun arm **253** thus remains stationary and supports the connecting unit **100** on the rear side, while the gun arm **255** adjusts the receptacle arm **108** in the direction of the base body **103**. Its free end **113** of its closing leg **111** then comes into contact with the front side

114 of the base body **103** of the connecting unit **100**. The conductor receptacle **107** is therefore closed and a receptacle eye **119**A is formed.

[0168] It is also possible that a welding gun or similar other milling device reshapes the receptacle arm **108** from an initially elongated, linear shape, in which the closing leg **111** is not yet formed, for example, into a receptacle arm **108** having closing leg **111**, for example on the basis of a schematically indicated deformation contour **259** on the gun arm **255**.

[0169] The gun arms **253**, **255** are then energized by an energizing unit **258** in that the gun arms **253**, **255** have different potentials and thus generate a current flow through the connecting unit **100**.

[0170] The welding current IS flows through the more or less ring-shaped closed connecting unit **100**, i.e., through the sections of the connecting unit **100** which close the conductor receptacle **107**, namely the base body **103** in the region of the conductor receptacle **107** and the receptacle arm **108**. The welding current IS flows via connection regions **118** and **119**, namely, on the one hand, via the connection portion **109**, but also, on the other hand, via a contact region **117** between the free end **113** of the closing leg **111** and the front side **114** of the base body **103**. A large amount of heat occurs both in the contact region **117** and also in the region of the bottom **116**, which does not damage the coil conductors **88** or **88**B, however, because they have a distance to the bottom **116**, but also to the upper contact region **117**. Nonetheless, the connecting unit **100** becomes sufficiently hot in the region of the conductor receptacle **107** that a paint or other similar insulation of the coil conductors **88** melts and they come into electrical contact with the surfaces of the connecting unit **100**.

[0171] The connecting unit **100** is therefore more or less mechanically closed and subsequently welded to those coil conductors **88** which are accommodated in the conductor receptacle **107**. The installation is, on the one hand, protective for the coil conductors **88**, but, on the other hand, also reliable and highly durable, namely because the coil conductors **88** can be somewhat mechanically changed by the above-mentioned pressing process and the welding process, but are not weakened or changed in their cross-sectional geometry in such a way that they break, for example, during the operation of the drive motor **20**, **120**.

[0172] When the excitation coils **87** are inserted in the grooves **89**, they are closed by groove covers **180**.

[0173] The groove covers **180** include a profile body **181**. The groove covers **180** preferably consist of plastic and/or an electrically insulating material. The profile body **181** is embodied, for example, as a plastic part or plastic wall body.

[0174] The profile body **181** forms a wall body **182** which more or less represents a closure wall for a respective groove **89**.

[0175] The groove cover **180** or the profile body **181** has a long design and extends along a longitudinal axis L**8**, which extends in parallel to a longitudinal axis L**9** of the groove **89**, when the groove cover **180** is installed in the groove **89**. Longitudinal narrow sides or long sides **195** of the groove cover **180** extend along the longitudinal axis L**8**. The longitudinal sides **195** have a transverse distance Q transversely to the longitudinal axis L**8**.

[0176] Longitudinal end regions **183** of the groove cover **180** preferably protrude from the laminated cover **81** up to the carrier body **90**, so that electrical insulation is provided over the entire length of a groove **89**. Adhesive bonding, welding, or similar other fastening on one or both of the bearing covers **21** or **22** is advantageous there, for example.

[0177] The groove cover **181** includes a wall section **184**, which completely covers the groove **88** transversely to the longitudinal axis L**8**. The wall section **184** is approximately U-shaped or arched in cross section, thus transversely to the longitudinal axis L**8**, and forms formfitting projections **186** on its transverse end regions, thus transversely to the longitudinal axis L**8**, which are provided to engage in formfitting receptacles **89**B of the grooves **89**. Transversely to the longitudinal axis L**8**, the groove cover **180** includes two formfitting receptacles **186**, which form sections of the groove cover **180** protruding farthest transversely to the longitudinal axis L**8** and/or are opposite to one another. The formfitting projections **186** and the formfitting receptacle **89**B form formfitting contours **185**, **89**A, which hold the groove cover **180** in the groove **89** transversely to the longitudinal axis L**8**, which simultaneously represents the longitudinal axis of the groove **89**.

[0178] The wall section **184** forms a trough-shaped formation between the formfitting contours **185**, and thus has a bottom **187**. The bottom **187** is, for example, bulging into the respective groove **89**, thus extends therein. Of course, a reverse configuration would also be possible, in which the wall section **184** does not protrude radially outward with respect to the rotational axis D, but rather radially inward. However, it would possibly be in the way of the rotor **40**, **140** there.

[0179] Lateral legs **188** extend away from the wall section **184**. The lateral legs **188** are inclined toward one another, i.e., their free end regions remote from the wall section **184** are inclined toward one another. The lateral legs **188** and the wall section **184** in the transition region to the lateral legs **188** thus form the formfitting contour **185**, which is V-shaped in a side view, thus a formfitting projection **186**.

[0180] The installation of the groove cover **180** is structured as follows:

[0181] As such, it would be possible to insert the groove cover **180** into a respective groove **89**, for example, from one of the end sides **84** or **85**, i.e., along an insertion axis which extends in parallel to the rotational axis D. However, the formfitting contours **185** are movable toward one another transversely to the longitudinal axis L**8**, so that a transverse distance Q between the formfitting contours **185** can be reduced, so that the groove cover **180** can be pushed into the groove **89** past a side edge **89**C of the groove **89**, see FIGS. **21** to **23** in this regard. In this case, the wall section **184** slides with its rounded outside **189**, thus on its side opposite to the bottom **187**, which thus forms a displacement contour **189**A, past the side edges **89**C, wherein the wall section **184** yields flexibly, in this regard thus forms a flexible section **194**. At the same time, the lateral legs **188** and the formfitting contours **185** are moved toward one another in terms of narrowing the transverse distance Q and finally at the end of this insertion movement SB, the groove cover **180** locks in the groove **89**, i.e., the formfitting contours **185** engage with the formfitting contours **89**A.

[0182] The groove cover **180** is then accommodated in a formfitting manner in the groove **89**, namely in two directions orthogonal to one another transversely to the longitudinal axis L**8**.

[0183] A surface of the formfitting receptacle **89**B facing away from the rotor receptacle **82** forms an engage-behind contour **89**E. A surface of the formfitting receptacle **89**B facing toward the rotor receptacle **82** forms a support contour **89**F.

[0184] The engage-behind contour **89**E and/or the support contour **89**F are preferably planar.

[0185] The engage-behind contour **89**E and/or the support contour **89**F preferably support the groove cover **180** over its entire longitudinal axis L**8**.

[0186] The lateral legs **188** include engage-behind surfaces **188**A, which are supported on the engage-behind contour **89**E. Sections of the wall portion **184** adjoining the lateral legs **188** include support surfaces **188**B or form these support surfaces, which are supported on the support contours **89**F. Therefore, the engage-behind contours **89**A support the groove cover **180** in the direction of the interior of the rotor receptacle **82** or the rotational axis D and the support contours **89**F in opposition thereto, thus in the direction radially outward with respect to the rotational axis D or a bottom of the respective groove **89**.

[0187] The advantage of this construction method also results in that, for example, the carrier body **90** can protrude somewhat radially inward in the direction of the rotor receptacle **82** at the longitudinal end regions of the groove **89** when the groove covers **180** are installed. This is because the longitudinal end regions **183** thereof can then be brought into engagement behind in the direction of the rotor receptacle **82** of the protruding section of the carrier body **90**.

[0188] Furthermore, the engage-behind surfaces **188**A and the engage-behind contours **89**E as well as the support surfaces **188**B and the support contours **89**F press flatly against one another, so that a sealed seat or a seal of the groove **89** is implemented and/or the groove cover **180** seals closed the groove **89**.

[0189] The groove covers **180** advantageously have a seal function for sealing off the grooves **89**, but no support function for the excitation coils **87** of the excitation coil assembly **86**. The oblique inclination of the engage-behind contours **89**E and the engage-behind contours **188**A rather even acts in terms of a release bevel, which, upon an application of force to the groove cover **180** in a direction out of the groove **89** or radially inward with respect to the rotational axis D, causes a deformation or narrowing of the groove cover **180** and thus facilitates or enables its release from the groove **89**.

[0190] An alternative exemplary embodiment according to FIG. **23**B, which is only schematically shown, provides, for example, a groove **489** designed alternatively to the groove **89**, into which a groove cover **480** is introduced. The groove cover **480** includes formfitting receptacles **486** on its longitudinal narrow sides, which are engaged with formfitting projections **489**B of the groove **489**. The formfitting projections **489**B are opposite to one another. The formfitting receptacles **486** and the formfitting projections **489**B are complementary to one another, for example V-shaped.

[0191] Surfaces of the formfitting projections **489**B facing away from the rotor receptacle **82** form engage-behind contours **489**E. Surfaces of the formfitting projections **489**B facing toward the rotor receptacle **82** form support contours **489**F. The engage-behind contour **489**E and/or the support contour **489**F are preferably planar. The engage-behind contour **489**E and/or the support contour **489**F preferably support the groove cover **480** over its entire longitudinal axis L**8**. The long sides of the groove cover **480** or the formfitting receptacles **486** include engage-behind surfaces **488**A, which are supported on the engage-behind contours **489**E. The formfitting receptacles **486** furthermore include support surfaces **488**B or form these support surfaces, which are supported on the support contours **489**F.

[0192] The mechanical structure of the stator **80** is preferably entirely or partially identical for both voltage levels P**1** and P**2**. In particular, the rotor receptacle **82** for the rotor **40**, **140** is identical, thus, for example, has the same diameter. The design of the grooves **89**, thus, for example, their formfitting contours **89**A and/or their width and/or depth are also identical. It is also advantageous if the groove cover **180** is usable or used on the stator **80** independently of whether the excitation coil assembly **86** is designed and/or arranged for the voltage P**1** or the voltage P**2**. An extensive equivalent part principle is thus implementable.

[0193] It is possible to provide the groove covers **180** as individual profile parts, i.e., that they already have the elongated design shown in FIG. **20** and have lengths corresponding to the length of the groove **89**.

[0194] However, one advantageous embodiment provides that the groove covers **180** are obtained from a roll material **190**. The roll material **190** is provided, for example, as a coil **191**. The coil **191** is rotatably accommodated on a coil carrier **273**, for example, in particular a corresponding holding stand. An unwinding device **274** unwinds the roll material **190** from the coil **191**.

[0195] A portion **192** of the roll material **190** unwound from the coil **191** passes through, for example, a roll assembly **275** having one or more rolls, in particular deflection rolls or guide rolls.

[0196] Downstream of the roll assembly **275**, a smoothing unit **276** is provided, in which the portion **192** is smoothed, so that its originally rounded formation on the coil **191** is transferred into an elongated formation. The smoothing unit **276** comprises, for example, at least one pressing element **277**, in particular pressing elements **277** opposite to one another, and/or a heating device **278** having heating bodies **279**, in order to bring the roll material **190** of the portion **192** into an elongated formation, as shown in FIG. **20**. The roll material **190** is thus brought by the smoothing unit **276** into a linear elongated shape.

[0197] A cutting unit **280** adjoins the smoothing unit **276**, using which a length is cut to length in each case from the portion **192**, which corresponds to a desired groove cover **180**, thus, for example, the length of the laminated core **81** or the carrier body **90**. The cutting unit **280** includes, for example, cutting elements **281**, in particular cutters, blades, sawing elements, or the like.

[0198] It is to be noted at this point that instead of the laminated core **181** or stator **80**, other, i.e., shorter or longer stators can be provided with groove covers by means of the installation unit **270**. Respective suitable groove covers **180** are thus produced as needed, the length of which is adapted to the length of the stator to be equipped. The cutting element **280**, for example a blade cutter, thus cuts off a groove cover **180** in each case from the portion **192**, which is then grasped by a holding element **271** and inserted in the stator **80**.

[0199] The holding element **271**, for example a gripper, comprises holding arms **272**, which can grasp the profile body **181** or the groove cover **180** on its longitudinal end regions **183** and can insert it into the groove **89** by means of the insertion movement SB. It would readily be possible that the holding element **271** includes a suction unit or similar holding element, which suctions on the groove cover **180** in the region of the bottom **187** and inserts it with a force component generating the insertion movement SB into the groove **89**.

[0200] It can thus be seen that by inserting, joining, pressing and the like, essential components of the motor **20**, **120** are to be produced, namely, for example, the connecting units **100**, the cover of the grooves **89** by means of the groove covers **180**.

[0201] The magnetization described hereinafter of the magnets **51** also follows this installation concept.

[0202] This is because the magnets **51** are initially not yet magnetized during the installation on the rotor **40**, **140** or laminated core **41**, **141**. A magnetizable material **51**A of a respective magnet body **56** is thus initially not magnetic when the magnet body **52**, which is not yet magnetic as such, is inserted or pressed in the context of an insertion process or pressing process into one of the holding receptacles **45**. The magnetizable material **51**A is, for example, neodymium-iron-boron (NdFeB), advantageously with an additive of dysprosium, or samarium-cobalt (SmCo).

[0203] For example, support projections **48** are provided on the holding receptacles **45**, which support narrow sides **54** of a respective magnet body **52**. The narrow sides **54** extend in parallel to the rotational axis D in the state of the magnets **50** installed on the rotor **40**, **140**. The magnet bodies **52** or magnets **51** are preferably clamped between the support projections **48**.

[0204] Flat sides **53** having larger areas than the narrow sides **54** extend between the narrow sides **54**. Normal directions of the flat sides **53** are preferably radial to the rotational axis D.

[0205] The laminated cores **41**, **141** include holding projections **49** for holding the magnet bodies **52**. The holding projections **49** protrude, for example, toward the flat sides **53** and press with their free end regions against the flat sides **53**. It is preferred if the holding projections **49** more or less claw together and/or form buttress projections with the magnet body **52**.

[0206] The sheets **43** of the laminated cores **41**, **141** comprise sheets **43** which have recesses **59**A in a predetermined angular position with respect to the rotational axis D. The recesses **59**A preferably extend radially with respect to the rotational axis D away from one of the flat sides of the respective holding receptacle **45**, for example radially inward toward the rotational axis D. It is preferred if the recesses **59**A are arranged in succession in an axial line in parallel to the rotational axis D, thus are aligned with one another. Some of the sheets **43** have holding projections **59** protruding into the recesses. The holding projections **59** furthermore protrude into the insertion cross section of a respective holding receptacle **45**, so that upon insertion of a magnet body **52** into a holding receptacle **45**, they engage with the magnet body **52** and are bent over by the magnet body **52** in an insertion direction SR, in which the magnet body **52** is inserted into the holding receptacle **45**. A holding projection **59** can be displaced here into the recess **59**A of one or more adjacent sheets **43**. An end side of a respective holding projection **59**, which is the width of a narrow side of a sheet **43**, is then supported obliquely inclined on the flat side **53** of the magnet body **52** and prevents the magnet body **52** from being pulled out of the holding receptacle **45** against the insertion direction SR.

[0207] The magnet bodies **52** or magnets **51** are preferably accommodated in the clamp fit in the holding receptacle **45**. Of course, adhesive bonding, welding, or similar other installation would be entirely possible. The magnetizable material **51**A is thus inserted into the respective laminated core **41**, **141** in the not yet magnetized state. The rotor **40**, **140** is then balanced by means of a balancing unit **285**. In this case, the motor shaft **30**, **130** and possibly the insulation sleeve **60** is already installed. Therefore, the rotor **40**, **140** can thus be rotated by means of the motor shaft **30**, **130** around its rotational axis D by means of a motor **286**. A measuring unit **287** establishes, for example, imbalances of the rotor **40**, **140**.

[0208] Still existing imbalances are then remedied in that, for example, at least one balancing section **55** is produced, for example, by means of a material-reducing unit **288**, for example a grinding unit, a milling unit, or the like. In this case, for example, material of the laminated core **41**, **141** is removed where balancing is necessary, wherein chips, metal dust, or the like result. However, this is not problematic since the magnet bodies **52** are not yet magnetized when the material of the laminated core **41**, **141** is machined. The chips, dust, or the like which result due to removal of the sheets **43** do not magnetically adhere to the laminated core **41**, **141**, so that they are easily removable. During the later operation of the drive motor **20**, **120**, no metal chips or dust are thus present, which can damage, for example, the bearings **24** or **25**.

[0209] It is advantageous if the balancing sections **55** are attached to those regions of the laminated core **41**, **141** where the laminated core **41**, **141** has the greatest possible material thickness or thickness in the radial direction with respect to the rotational axis D, i.e., in particular on the radial outside with respect to the magnets **51**.

[0210] Thus, for example, if an imbalance U occurs at a region unfavorable for producing a balancing section, vectorial balancing is preferred in which the imbalance U is decomposed into force vectors Ux and Uy and, for example, balancing sections **55***x* and **55***y* are produced corresponding to these vectors by the material-reducing device **288** on the radial outside on the laminated core **41**, **141**. The balancing sections **55***x* and **55***y* are located, for example, radially outside on the laminated core **41**, **141** from holding receptacles **55**, which are arranged at an angular interval in relation to the imbalance U directly adjacent thereto.

[0211] In the rotor **40**, **140**, no balancing bodies or balancing weights are necessary on the end sides **44**. Thus, for example, the inflow openings and outflow openings of the air ducts **46** are not covered by balancing weights or balancing bodies. Furthermore, air can also flow laterally past the magnets **51**, namely through air ducts **46**A, which are provided on the holding receptacles **45** or are provided by the holding receptacles **45**. The inflow openings and outflow openings of the air ducts **46**A are also not covered by balancing weights or balancing bodies.

[0212] A cleaning unit **289**, for example a blowing unit, a brushing unit, and/or a vacuum cleaner or the like, can readily remove the metallic particles resulting during the material removal by the material-reducing unit **288** from the rotor **40**, **140**, in particular the respective laminated core **41**, **141**, as long as the magnet bodies **52** are not magnetic. For example, the cleaning device **289** generates an air jet LU, which removes chips and the like from the region of the balancing section **55**.

[0213] When the rotor **40**, **140** is balanced, it is magnetized by means of a magnetizing unit **290**, i.e., in particular the magnet bodies **52** are magnetically activated. The magnetizing unit **290** includes, for example, magnetizing heads **291**A, **291**B, **291**C, **291**D.

[0214] For example, the magnetizing unit **290** comprises a positioning unit **292**, which positions, in particular pivots, the motor shaft **30**, **130** in such a way that the magnets **51** are exactly opposite to the magnetizing heads **291** at the correct angle.

[0215] The rotor **40**, **140** is advantageously positioned by means of a mechanical coding **57** with respect to the magnetizing heads **291**A, **291**B, **291**C, **291**D in such a way that one magnetizing head **291**A, **291**B, **291**C, **291**D is arranged in each case between adjacent magnets **51**.

[0216] For example, the twist-lock contour **74** is used as the coding **57**, which strikes on a stop **293**, for example, in particular a rotational stop, of the magnetizing device **290**, so that the rotor **40**, **140** is arranged at the correct rotational angle with respect to the magnetizing heads **291**. The stop **293** is shown in conjunction with the balancing unit **285**. However, other components of the rotor **40** can readily be used as the coding **57**, for example the air ducts **46**, which can engage in corresponding stops of the magnetizing unit **290** and/or which are optically acquirable. An optical acquisition of the rotational angle position of the rotor **40**, **140** is advantageously also possible, for example by a camera or similar other optical sensor of the magnetizing unit **290**.

[0217] The magnetizing heads **291**A, **291**B, **291**C, **291**D generate magnetic fields MFA, MFB, MFC, MFD, which penetrate the magnet bodies **52** or magnets **51** arranged adjacent to one another at an angular interval with respect to the rotational axis D so that they are permanently magnetized and form magnetic poles, which are indicated as north poles N and south poles S. The magnetic fields MFA, MFB, MFC, MFD are indicated in dashed field lines having errors corresponding to the magnetic flux direction in the drawing.

[0218] When the magnets **51** of the rotors **40**, **140** are magnetized, the rotors **40**, **140** are installed on the stator **80**.

[0219] It is obvious that multiple magnet bodies **52** or magnets **51** are also arrangeable in the holding receptacles **45** for the magnets **51**, for example a series arrangement of two or more magnet bodies **52** are magnets **51** in parallel to the rotational axis D. Magnetizing of the respective magnet bodies **52** is also readily possible in this case when they are already accommodated in the holding receptacles **45**.

[0220] In the case of the magnetizing by the magnetizing device **290**, it is also advantageous that the sheets **43** of the laminated cores **41**, **141** are magnetically conductive, so that they can optimally conduct the magnetic fields **292** of the magnetizing device **290** through the magnet bodies **52**.

1. A drive motor for a suction device or a machine tool in the form of a handheld power tool or a semi-stationary machine tool, wherein the drive motor includes a stator having an excitation coil assembly and a rotor having a motor shaft, which is rotatably mounted around a rotational axis on the stator or with respect to the stator by means of a bearing assembly, wherein the drive motor includes a connecting unit for electrically connecting the drive motor to an energizing unit for energizing the excitation coil assembly, wherein the connecting unit includes a base body for fastening on the stator and a receptacle arm protruding from the base body, between which a conductor receptacle for at least one electrical coil conductor of an excitation coil of the excitation coil assembly is formed, and wherein the connecting unit includes a connecting contact region for electrically connecting a connecting line for the connection to the energizing unit and wherein the receptacle arm and the base body are connected to one another by means of two electrically conductive connection regions and form a receptacle eye enclosing the conductor receptacle in a ring shape, so that the conductor receptacle has a closed state, and a welding current between the base body and the receptacle arm can flow past the conductor receptacle via the electrical connection regions.

2. The drive motor as claimed in claim **1**, wherein the receptacle arm is adjustable from a position spaced apart from the base body, in which the conductor receptacle has an open state and is open on one side for the insertion of the at least one coil conductor, into a position adjusted toward the base body, in which the conductor receptacle has the closed state.

3. The drive motor as claimed in claim **1** wherein a free end of the receptacle arm, is in touch contact with the base body to form one of the electrical connection regions before and during the energizing using the welding current.

4. The drive motor as claimed in claim **1**, wherein the receptacle arm is welded at one or both electrical connection regions to the base body.

5. The drive motor as claimed in claim **1**, wherein the receptacle arm is permanently connected to or integral with the base body by means of a connection portion.

6. The drive motor as claimed in claim **5**, wherein the connection portion forms one of the electrical connection regions.

7. The drive motor as claimed in claim **5** wherein, the connection portion has an arched or curved profile and/or is V-shaped or U-shaped and/or forms a receptacle trough or a bottom of the conductor receptacle.

8. The drive motor as claimed in claim **1**, wherein the receptacle arm includes an arm portion, which is opposite to a front side of the base body in the region of the conductor receptacle in the closed state of the conductor receptacle at a distance suitable for receiving the at least one coil conductor.

9. The drive motor as claimed in claim **8**, wherein the arm portion protrudes at a larger angle from the front side of the base body in the open state of the conductor receptacle than in the closed state of the conductor receptacle.

10. The drive motor as claimed in claim **8** wherein the receptacle arm includes a closing leg protruding from the arm portion that protrudes from the arm portion in the direction of the front side of the base body.

11. The drive motor as claimed in claim **8**, wherein the arm portion extends essentially in parallel to the front side of the base body in the closed state of the conductor receptacle, and/or wherein the conductor receptacle includes, in the region of the arm portion, a longitudinal formation for accommodating multiple coil conductors in a series arrangement in parallel to the longitudinal extension of the arm portion.

12. The drive motor as claimed in claim **1**, wherein the base body includes at least one insertion projection to be plugged into a socket of the stator.

13. The drive motor as claimed in claim **12**, wherein the at least one insertion projection protrudes laterally from the base body and/or the receptacle arm and/or an insertion projection protrudes from the base body in each case on opposing sides.

14. The drive motor as claimed in claim **12** wherein, the at least one insertion projection includes, on its free end region protruding from the base body, at least one formfitting contour for formfitting engagement in the socket of the stator.

15. The drive motor as claimed in claim **12**, wherein the at least one insertion projection is arranged on a portion of the base body delimiting the conductor receptacle and/or a free end region of the at least one insertion projection and the base body are located in planes parallel to one another and spaced apart from one another.

16. The drive motor as claimed in claim **1**, wherein on at least one of the electrical connection regions between the base body and the receptacle arm, a support contour for supporting the at least one coil conductor at a distance to an inner surface, of the conductor receptacle is arranged on the connection region, so that the at least one coil conductor is not in touch contact with the connection region during energizing using the welding current.

17. The drive motor as claimed in claim **16**, wherein the support contour is arranged on a component separate from the connecting unit.

18. The drive motor as claimed in claim **1**, wherein an electrical connection region between the base body and the receptacle arm is arranged between two support contours of the stator wherein the support contours support the at least one coil conductor at a distance to the input particular trough-shaped connection region.

19. The drive motor as claimed in claim **1**, wherein the connecting unit includes, in the region of the conductor receptacle, an elongated support surface and a lateral narrow side angled thereto, wherein an oblique surface obliquely inclined to the support surface and to the narrow side for supporting the at least one coil conductor is arranged between the support surface and the narrow side.

20. A method for installing an electrical connecting unit of a drive motor for a suction device or a machine tool in the form of a handheld power tool or a semi-stationary machine tool, wherein the drive motor includes a stator having an excitation coil assembly and a rotor having a motor shaft, which is rotatably mounted around a rotational axis on the stator or with respect to the stator by means of a bearing assembly, wherein the drive motor includes a connecting unit for electrically connecting the drive motor to an energizing unit for energizing the excitation coil assembly, wherein the connecting unit includes a base body for fastening on the stator and a receptacle arm protruding from the base body, between which a conductor receptacle for at least one electrical coil conductor of an excitation coil of the excitation coil assembly is formed, and wherein the connecting unit includes a connecting contact region for electrically connecting a connecting line for the connection to the energizing unit, the method comprising:

inserting the at least one coil conductor into the conductor receptacle

connecting the receptacle arm and the base body while forming two electrically conductive connection regions, so that the receptacle arm and the base body form a receptacle eye enclosing the conductor receptacle in a ring shape and the conductor receptacle has a closed state; and

applying welding electrodes to the base body and the connection arm and energizing using a welding current, which flows via the electrical connection regions past the conductor receptacle between the base body and the receptacle arm.

21. The method as claimed in claim **20**, further comprising adjusting the receptacle arm out of a position spaced apart from the base body in which the conductor receptacle has an open state and is open on one side for inserting the coil conductor, into a position adjusted toward the base body, in which the conductor receptacle has the closed state.

22. The method as claimed in claim **20** further comprising partially deforming an end region of the receptacle arm in the direction of the base body in such a way that a free end of the receptacle arm is in touch contact with the base body to form one of the electrical connection regions before and during the energizing using the welding current.

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