



(43) International Publication Date
24 July 2014 (24.07.2014)

(51) International Patent Classification:

E04H 12/24 (2006.01) *G08G 1/095* (2006.01)
F21V 21/116 (2006.01) *G09F 7/18* (2006.01)

(21) International Application Number:

PCT/EP2013/051057

(22) International Filing Date:

21 January 2013 (21.01.2013)

(25) Filing Language:

English

(26) Publication Language:

English

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(81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM,

DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

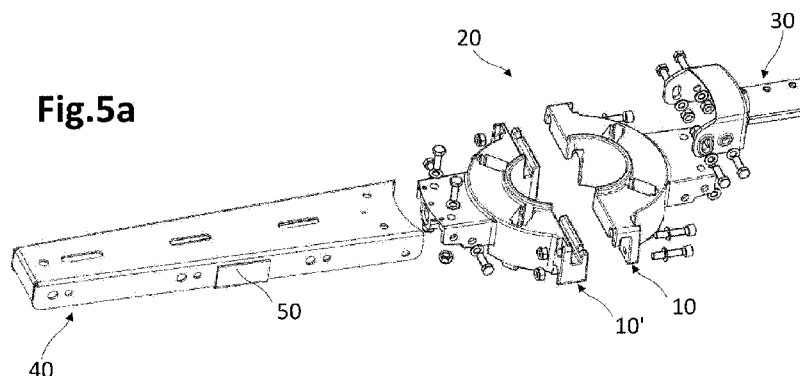
— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

Published:

— *with international search report (Art. 21(3))*

(54) Title: KIT FOR MOUNTING ONE OR MORE APPLIANCES ON A POLE

Fig.5a



(57) Abstract: A kit for mounting one or more appliances on a pole, the kit comprising: a carrier ring and at least one carrier arm for supporting one or more appliances. The carrier ring is divided into two semi carrier rings with respective coupling ends, such that the carrier ring can be mounted around a pole by coupling the two semi carrier rings with one another by the respective coupling ends. The coupling of the two semi carrier rings with one another causes the carrier ring to have a tapered through-hole. At least one of the semi carrier rings has one or more side arms. Each carrier arm is mountable by an end on one of the side arms of the carrier ring.



WO 2014/111168 A1

Kit for mounting one or more appliances on a pole

The present invention relates to a kit for mounting one or more appliances on a pole, a carrier ring to be used in such a kit and to a utility pole.

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BACKGROUND ART

Utility poles are commonly used to carry electrical power lines, including distribution lines and sub transmission lines. In urban areas, a variety of utility poles may be used for supporting telephone lines, fibre optic cables, and even
10 traffic lights, street illumination and video cameras. It may happen that whenever a utility is installed in a neighbourhood, new poles are placed next to already existing ones. Chaotic situations may arise wherein different kinds of cables cross over and under each other and a variety of poles exist next to each other.

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This kind of situation may have a number of disadvantages: firstly, maintenance work on any of the utilities involved may be complicated, and it may be difficult to install any new utility or other appliance on existing poles or new poles. Secondly, when electrical power lines are placed in the vicinity of
20 other utility cables, electromagnetic interference may occur. Thirdly, the chaos of cables may lead to an unpleasant street view.

In order to solve the above-mentioned problems, it is known to use underground power and telephone lines instead of overhead lines. However,
25 depending on the circumstances, an enormous investment may be necessary to replace a significant part of the overhead systems with underground systems. Such an investment may not be viable in all situations.

WO 2012025153 A1 discloses a kit for mounting one or more appliances on a
30 pole, the kit comprising a central ring for being mounted around a pole and having a through-hole, a fitting surface and a support surface, and a carrier having a base part and at least one support arm extending from said base part

for supporting one or more appliances, wherein said base part is adapted to be fitted on said support surface and has a through-hole adapted for being fitted around said fitting surface. This kit permits mounting several appliances on a same pole with a versatility which solves the above-mentioned problems.

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The present invention aims at further improving the prior art systems.

SUMMARY OF THE INVENTION

In a first aspect, the invention provides a kit for mounting one or more
10 appliances on a pole, the kit comprising a carrier ring and at least one carrier arm for supporting one or more appliances. The carrier ring is divided into two semi carrier rings with respective coupling ends, such that the carrier ring can be mounted around a pole by coupling the two semi carrier rings with one another by the respective coupling ends. Said coupling of the two semi carrier
15 rings with one another causes the carrier ring to have a tapered through-hole. At least one of the semi carrier rings has one or more side arms. Each carrier arm is mountable by an end on one of the side arms of the carrier ring.

In this first aspect, a tapered through-hole of a carrier ring (i.e. the two semi
20 carrier rings constituting the carrier ring) may be adapted to a particular size and shape of a pole and a particular position on the pole. An inner surface of each of the semi carrier rings may define half of such a tapered through-hole. Moreover, the carrier ring and the at least one carrier arm are separate pieces which can be assembled. Replacement of a carrier arm can thus be done
25 without having to replace the carrier ring, or dismounting any other part from a pole. Furthermore, replacement of a carrier ring (i.e. the two semi carrier rings constituting the carrier ring) can also be done without having to dismount any other part from a pole. This way, if a pole has a permanent arrangement (i.e. which cannot be dismounted), a kit according to the invention can be mounted
30 around the pole at a height below said permanent arrangement. This kit for mounting appliances on a pole is thus very versatile. Moreover, the tapered through-hole may permit an interlocking fit which may make the fixation of the

carrier ring easier. Also, in some situations, a carrier ring could be mounted on a pole with the one or more side arms having a desired (or almost desired) horizontal orientation.

- 5 In some embodiments, for each pair of coupling ends (of different semi carrier rings) whose coupling with one another causes coupling of the two semi carrier rings with one another, a first coupling end of the pair has a downwards sunken region and an upwards salient region and a second coupling end of the pair has an upwards sunken region and a downwards salient region, the
- 10 upwards salient region of the first coupling end fitting into the upwards sunken region of the second coupling end and the downwards salient region of the second coupling end fitting into the downwards sunken region of the first coupling end.
- 15 In some embodiments, the salient regions and sunken regions are arranged substantially vertical, with respect to a position of use of the carrier ring, in such a way that, when the two semi carrier rings are coupled with one another, holding of one of the two semi carrier rings causes said semi carrier ring to hold the other semi carrier ring. This causes two semi carrier rings
- 20 coupled with one another to be substantially stably fixed around a tapered pole without needing particular fasteners (e.g. screws or bolts or similar).

In some embodiments, the vertical orientation of at least one of the carrier arms may be adjustable. To this end, the carrier arm may comprise curved

25 oblong holes for fastening the carrier arms to the side arms of the carrier ring. Different inclinations of the carrier arm may be achieved by fitting the fastener at different positions along the length of the lateral elongated hole. Therefore, some embodiments of the invention may permit adjustable horizontal orientation (mounting the carrier ring with a desired orientation of the side

30 arms) and adjustable vertical orientation (through e.g. said curved oblong holes) of appliances. An aspect of this combination of adjustable horizontal and vertical orientations may make mounting of appliances more flexible and

versatile, which may be very important in situations where obstacles have to be overcome to achieve specific arrangement of appliances.

In a further aspect, the invention provides a kit as substantially hereinbefore described, comprising at least two carrier rings. The first carrier ring (constituted by two corresponding semi carrier rings) has a first tapered through-hole and a second carrier ring (constituted by two other corresponding semi carrier rings) has a second tapered through-hole of a different size than said first tapered through-hole. In this aspect of the invention, a kit is provided wherein several carrier rings with varying sizes of tapered through-holes can be mounted at different heights on a utility pole (due to the taper of the pole).

In some embodiments, the carrier arm may comprise holes for fitting electrical insulators and thus be adapted to carry electrical power lines. In some implementations, a carrier arm may comprise an illumination system (e.g. street lights) or may carry a traffic light.

In yet another aspect, the invention provides a carrier ring suitable for being used in a kit substantially as hereinbefore described. And in yet another aspect, the invention provides a utility pole carrying one or more of the kits substantially as hereinbefore described.

BRIEF DESCRIPTION OF THE DRAWINGS

Particular embodiments of the present invention will be described in the following by way of non-limiting examples, with reference to the appended drawings, in which:

Figures 1a – 1b illustrate an embodiment of a semi carrier ring in accordance with the present invention;

Figures 2a – 2b illustrate an embodiment of a carrier ring in accordance with

the present invention;

Figures 3a – 3b illustrate a first embodiment of a carrier arm in accordance with the present invention;

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Figures 4a – 4b illustrate a second embodiment of a carrier arm in accordance with the present invention;

Figures 5a – 5b illustrate instructions for assembling a kit comprising a carrier
10 ring, constituted by corresponding semi carrier rings, and a first and second carrier arm of the types shown in preceding figures;

Figures 6a – 6b illustrate the kit shown in figures 5a – 5b once assembled;

15 Figure 7 illustrates a utility pole according to an embodiment of the invention; and

Figures 8a – 8d illustrate different arrangements of a same carrier ring with one or more supporting plates mounted on said carrier ring, according to
20 embodiments of the invention.

DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

In the following description, numerous specific details are set forth in order to provide a thorough understanding of the present invention. It will be
25 understood by one skilled in the art however, that the present invention may be practiced without some or all of these specific details. In other instances, well known elements have not been described in detail in order not to unnecessarily obscure the description of the present invention.

30 Figures 1a – 1b illustrate an embodiment of a semi carrier ring according to the present invention. Figure 1a gives a perspective view of the semi carrier ring 10 and figure 1b gives a perspective view of the same semi carrier ring 10

but turned upside down with respect to the position shown in figure 1a.

The semi carrier ring 10 is shown in Figures 1a - 1b comprising a side arm 11 with corresponding holes 12 to fix a carrier arm (or other suitable piece) through appropriate fasteners, such as e.g. screws or bolts. The semi carrier ring 10 also comprises two coupling ends 16. Each of the coupling ends 16 comprises a salient region 14, a sunken region 13 and corresponding holes 15 to fasten the coupling end 16 with another coupling end of another semi carrier ring. Figure 1b further shows cavities 17 suitable to house cables or similar associated with appliances to be mounted on a pole.

The side arm 11 is shown comprising a top surface 19a and two side surfaces 19b that are perpendicular to the top surface 19a. This configuration may be suitable to mount on the side arm 11 embodiments of carrier arms shown in other figures.

In some embodiments, the inner surface 18a of the semi carrier ring 10 may comprise a plurality of elongated indentations arranged vertically and from top to bottom (considering a normal position of use of the semi carrier ring). These vertical indentations may be equispaced. Metallic poles normally exhibit a weld bead longitudinally disposed along the pole. An interlocking fit may thus be achieved when part of a weld bead fits into an indentation. A scale may be arranged on an upper surface 18b of the semi carrier ring 10 to guide the selection of an indentation into which the weld bead should be fitted to achieve a particular orientation. This scale may be based on reflecting suitable points of reference, such as e.g. degrees, cardinal points (North, South, etc.). A carrier ring with such an adjustable interlocking fit may be formed by using two semi carrier rings of this type.

Alternatively to vertical indentations, the inner surface 18a of the semi carrier ring 10 may comprise a plurality of protrusions or roughness. These protrusions may have different shapes and arrangements (e.g. elongated

and/or vertical and/or from top to bottom and/or equispaced). These protrusions or roughness may increase the friction between the inner surface 18a of the semi carrier ring 10 and the outer surface of a pole, which may improve fixation of a carrier ring formed by two semi carrier rings of this type.

5 Application of carrier rings with such an increased friction to cement poles may be very appropriate.

This semi central ring 10 comprises several radial O-shaped pieces 101 constituting respective holes 102 through which cables (or similar elements) related to e.g. appliances may be passed and, therefore, suitably hold. This

10 semi central ring 10 is shown having two of said O-shaped pieces 101, but other numbers of such pieces 101 may be taken into account to achieve the goal of suitably holding cables or similar. Each of said O-shaped pieces 101 has a related sunken region 103 on the upper surface 18b. These sunken

15 regions 103 may make the extraction of the semi central ring 10 from a mould easier. Apart from moulding, other known techniques may be used to construct this semi central ring 10 (with or without said sunken regions 103).

Figures 2a – 2b illustrate an embodiment of a carrier ring 20 in accordance with the present invention. Figure 2a gives a perspective view of the semi

20 carrier ring 20 in a normal position of use (horizontal), and Figure 2b gives a perspective view of the same semi carrier ring 20 but turned upside down with respect to the position shown in figure 2a.

25 This carrier ring 20 comprises two semi carrier rings 10, 10'. The semi carrier ring 10 is very similar to the one shown in Figures 1a - 1b. The semi carrier ring 10' is substantially equal to the semi carrier ring 10 with the only difference of that the coupling ends 16' of the semi carrier ring 10' have an "inverse" configuration with respect to the coupling ends 16 of the semi carrier

30 ring 10. This "inverse" configuration is necessary for the coupling ends 16 and the coupling ends 16' to be attachable with one another in the following manner.

A coupling end 16 of the semi carrier ring 10 is shown having a salient region 14 and a sunken region 13, both arranged substantially vertical. A coupling end 16' of the semi carrier ring 10' is shown also having a salient region 14' and a sunken region 13', both arranged substantially vertical. The coupling ends 16 and 16' are shown coupled with one another with the salient region 14 fitted in the sunken region 13' and the salient region 14' fitted in the sunken region 13. The other two coupling ends of the semi carrier rings 10, 10' are also coupled under the same principles. This way of attaching the coupling ends 16 and 16' causes the semi carrier ring 10 (when held by an external mean) to hold the other semi carrier ring 10'. This causes the two coupled carrier rings 10 and 10' to be substantially stably fixed around a tapered pole without needing particular fasteners (e.g. screws or bolts or similar).

Assembly of the carrier ring on a post may be relatively easy, since the tapered through-hole fixes the carrier ring in vertical direction, and the coupling ends fixes the carrier ring radially. Then, once the carrier ring has been "temporarily" fixed, suitable bolts may be used to fix the carrier ring more strongly. Moreover, two semi carrier rings may be coupled with one another in such a way that the one or more side arms can be horizontally oriented as desired.

Figures 3a – 3b illustrate a first embodiment of a carrier arm in accordance with the present invention. Figure 3a gives a perspective view of this carrier arm 30 and figure 3b gives a perspective view of the same carrier arm 30 but from the back.

This carrier arm 30 comprises a tubular part 37 with a longitudinal through-hole 31. The through-hole 31 may receive a fitting region of an appliance such that the appliance may be reliably supported by the carrier arm 30. The tubular part 37 may further comprise corresponding holes 32 for fitting fasteners to fix the received part of the appliance to the carrier arm 30. This

carrier arm 30 may also comprise a structure with two lateral regions 36 with corresponding holes 34, 35 for fitting fasteners to fix the carrier arm 30 to the side arms of a carrier ring 20 as the one shown in figures 2a - 2b. Both holes 34, 35 may have the common function of fixing the carrier arm 30 to the carrier ring 20. The curved oblong hole additionally permits a variable inclination of the carrier arm 30. This variable inclination will depend on the position along the length of the elongated and curved hole 35 where the corresponding fastener (e.g. screw or bolt) is fitted and tightened.

Therefore, in some embodiments, appliances may be mounted on a pole with adjustable horizontal and vertical orientations. The adjustable horizontal orientation may be achieved in the way commented with respect to Figures 2a - 2b (semi carrier rings coupled according to a desired horizontal orientation). The adjustable vertical orientation may be implemented in the way commented with respect to Figures 3a - 3b (carrier arm with e.g. curved oblong holes). An advantage of this adjustable horizontal and vertical orientation may be that mounting of appliances is more flexible and versatile, which may be very important in situations where obstacles have to be overcome to achieve particular arrangement of appliances.

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Figures 4a – 4b illustrate a second embodiment of a carrier arm in accordance with the present invention. Figure 4a gives a perspective view of this carrier arm 40 and figure 4b gives a perspective view of the same carrier arm 40 but turned upside down with respect to the position of figure 4a.

25

In this embodiment, the carrier arm 40 comprises a first end with suitable shape to be fitted in/on a side arm 11, 11' as the ones shown in figures 2a - 2b, and a second end with suitable shape to mount a pertinent appliance in/on it. Once the carrier arm 40 has been mounted on a carrier ring 20, the first end would correspond to the proximal end with respect to the carrier ring 20, and the second end would correspond to the distal end with respect to the carrier ring 20. The first end (proximal end) of the carrier arm 40 may comprise

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suitable holes 41 to fit fasteners for fixing the carrier arm 40 to the carrier ring 20. The side arm 11, 11' may comprise a large plurality of holes, such that some of said holes could be selected depending on the carrier arm to be fixed. The second end (distal end) of the carrier arm 40 may comprise suitable holes 43 to fit fasteners for fixing an appliance to the carrier arm 40. This carrier arm 40 may also comprise intermediate holes 42 between the first and second ends. Some of the "distal" and intermediate holes 43, 42 may be adapted to fit electrical insulators, so that electrical power lines may be mounted on top of the carrier arm. This carrier arm 40 has a cross-section with Π shape, the size of Π progressively decreasing from the proximal end towards the distal end. Alternatively, the carrier arm 40 may have other suitable cross-sections, such as e.g. circular, square, triangular, hexagonal etc.

Figures 5a – 5b illustrate exploded views of an assembly of a kit comprising two semi carrier rings 10, 10', from which a central ring 20 is to be constituted, and two different carrier arms 30, 40. The carrier arm 30 is of the type illustrated by Figures 3a and 3b, whereas the carrier arm 40 is of the type illustrated by Figures 4a and 4b. Figure 5a shows a perspective view of the "exploded" kit disposed in a normal position of use, whereas Figure 5b shows the same "exploded" kit but turned upside down with respect to the position shown in figure 5a. The carrier arm 40 is shown comprising a holding piece 50 with substantially U-shaped cross-section coupled with the carrier arm 40. This coupling may be achieved e.g. by using a proper adhesive or by attributing to the holding piece 50 a suitable size to cause enough pressure between respective surfaces of the carrier arm 40 and the holding piece 50 when coupled. Alternative fixing means may also be used, such as e.g. screws, bolts, or similar. Of course, further holding pieces 50 could be arranged (in a similar way) along the carrier arm 40 to improve holding of e.g. cables passing through the cavity of the carrier arm 40 aimed at that end. One or more of said holding pieces 50 arranged along a carrier arm 40 may make the carrier arm 40 to have an increased stiffness.

Figures 6a – 6b illustrate the kit shown in figures 5a – 5b once assembled. Figure 6a gives a perspective view of the assembled kit in a normal position of use, whereas Figure 6b gives a perspective view of the same assembled kit but turned upside down with respect to the position of Figure 6a.

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Figures 8a – 8d illustrate different arrangements of a same carrier ring with one or more different supporting plates mounted on said carrier ring, according to embodiments of the invention. Figure 8a shows a perspective view of one of said arrangements, in which two L-shaped supporting plates
10 80, 81 are mounted on the carrier ring 20 and fixed through corresponding screws 82. Figure 8a shows a perspective view of the carrier ring 20 with L-shaped supporting plates 80, 81 disposed in a normal position of use. Figure 8b gives a perspective view of the same arrangement but turned upside down with respect to the position of Figure 8a. Figure 8c illustrates an arrangement
15 very similar to the one shown in Figures 8a-8b but comprising two C-shaped supporting plates 83, 84, i.e. with a shape different from the shape of the supporting plates 80, 81 of Figures 8a and 8b.

Figure 8d shows another arrangement of the same type, but, in this case, just
20 comprising one semicircle-shaped supporting plate 85, i.e. with a shape different from the shape of the supporting plates 80, 81, 83, 84 of Figures 8a, 8b and 8c. All the arrangements illustrated by Figures 8a – 8d are suitable for supporting particular devices, such as e.g. transformers, accumulators, solar panels, etc. which may be useful for certain appliances mounted on a same
25 pole. For example, one or more solar panels could be mounted on supporting plates of the described type to supply power to a traffic light mounted on the same pole.

Figure 7 illustrates a utility pole 72 comprising alternative assembled kits
30 according to embodiments of the present invention. In these kits, the carrier rings 20 and 20' are of the type shown in Figures 2a - 2b and are mounted about the pole 72 at different heights. The carrier ring 20 supports two carrier

arms 40 and 40' of the type shown in Figures 4a - 4b. The carrier ring 20' supports a carrier arm 30 of the type shown in Figures 3a - 3b. The shown carrier arms 30, 40, 40' may have different lengths depending on the particular circumstances. In certain embodiments of the invention, the carrier rings need
5 merely be mounted about the pole 72 by coupling, without fastening means, the corresponding semi carrier rings at the desired height. In alternative embodiments, however, it may be necessary or preferable to provide suitable fasteners to fix a carrier ring with respect to the pole 72.

10 One or more lateral holes may be provided in e.g. top salient parts of a carrier ring to house e.g. bolts to fix the carrier ring with respect to the pole 72. The bolts may penetrate to the interior of the pole 72, or may simply exert a sufficient pressure on the external surface of the pole. Furthermore, substantially vertical holes may be provided in a top surface of the carrier ring
15 in order to fix the carrier arms with respect to the carrier ring using suitable bolts.

The pole 72 may have a tapering circular cross-section. The heights at which the carrier rings 20 and 20' are mounted may be determined by the size of the
20 tapered through-holes of the carrier rings (i.e. of the semi carrier rings constituting the carrier rings). Once the pertinent semi carrier rings have been coupled with one another, the resulting carrier rings may be slid down the pole until the internal surface of the tapered through-hole interlocks with the pole's external surface. In this case, the pole and tapered through-holes of the
25 carrier rings are of circular cross-section.

Although the carrier rings 20 and 20' have different through-holes, they may have an identical number of side arms substantially equally sized. In this aspect of the invention, carrier arms 40, 40' may be mounted on carrier ring
30 20, but could also be mounted on carrier ring 20'. Also the other carrier arms could be mounted on any of the carrier rings. A modular concept for a utility pole is thus provided which may be quickly and easily installed, and can also

easily be adapted to different needs. A further aspect of the modular concept is that the different parts may be easily manufactured at low cost. In embodiments of the invention, the carrier rings do not need any fasteners to fix them with respect to the pole (because of the interlocking fit of the internal surface of the tapered through-hole with the conical pole). These
5 embodiments may thus be particularly easy to assemble.

The carrier rings 20, 20' (and associated carrier arms 30, 40, 40') may have substantially the same or different orientations with respect to the carrier rings.
10 As previously explained, the relative orientations of the carriers may be varied in accordance with circumstances.

In certain implementations, electromagnetic interference between different utilities may be a problem. This problem may be reduced by increasing the
15 distance between the utilities and/or changing their relative orientations. One or both of these adjustments may be done relatively easily in various embodiments of the invention.

It may be seen in figure 7, that different utilities may be mounted on the pole.
20 The carrier ring 20' and carrier arm 30 comprises (or may be adapted to carry) a traffic light 70, whereas the carrier ring 20 and carrier arms 40, 40' may be adapted to carry lamps 71, 71' for street illumination (as shown in the figure), but other types of appliances are possible, such as e.g. electrical power lines, telephone lines or other. The lamps 71, 71' may be supplied with electricity
25 through the use of batteries or through cables running down in the pole.

The pole 72 may have tapering cross-section which may be circular, triangular, square (or rectangular) and hexagonal. It will be clear however, that further alternative cross-sections are also possible, e.g. pentagonal,
30 heptagonal etc.

An aspect of the invention is that only the tapered through-hole of the carrier ring needs to be adapted to the pole upon which it is to be mounted. This through-hole may thus also be of circular, triangular, etc. cross section. The height of the utility pole may be varied freely, but for most of the
5 implementations mentioned, heights between 6 meters and 12 meters may be most advantageous.

Furthermore, only a limited number of all possible appliances that may be mounted on a pole have been illustrated. Non-illustrated alternative
10 appliances include (but are not limited to): transformers, optical fibre, telephone, ADSL, Internet connection, photovoltaic systems, Wi-Fi, low voltage and medium voltage electrical power lines, webcams, security cameras, speed cameras, traffic cameras, street lighting and non-public lamps.

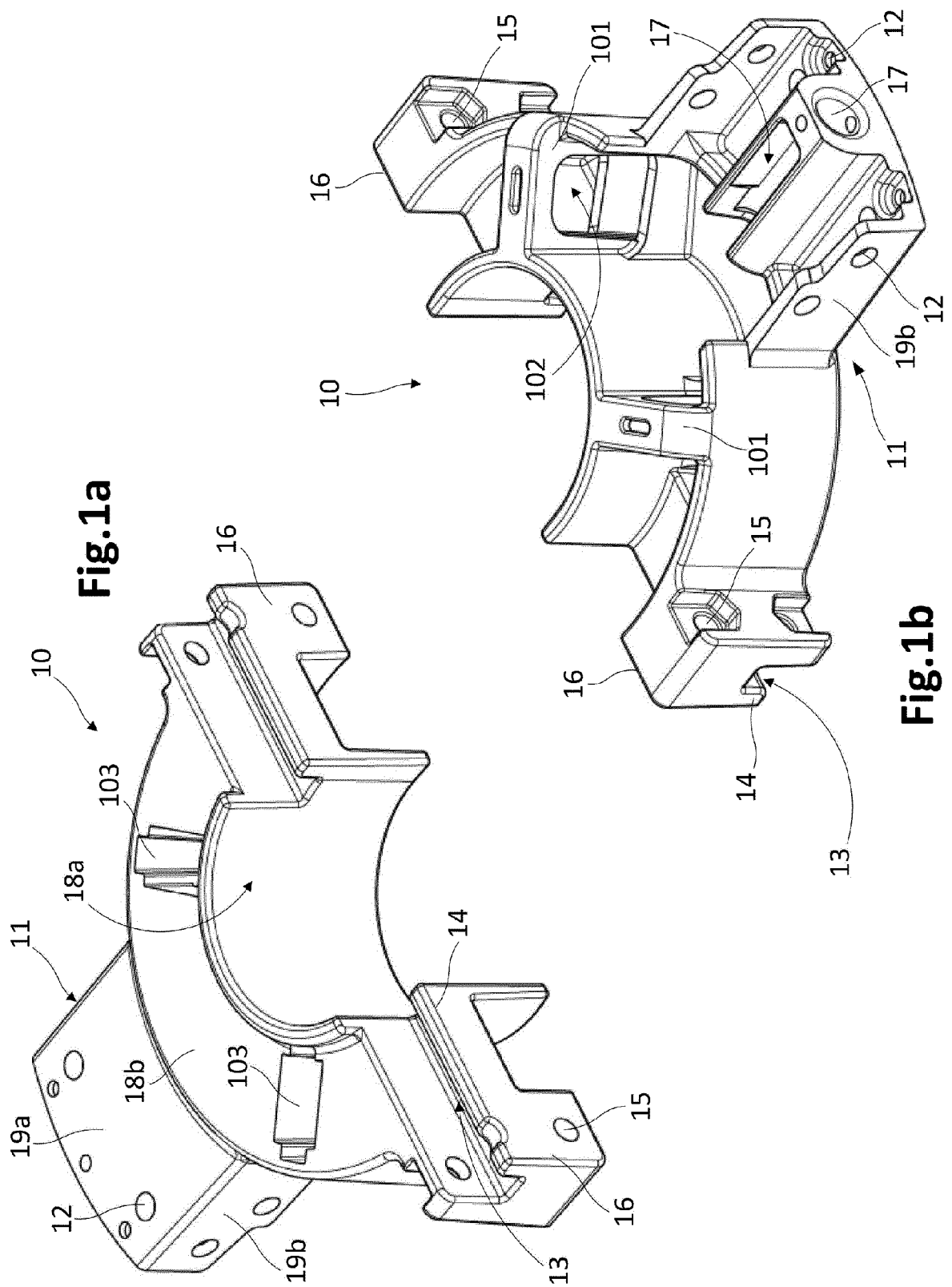
15 Although only a number of particular embodiments and examples of the invention have been disclosed herein, it will be understood by those skilled in the art that other alternative embodiments and/or uses of the invention and obvious modifications and equivalents thereof are possible. Furthermore, the
20 present invention covers all possible combinations of the particular embodiments described. Thus, the scope of the present invention should not be limited by particular embodiments, but should be determined only by a fair reading of the claims that follow.

CLAIMS

1. A kit for mounting one or more appliances on a pole, the kit comprising:
a carrier ring divided into two semi carrier rings with respective coupling
5 ends, such that the carrier ring can be mounted around a pole by coupling the
two semi carrier rings with one another by the respective coupling ends, said
coupling of the two semi carrier rings with one another causing the carrier ring
to have a tapered through-hole, and at least one of the semi carrier rings
having one or more side arms, and
10 at least one carrier arm for supporting one or more appliances, each carrier
arm being mountable by an end on one of the side arms of the carrier ring.
2. A kit according to claim 1, wherein for each pair of coupling ends whose
coupling with one another causes coupling of the two semi carrier rings with
15 one another, a first coupling end of the pair has a downwards sunken region
and an upwards salient region and a second coupling end of the pair has an
upwards sunken region and a downwards salient region, the upwards salient
region of the first coupling end fitting into the upwards sunken region of the
second coupling end and the downwards salient region of the second coupling
20 end fitting into the downwards sunken region of the first coupling end.
3. A kit according to claim 2, wherein the salient regions and sunken regions
are arranged substantially vertical, with respect to a position of use of the
carrier ring, in such a way that, when the two semi carrier rings are coupled
25 with one another, holding of one of the two semi carrier rings causes said
semi carrier ring to hold the other semi carrier ring.
4. A kit according to any of claims 1 to 3, wherein the carrier ring comprises a
plurality of salient pieces at the bottom of the carrier ring for protecting cables
30 and wires related to appliances.

5. A kit according to any of claims 1 to 4, wherein the through-hole of the carrier ring is adapted to form an interlocking connection with a pole.
6. A kit according to any of claims 1 to 5, wherein the carrier ring is adapted to
5 carry two carrier arms mountable by an end on the carrier ring.
7. A kit according to any of claims 1 to 6, wherein the orientation of at least one of the carrier arms is adjustable.
- 10 8. A kit according to claim 7, wherein the carrier arms comprise two curved oblong holes for fastening the carrier arms to the side arms of the carrier ring.
9. A kit according to any of claims 1 – 8, wherein the side arms of the carrier ring comprise a top surface and two side surfaces that are perpendicular to
15 the top surface.
10. A kit according to any of claims 1 – 9, wherein the side arms comprise a cylindrical hole.
- 20 11. A kit according to any of claims 1 to 10, wherein the carrier ring comprises at least two salient top pieces with a hole for fitting a fastener to fasten the carrier ring to the pole.
12. A kit according to any of claims 1 to 11, comprising at least two carrier
25 rings, wherein a first carrier ring has a first tapered through-hole and a second carrier ring has a second tapered through-hole of a different size than said first tapered through-hole.
13. A kit according to any of claims 1 to 12, wherein one or more of the
30 carrier arms comprises holes near its end for fitting electrical insulators.

14. A kit according to any of claims 1 to 13, wherein one or more of the carrier arms comprises or is adapted to carry an illumination system.
15. A kit according to any of claims 1 to 14, wherein one or more of the
5 carrier arms comprises or is adapted to carry a traffic light.
16. A kit according to any of claims 1 - 15, further comprising at least one pole around which a carrier ring of the kit may be mounted.
- 10 17. A carrier ring suitable for being used in a kit according to any of claims 1 to 16.
18. A utility pole carrying one or more of the kits according to any of claims 1 to 16.



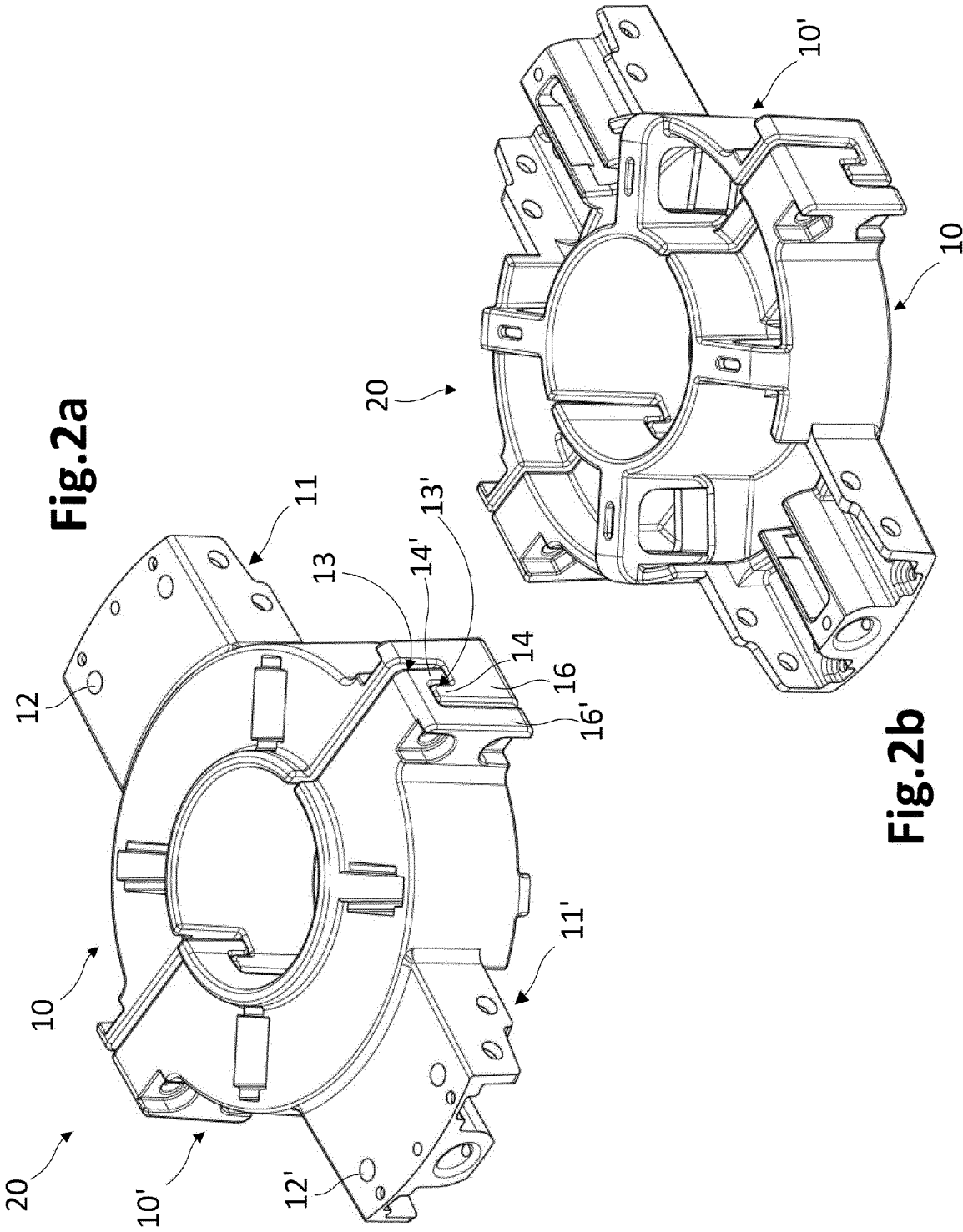


Fig.3a

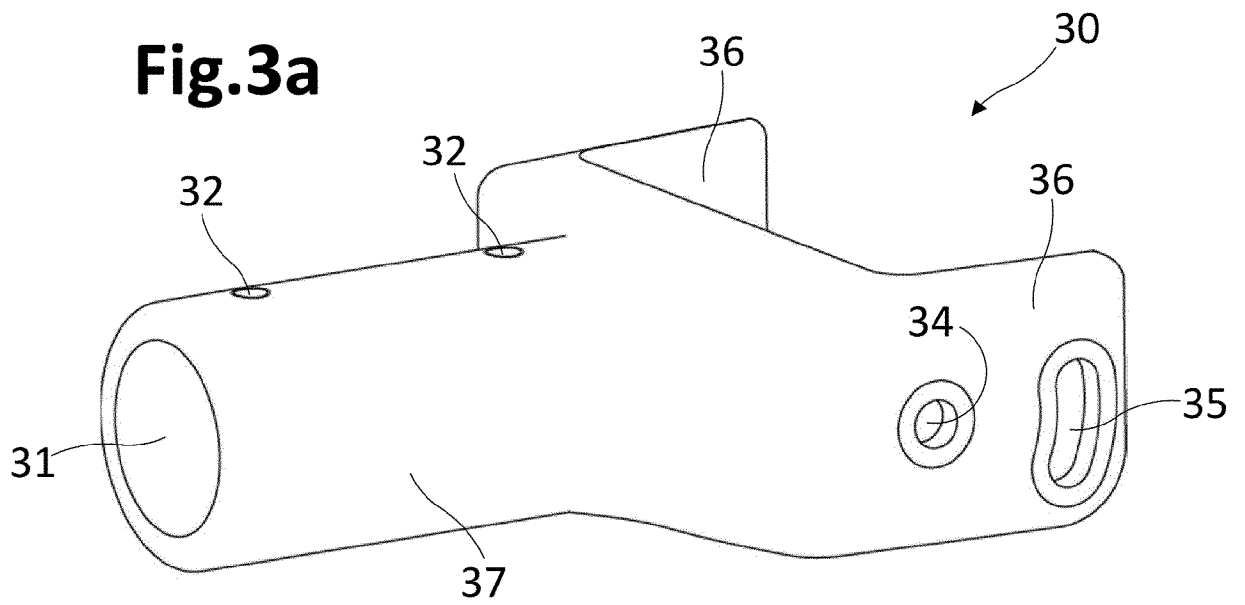
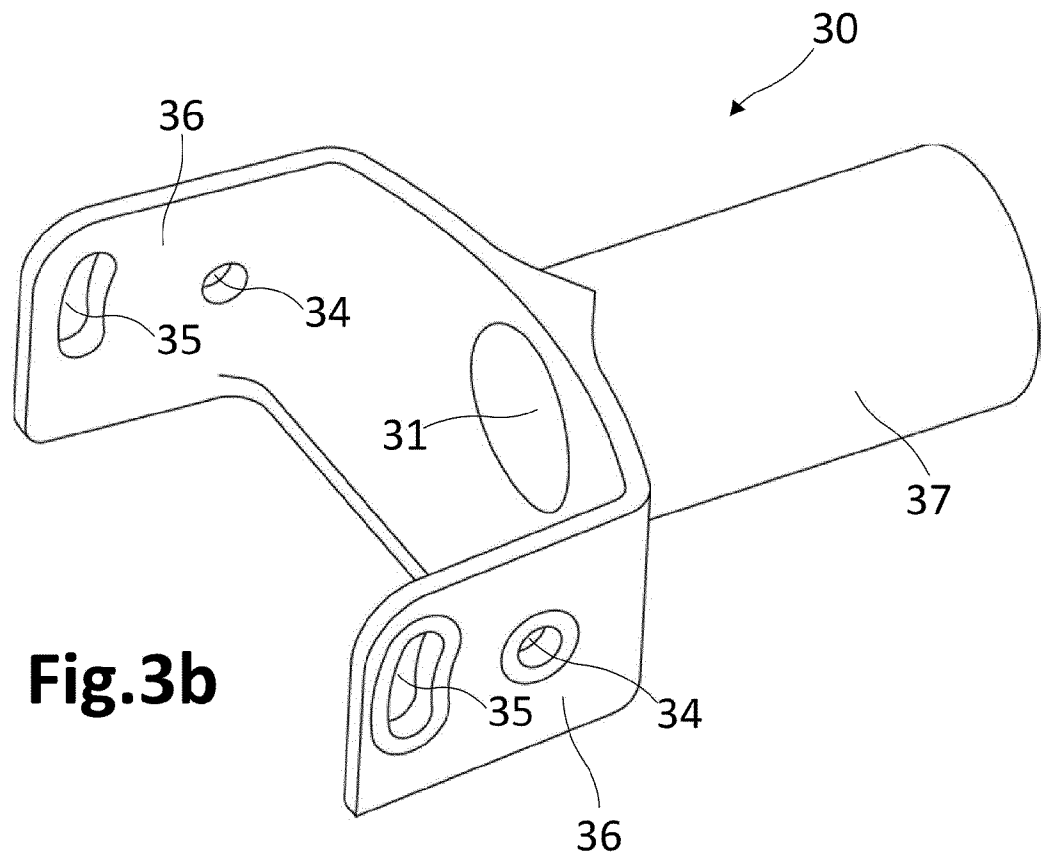
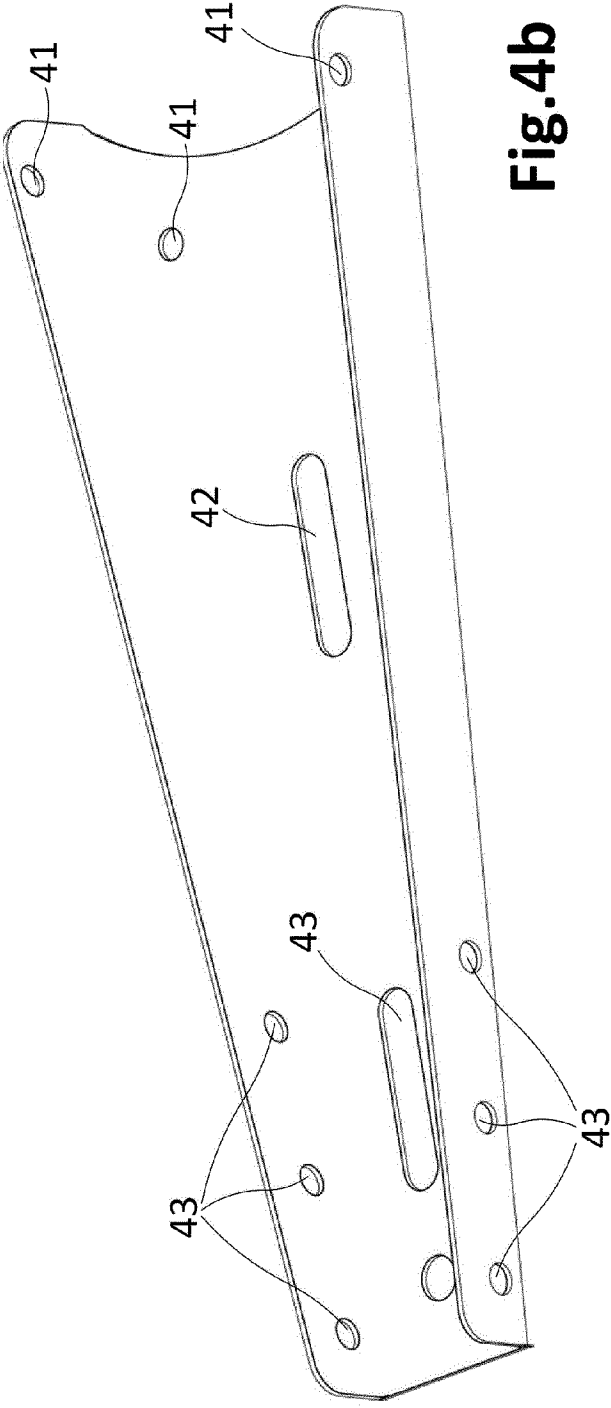
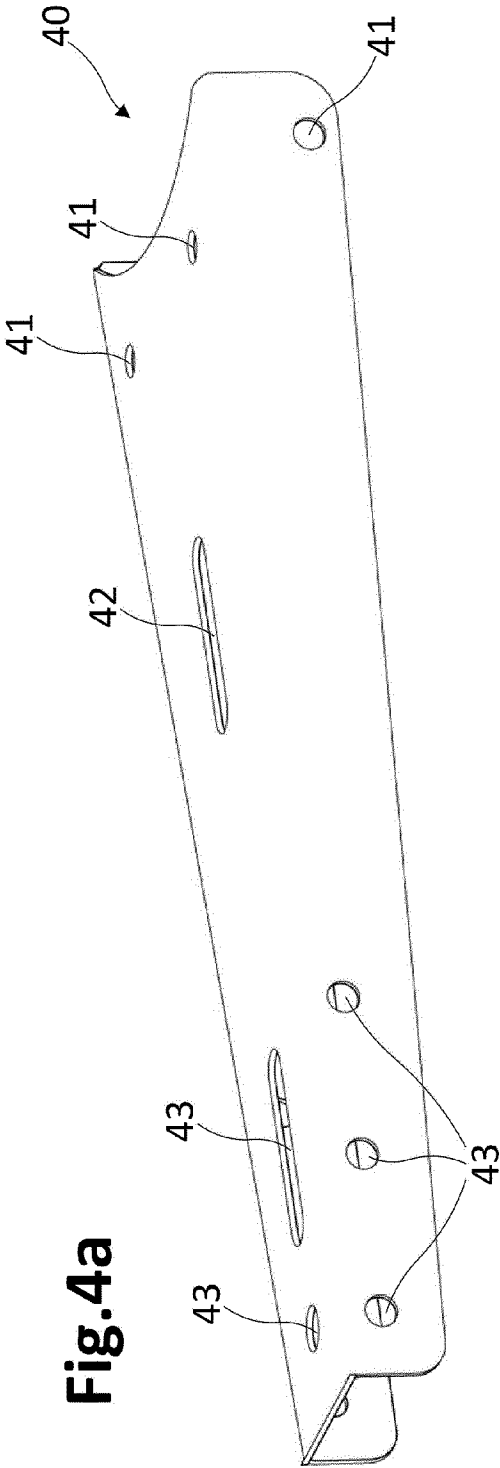
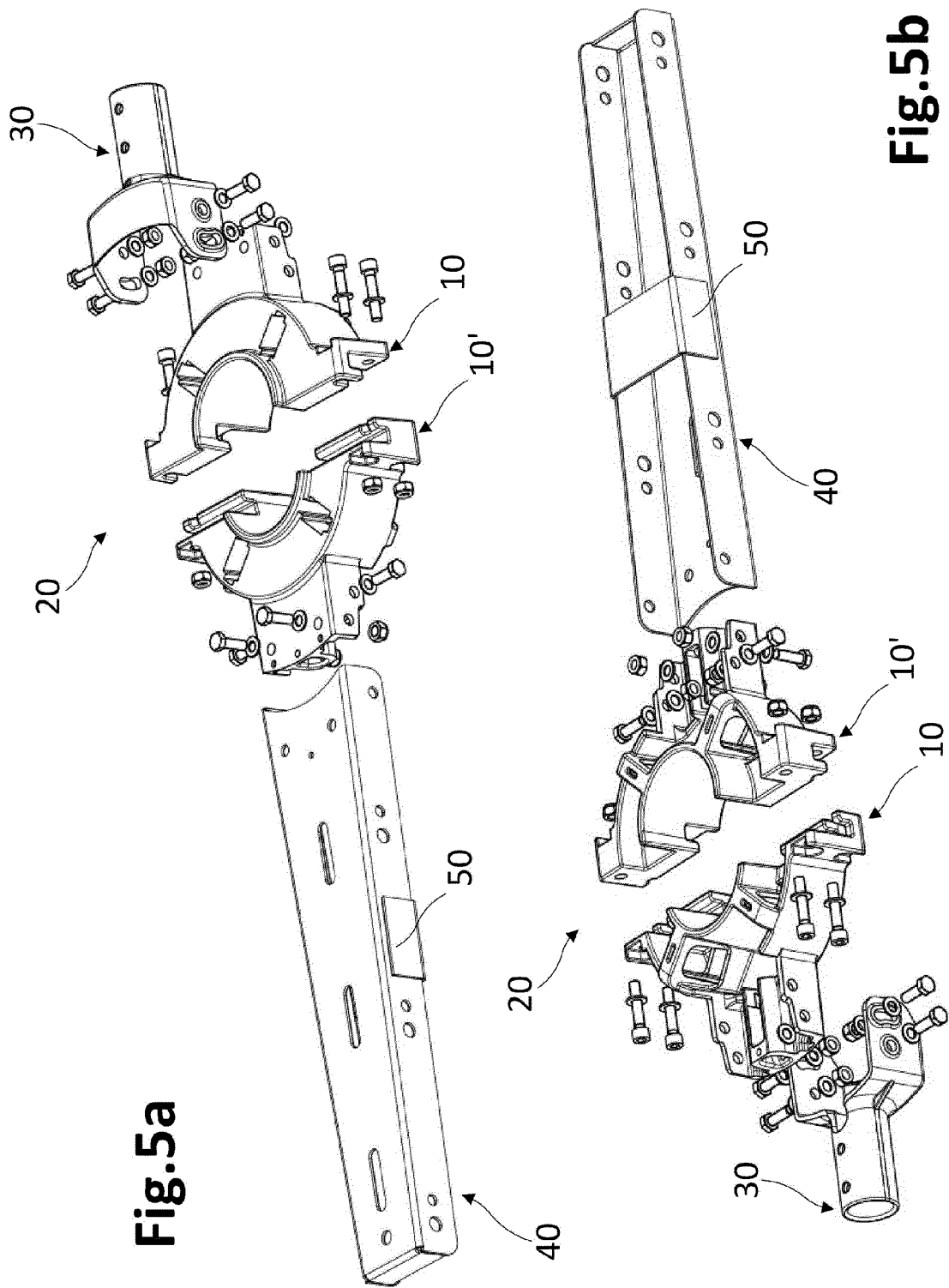
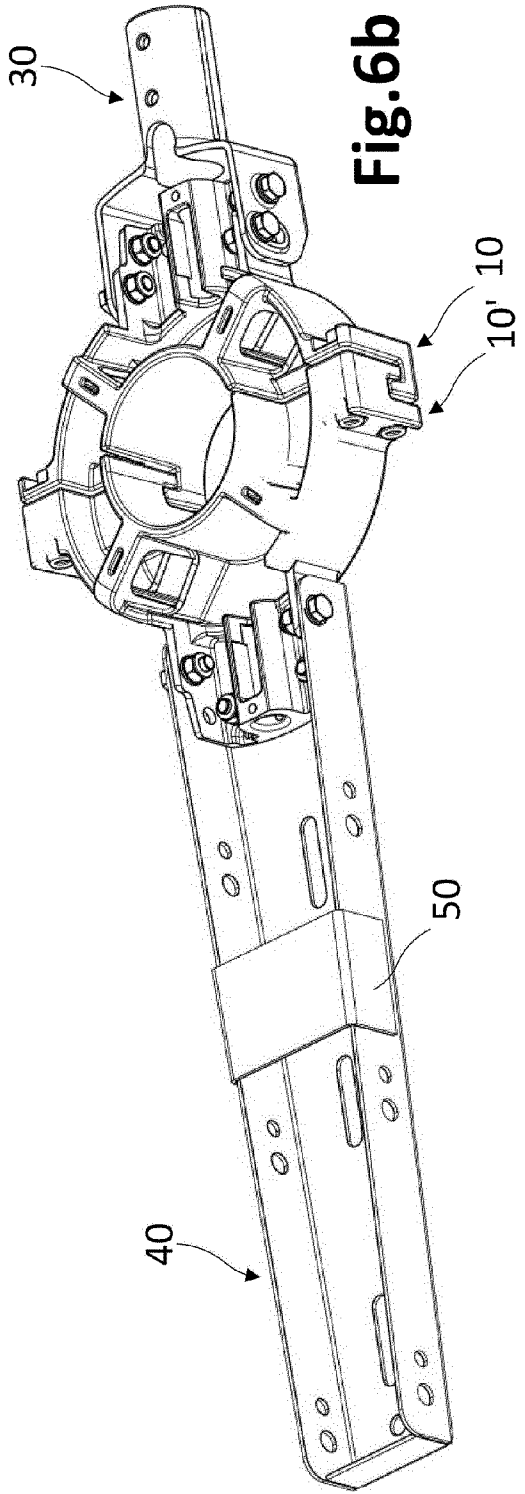
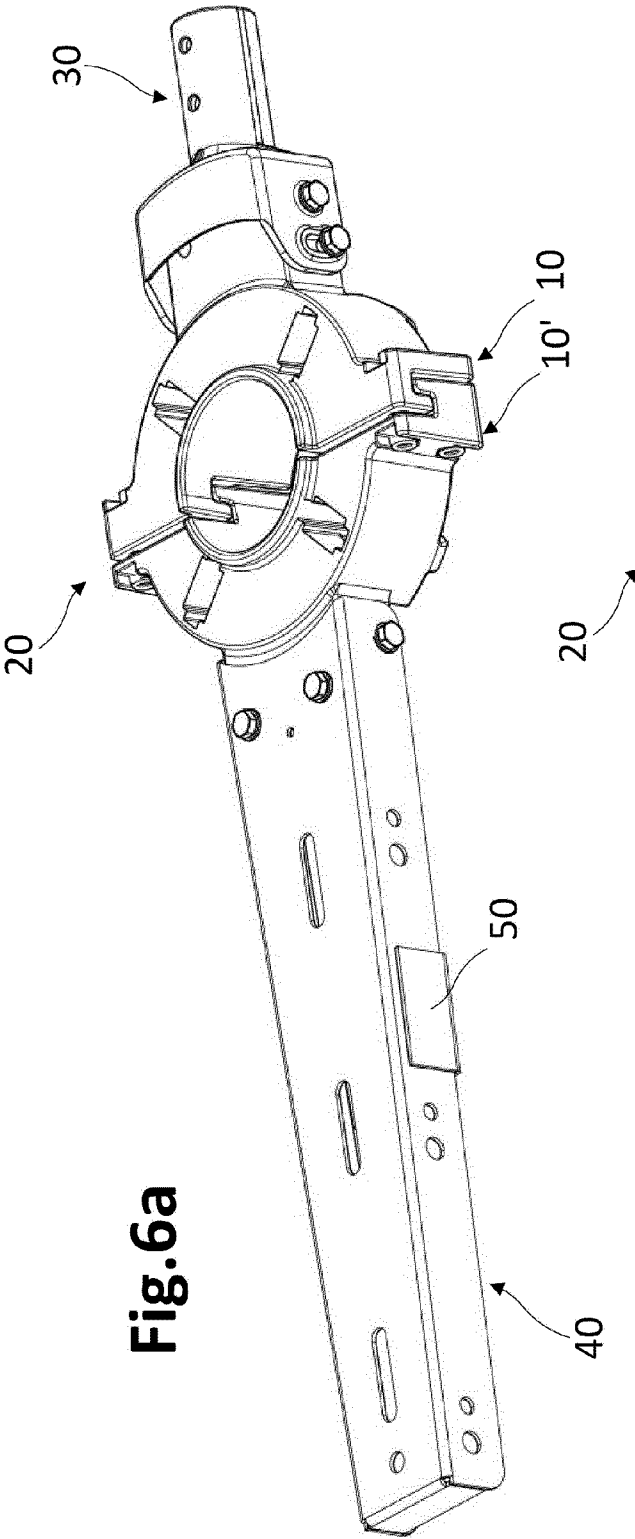


Fig.3b









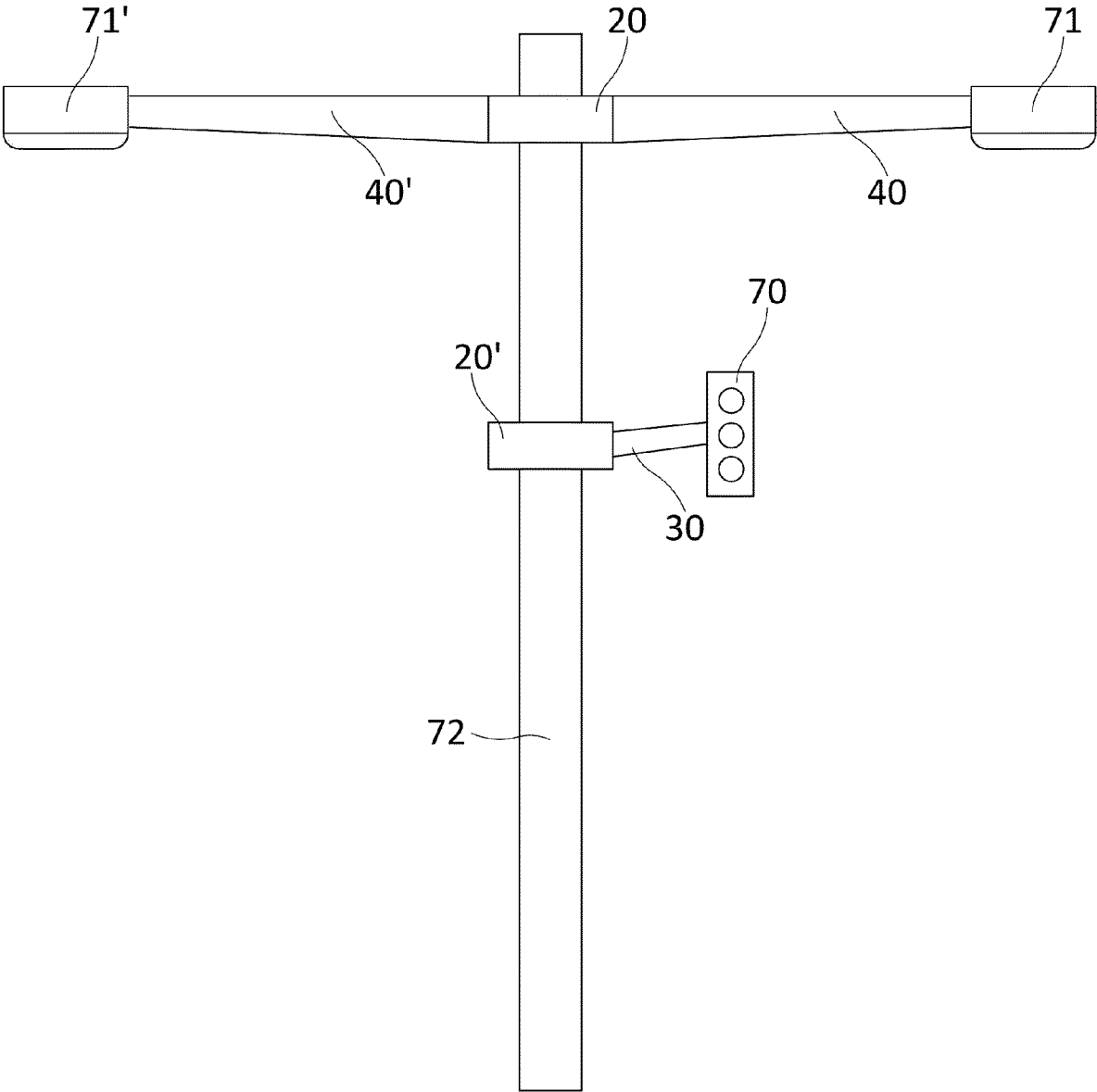


Fig.7

Fig.8a

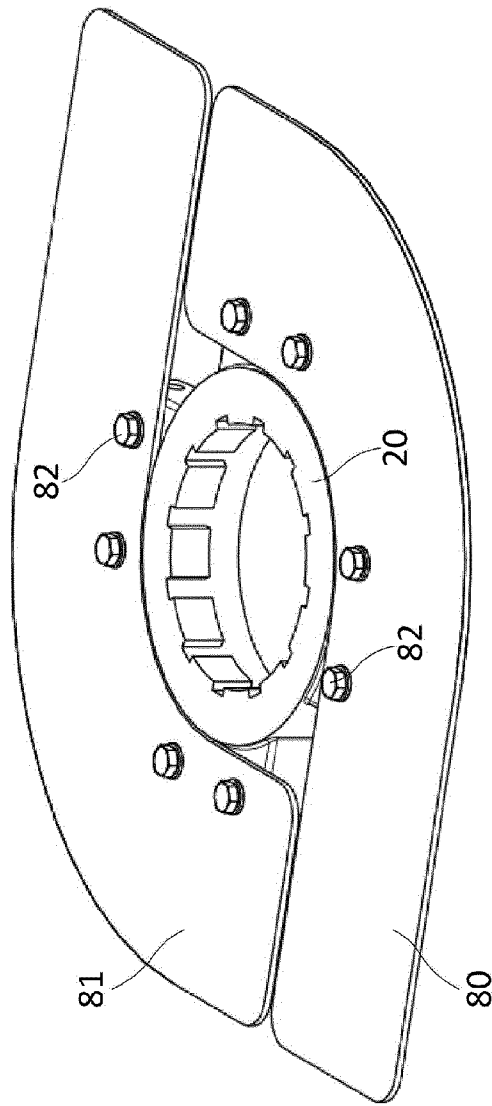


Fig.8b

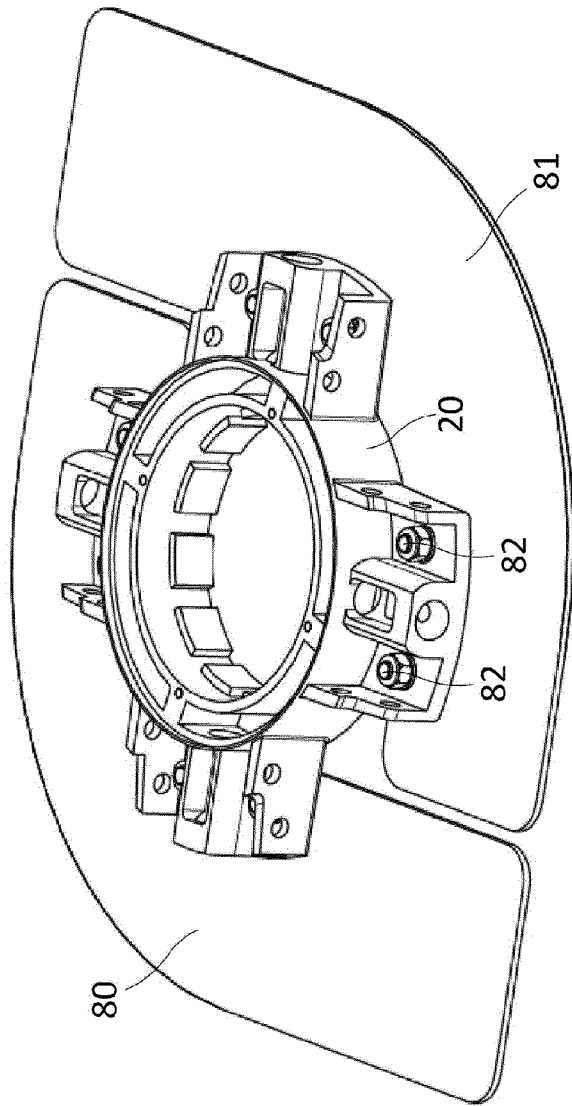


Fig.8c

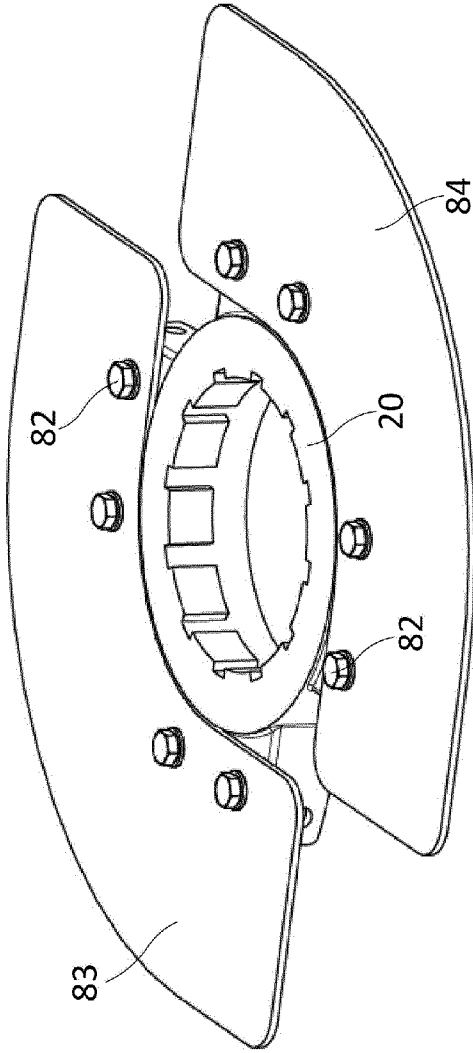
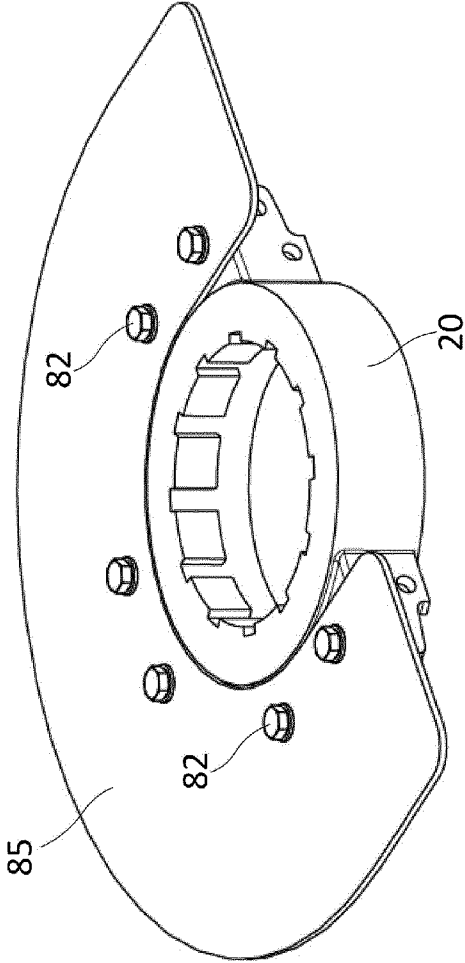


Fig.8d



INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2013/051057

A. CLASSIFICATION OF SUBJECT MATTER

INV. E04H12/24 F21V21/116 G08G1/095 G09F7/18
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

E04H F21V G08G G09F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EP0-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 240 054 A1 (DEN BROEKE ALEIDUS GERRIT VAN) 7 October 1987 (1987-10-07)	1-6, 9-12, 14-18
Y	figures 1-3 column 3, line 46 - column 4, line 56 -----	7,8,13
Y	US 4 489 910 A (FERGUSON JOSEPH D [US]) 25 December 1984 (1984-12-25) figure 8 -----	7,8
Y	BE 856 513 A1 (PIEDBOEUF JACQUES) 31 October 1977 (1977-10-31) figure 1 -----	7,8
Y	WO 2012/025153 A1 (TRESSERRAS PICAS JOSEP [ES]; VINAS GARCIA DE FALCES JAVIER [ES]; FARGA) 1 March 2012 (2012-03-01) cited in the application page 5, line 13 - line 16 -----	13



Further documents are listed in the continuation of Box C.



See patent family annex.

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Date of the actual completion of the international search

24 September 2013

Date of mailing of the international search report

01/10/2013

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Brucksch, Carola

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2013/051057

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