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(54) **Connecting structure for a traffic-safe pole**

Verbindungsstruktur für einen verkehrssicheren Balken

Structure de connexion pour un pôle à trafic sécurisé

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Description

[0001] The invention relates to a connecting structure for a traffic pole, such as a lamp post, composed of two pole parts, comprising connecting pieces which can each be connected to a pole part in such a manner that the connecting pieces and pole parts are in line with one another, which connecting pieces are each provided with an end face and a connecting part which can be connected to a pole part, a mounting flange having recesses opening into a periphery thereof and a mounting face, which mounting face is turned away from the associated end face, as well as clamping members which are accommodated in recesses which are aligned with respect to one another and which are supported on mounting faces which are turned away from one another in such a manner that the end faces of the connecting pieces are pushed together.

[0002] A connecting structure of this type is known from GB-A-1,087,073 and US2005/0284999. With these known connecting structures, both pole parts have external, more or less square or triangular flanges, respectively. Cutouts are provided on the four and three corners, respectively, of these flanges, in which bolt connections are accommodated. The bolt connections clamp the flanges together at a predetermined force. This clamping force is such that the pole remains intact under normal circumstances, but can shear under the effect of collision forces. The upper section of the pole is thus able to yield and can then fall over. The aim of such a procedure is to limit the collision forces to which a vehicle colliding with the pole is subjected. The passengers in the vehicle are thus subjected to accelerations which are less high, thereby reducing the risk of injuries.

[0003] However, the drawback of this known pole is that the attachment means which are provided externally may be dangerous. They form projections which may penetrate into a colliding vehicle, so that the vehicle may be decelerated considerably as a result of hook effects. As a result, passengers run the risk of still being injured. In addition, due to the fact that they are arranged externally, the attachment means are exposed to weather conditions, as a result of which the reliability thereof in the long term cannot be reliably ensured. A further drawback is the fact that the presence of the flanges on the exterior of the pole may form an obstacle when providing a so-called ground-level protection and/or an obligatory base-part protection and/or the protection for that part of the pole which extends into the ground, which protection, according to the regulations, has to extend approximately 25 cm above ground level. Another drawback is also the fact that the directional sensitivity of the known connecting structure is relatively high, depending on the direction of mounting between the connecting pieces. It is therefore an object of the invention to provide a connecting structure for a traffic-safe pole which does not result in additional risks and the correct action of which can be ensured for a relatively long time. This object is achieved

by the fact that the recesses open into the inner periphery of the mounting faces, said inner periphery situated inside the connecting structure.

[0004] Providing the recesses on the inner periphery of the mounting flanges has the advantage that the exterior of the connecting structure does not have any irregularities or sharp edges, so that the danger of a cutting action or hook action is significantly reduced. In addition, the parts which are critical to the correct functioning of the connecting structure can be more readily protected against outside influences. The base-part protection which extends across the connecting structure ensures that the respective parts are invisible from the outside. The advantage thereof is also that poles provided with such a connecting structure are less susceptible to vandalism.

[0005] Preferably, the recesses flare out, for example in accordance with a V shape. In order to achieve a reliable shearing action, washer discs are preferably provided between each mounting face and clamping member. These washer discs may also be designed in such a manner that they flare out, viewed in the direction of the inner periphery of the mounting faces. The effect of these flaring shapes is that, viewed in the peripheral direction, it becomes less critical where a vehicle collides with the pole. This effect is reinforced by the use of a relatively large number of clamping members, for example 8, 10 or 12.

[0006] The effect can be further improved if the connecting pieces each have holders which project with respect to the mounting faces of the mounting flanges, between which holders the washer discs are accommodated. In each case two adjacent holders can then determine a holder space for the associated washer disc, which holder space flares out in the direction of the inner periphery of the mounting flanges. In such a flaring holder space, the washer discs which shear off under the effect of collision forces can readily be guided. In addition, the holder space in which the washer disc is enclosed provides greater stability to the connecting structure during normal use, so that the pole is able to withstand normal loads, such as those caused by the wind and the like.

[0007] In another preferred embodiment, it is provided that the mounting faces at adjacent recesses form steps. As a result thereof, adjacent washer discs of a connecting piece can be at different levels. When the pole shears off on account of a collision, the washer discs which are relatively close to one another and which move even closer together during the shearing can then slide over one another and thus do not become locked.

[0008] A friction means, such as one or more friction rings, may be provided between the mounting faces, which results in a low, controlled friction. Preferably, two rings lying on top of one another are provided which cause a reliable and long-lasting nominal shearing force between them. Furthermore, the connecting pieces may each have a reinforcing flange at a distance from the end face. The connecting pieces, at their ends which face

one another, may each comprise a collar which projects with respect to the sleeve and which determines a stop for a pole part which can be placed over the sleeve.

[0009] In a preferred embodiment, the connecting pieces may comprise a sleeve, in which case the mounting flanges are situated on the inside of the sleeve. The connecting pieces may be rotationally symmetrical and are preferably made of aluminium castings. In addition, a connecting piece may be provided with a reinforcing flange at a distance from the end face. Said reinforcing flange is preferably at the level of impact, in such a manner that the collision forces can reliably be passed on to the end faces without the connecting pieces breaking prematurely.

[0010] The connecting pieces may be rotationally symmetrical. In addition, alignment means may be provided for aligning the connecting pieces and the recesses with respect to one another. Between the end faces, a friction means, such as one or more friction rings, may be provided. At least one of the friction rings may have recesses which open into the inner periphery thereof, in which recesses a bolt is accommodated in each case.

[0011] These recesses in the friction ring may have an undercut shape. Furthermore, a connecting piece may have a reinforcing flange at a distance from the end face. The connecting pieces may be identical. The pole parts may be connected to the connecting pieces by an adhesive connection. The area of the pole parts adjacent to the connecting structure and the connecting structure may be covered by a base-part protection.

[0012] The invention also relates to a traffic pole having pole parts which are in line with one another and which are connected to one another by a connecting structure as described above. Preferably, the pole parts are connected to the connecting pieces by an adhesive connection. This prevents local weakened sections being formed by, for example, welding, which may give cause corrosion and fatigue phenomena.

[0013] One of the pole parts or the so-called base part is designed to be installed on or in a foundation, in such a manner that the connecting structure is situated at a slight distance above the ground level of the area in which the foundation is situated, which is preferably approximately 5 cm.

[0014] Since the flanges and the clamping members are situated inside the connecting structure, the latter may be designed in such a manner that the peripheral contour thereof is identical to the peripheral contour of the pole parts. This results in a very uniform appearance, which is not susceptible to soiling and does not have any dangerous protruding parts.

[0015] The invention will be explained in more detail below with reference to an exemplary embodiment illustrated in the figures, in which:

Fig. 1 shows a lamp post comprising a connecting structure according to the invention;

Fig. 2 shows a connecting structure as used with the

lamp post from Fig. 1;

Fig. 3 shows a view of a connecting piece of the connecting structure;

Fig. 4 shows a perspective view of the connecting pieces.

[0016] The lamp post 1 illustrated in Fig. 1 comprises a lower pole part 3 and an upper pole part 2, which are connected to one another by the connecting structure 4 according to the invention. The lower pole part 3 has its foundation in the ground 5, the upper pole part 2 carries a lighting fixture 6. Nevertheless, the connecting structure 4 can also be used with other poles, which are at risk of vehicles colliding with them.

[0017] Fig. 2 shows the connecting structure 4 on an enlarged scale. The connecting structure 4 comprises two connecting pieces 7, 8 which are identical in the illustrated exemplary embodiment. Each connecting piece 7, 8 has a connecting part 9 which can be attached to a respective pole part 2, 3. In addition, each connecting piece has a collar 10 and end faces 11 which are turned towards one another at the collar 10. Between the end faces 11, a friction ring or a couple of friction rings 12 may be provided which may produce a certain shearing force.

[0018] As regards achieving the desired shearing forces, the end faces 11 and the friction rings 12 have to be pressed together at a specific pretensioning force. This is achieved by means of a series of bolt connections 13, which are evenly distributed on the inner periphery of the connecting structure 4. Fig. 2 shows one of these bolt connections 13. Each bolt connection 13 comprises a bolt 14, a nut 15 and washer discs 16 under the head of the bolt and under the nut 15. These bolt connections 13 are accommodated in the V-shaped recesses 17 which expand towards the inside and which are provided in each connecting piece 7, 8, namely in the inner mounting flange 18 thereof.

[0019] As is illustrated in Fig. 3, at least one of the friction rings 12 is provided with undercut recesses 24 on the inner periphery. The shank of a bolt 14 can be inserted or pushed into these recesses 24, and subsequently held therein. This results in a certain stabilization of the bolt connections 16 which prevents the bolt connections from being displaced as a result of, for example, vibrations. However, the recesses 24 are designed in such a manner that the bolt connections 16 can be forced out of the recesses under the effect of a collision.

[0020] Each mounting flange 18 has a series of mounting faces 19 for the bolt connections 13, in particular for the washer discs 16 thereof. As can be seen in Figs. 3 and 4, the washer discs 16 are also designed to flare out. Furthermore, the flanges 18 are provided with so-called holders 20, which protrude relative to the mounting faces 19. The mounting faces 19 which are adjacent to one another are situated at different levels, viewed in the axial direction of the connecting structure 4, as can be seen in the perspective view of Fig. 4 and the side view of Fig. 2.

[0021] As can also be seen in Fig. 4, two adjacent holders 20 determine a holder space 21, the bottom of which is formed by a mounting face 19. A correspondingly shaped washer disc 16, as illustrated in Fig. 3, fits into this holder space 21 and on the mounting face 19 in a tight-fitting manner. The fact that the adjacent washer discs 16 are situated at different levels as the mounting faces 19 on which they are supported are likewise on different levels, offers the advantage that the washer discs 16 cannot touch one another when they shear off the mounting faces 19 in the event of a collision. The flared shape of the holder space 19 and of the recesses 17 in this case ensures that, in relative terms, it is not critical where a vehicle hits the connecting structure 4, viewed in the peripheral direction, with regard to the shearing direction. As has been discussed above, the relatively large number of bolt connections 16 is important in this connection.

[0022] The connecting pieces 7, 8, and in particular the recesses 17 thereof, may be aligned with respect to one another by means of alignment means 22, such as a tenon-mortise joint. In addition, a reinforcing flange 23 may be provided on the upper end of the upper connecting piece 7, by means of which the collision energy can be withstood in such a manner that correct shearing can be achieved.

[0023] As is diagrammatically illustrated in Fig. 1, the connecting structure 4 and the adjacent sections of the pole parts 2, 3 may be covered with a so-called base-part protection 26. The latter can be provided without any problems as the connecting structure 4 does not have any parts which protrude outside the contours of the pole 1. In addition, the connecting structure 4 is hidden from view, so that the risk of vandalism is reduced to a minimum. Incidentally, the connecting structure 4, in particular the end faces 11 thereof, are at a height of approximately 5 cm above the ground. Thus, only a very low stump 3 remains in the ground after the upper pole part 2 has sheared off, which stump presents only a very low-risk danger to the colliding vehicle. In any case, a height of 5 cm is so small that the vehicle cannot be decelerated thereby and cannot become caught behind such a low stump.

Claims

1. Connecting structure (4) for a traffic pole, such as a lamp post (1), composed of two pole parts (2, 3), comprising connecting pieces (7, 8) which can each be connected to a pole part in such a manner that the connecting pieces and pole parts are in line with one another, which connecting pieces (7, 8) are each provided with an end face (11) and a connecting part (9) which can be connected to a pole part (2, 3), a mounting face (19) having recesses (17) opening into a periphery thereof, which mounting face (19) is turned away from the associated end face (11), as

well as clamping members (13) which are accommodated in said recesses (17) which are aligned with respect to one another and which are supported on said mounting faces (19) which are turned away from one another in such a manner that the end faces (11) of the connecting pieces (7, 8) are pushed together, characterized in that the recesses (17) open into the inner periphery of the mounting faces (19), said inner periphery situated inside the connecting structure.

- 5 2. Connecting structure (4) according to Claim 1, in which washer discs (16) are provided between each mounting face (19) and clamping member (13).
- 10 3. Connecting structure (4) according to Claim 2, in which the washer discs (16) are designed in such a manner that they flare out, viewed in the direction of the inner periphery of the mounting faces (19).
- 15 4. Connecting structure (4) according to Claim 3, in which the connecting pieces (7, 8) each have holders (20) which project with respect to the mounting faces (19), between which holders (20) the washer discs (16) are accommodated.
- 20 5. Connecting structure (4) according to Claim 4, in which adjacent holders (20) determine a holder space (21) for the associated washer disc (16), which holder space flares out in the direction of the inner periphery of the mounting faces (19).
- 25 6. Connecting structure (4) according to Claim 5, in which the form of the holder space (21) corresponds to that of the washer disc (16).
- 30 7. Connecting structure (4) according to one of Claims 2-6, in which the clamping members comprise bolt connections (13) and the head of each bolt (14) and each nut (15) rest on a washer disc (16).
- 35 8. Connecting structure (4) according to one of the preceding claims, in which the mounting faces (19) at adjacent recesses (17) form steps.
- 40 9. Connecting structure (4) according to one of the preceding claims, in which the connecting pieces (7, 8) comprise a sleeve (9) and the mounting faces (19) are situated on the inside of the sleeve (9).
- 45 10. Connecting structure (4) according to one of the preceding claims, in which the connecting pieces (7, 8), at their ends which face one another, each comprise a collar (10) which projects with respect to the sleeve and which determines a stop for a pole part (2, 3) which can be placed over the sleeve (9).
- 50 11. Connecting structure (4) according to one of the pre-

ceding claims, in which at least five recesses (17) are evenly distributed in the peripheral direction in order to provide directional independence in the peripheral direction.

12. Traffic pole (1), comprising pole parts (2, 3) which are in line with one another and are connected to one another by a connecting structure (4), **characterized by** a connecting structure (4) according to one of the preceding claims.
13. Traffic pole (1) according to Claim 12, in which one of the pole parts (2, 3) is designed to be installed on or in a foundation, and the connecting structure (4) is situated at a distance above the ground level (5) of the area in which the foundation is situated.
14. Traffic pole (1) according to Claim 13, in which the pole parts (2, 3) are connected to the connecting pieces (7, 8) by an adhesive connection.
15. Traffic pole (1) according to one of Claims 12-14, in which the area of the pole parts adjacent to the connecting structure and the connecting structure (4) are covered by a base-part protection (26).

Patentansprüche

1. Verbindungsstruktur (4) für einen Verkehrsposten, wie einen Laternenposten (1), der aus zwei Pfostenteilen (2, 3) besteht, die Verbindungsstücke (7, 8) aufweisen, die jeweils mit einem Pfostenteil derart verbunden sein können, dass die Verbindungsstücke und die Pfostenteile zueinander ausgerichtet sind, wobei die Verbindungsstücke (7, 8) jeweils mit einer Stirnfläche (11) und einem Verbindungsteil (9), das mit einem Pfostenteil (2, 3) verbunden werden kann, einer Montagefläche (19) mit Aussparungen (17), die in dessen Umfang münden, wobei die Montagefläche (19) von der zugehörigen Stirnflächen (11) abgewandt ist, und mit Klemmgliedern (13) versehen sind, welche in den Ausnehmungen (17) aufgenommen sind, die in Bezug aufeinander ausgerichtet und auf den Montageflächen (19) gehalten sind, die voneinander derart abgewandt sind, dass die Stirnfläche (11) der Verbindungsstücke (7, 8) zusammengedrückt werden, **dadurch gekennzeichnet, dass** die Ausnehmungen am Innenumfang der Montageflächen (19) münden, wobei der Innenumfang innerhalb der Verbindungsstruktur liegt.
2. Verbindungsstruktur (4) nach Anspruch 1, wobei Beilagscheiben (16) zwischen jeder Montagefläche (19) und einem Klemmglied (13) vorgesehen sind.
3. Verbindungsstruktur (4) nach Anspruch 2, dem die Beilagscheiben (16) der Art gestaltet sind, dass sie

in Richtung des Innenumfangs der Montageflächen (19) aufgeweitet sind.

4. Verbindungsstruktur (4) nach Anspruch 3, wobei die Verbindungsstücke (7, 8) jeweils Halteelemente (20) aufweisen, die in Bezug auf die Montageflächen (19) vorspringen, wobei zwischen den Halteelementen (20) die Beilagscheiben (16) aufgenommen sind.
5. Verbindungsstruktur (4) nach Anspruch 4, wobei benachbarte Halteelemente (20) einen Halteraum (21) für die zugehörige Beilagscheibe (16) definieren, wobei der Halteraum in Richtung des Innenumfangs der Montageseiten (19) aufgeweitet ist.
10. Verbindungsstruktur (4) nach Anspruch 5, wobei die Form des Halteraums (21) der der Beilagscheibe (16) entspricht.
15. Verbindungsstruktur (4) nach einem der Ansprüche 2 bis 6, wobei die Klemmelemente Bolzenverbindungen (13) umfassen und der Kopf jedes Bolzens (14) und jeder Nuss (15) auf einer Beilagscheibe (16) ruht.
20. Verbindungsstruktur (4) nach einem der vorangehenden Ansprüche, wobei die Montageflächen (19) an benachbarten Aussparungen (17) Stufen bilden.
25. Verbindungsstruktur (4) nach einem der vorhergehenden Ansprüche, wobei die Verbindungsstücke (7, 8) eine Hülse (9) umfassen und die Montageflächen (19) innerhalb der Hülse (9) liegen.
30. Verbindungsstruktur (4) nach einem der vorangehenden Ansprüche, wobei die Verbindungsstücke (7, 8) an ihren Enden, die einander zugewandt sind, jeweils einen Kragen (10) aufweisen, der in Bezug auf die Hülse vorsteht und einen Anschlag für einen Pfostenteil (2, 3), der über die Hülse (9) gebracht werden kann, bildet.
35. Verbindungsstruktur (4) nach einem der vorangehenden Ansprüche, wobei die Verbindungsstücke (7, 8) an ihren Enden, die einander zugewandt sind, jeweils einen Kragen (10) aufweisen, der in Bezug auf die Hülse vorsteht und einen Anschlag für einen Pfostenteil (2, 3), der über die Hülse (9) gebracht werden kann, bildet.
40. Verbindungsstruktur (4) nach einem der vorangehenden Ansprüche, wobei wenigstens fünf Ausnehmungen (17) gleichmäßig um den Umfang verteilt sind, um in Umfangsrichtung Richtungsunabhängigkeit bereitzustellen.
45. Verbindungsstruktur (4) nach einem der vorangehenden Ansprüche, wobei die Verbindungsstücke (7, 8) an ihren Enden, die einander zugewandt sind, jeweils einen Kragen (10) aufweisen, der in Bezug auf die Hülse vorsteht und einen Anschlag für einen Pfostenteil (2, 3), der über die Hülse (9) gebracht werden kann, bildet.
50. Verbindungsstruktur (4) nach einem der vorangehenden Ansprüche, wobei die Verbindungsstücke (7, 8) an ihren Enden, die einander zugewandt sind, jeweils einen Kragen (10) aufweisen, der in Bezug auf die Hülse vorsteht und einen Anschlag für einen Pfostenteil (2, 3), der über die Hülse (9) gebracht werden kann, bildet.
55. Verbindungsstruktur (4) nach Anspruch 12, bei dem einer der Pfostenteile (2, 3) so gestaltet ist, dass er auf oder in einem Fundament installiert werden kann, und die Verbindungsstruktur (4) mit Abstand

über Erdniveau (5) in einem Bereich liegt, indem das Fundament angeordnet ist.

14. Verkehrspfosten (1) nach Anspruch 13, wobei die Pfostenteile (2, 3) mit den Verbindungsstücken (7, 8) durch eine Klebverbindung verbunden sind. 5

15. Verkehrspfosten (1) nach einem der Ansprüche 12 bis 14, wobei der Bereich der Pfostenteile benachbart der Verbindungsstruktur und die Verbindungsstruktur (4) von einem Basisteil-Schutz (26) bedeckt sind. 10

Revendications

1. Structure de raccordement (4) pour un poteau routier, tel qu'un lampadaire (1), composé de deux parties de poteau (2, 3), comprenant des pièces de raccordement (7, 8) qui peuvent chacune être raccordées à une partie de poteau de sorte que les pièces de raccordement et les parties de poteau sont alignées, lesquelles parties de raccordement (7, 8) sont chacune prévues avec une face d'extrémité (11) et une partie de raccordement (9) qui peuvent être raccordées à une partie de poteau (2, 3), une face de montage (19) ayant des évidements (17) s'ouvrant dans sa périphérie, laquelle face de montage (19) est détournée de la face d'extrémité (11) associée, ainsi que des éléments de serrage (13) qui sont logés dans lesdits évidements (17) qui sont alignés les uns par rapport aux autres et qui sont supportés sur lesdites faces de montage (19) qui sont détournées les unes des autres de sorte que les faces d'extrémité (11) des pièces de raccordement (7, 8) sont poussées ensemble, **caractérisée en ce que** les évidements (17) s'ouvrent dans la périphérie interne des faces de montage (19), ladite périphérie interne étant située à l'intérieur de la structure de raccordement. 20

2. Structure de raccordement (4) selon la revendication 1, dans laquelle des rondelles (16) sont prévues entre chaque face de montage (19) et l'élément de serrage (13). 25

3. Structure de raccordement (4) selon la revendication 2, dans laquelle les rondelles (16) sont conçues de sorte qu'elles s'évasent, observées dans la direction de la périphérie interne des faces de montage (19). 30

4. Structure de raccordement (4) selon la revendication 3, dans laquelle les pièces de raccordement (7, 8), ont chacune des supports (20) qui font saillie par rapport aux faces de montage (19), entre lesquels supports (20), on loge les rondelles (16). 35

5. Structure de raccordement (4) selon la revendication

4, dans laquelle des supports (20) adjacents déterminent un espace de support (21) pour la rondelle (16) associée, lequel espace de support s'évase dans la direction de la périphérie interne des faces de montage (19).

6. Structure de raccordement (4) selon la revendication 5, dans laquelle la forme de l'espace de support (21) correspond à celle de la rondelle (16). 10

7. Structure de raccordement (4) selon l'une des revendications 2 à 6, dans laquelle les éléments de serrage comprennent des raccordements à boulon (13) et la tête de chaque boulon (14) et chaque écrou (15) reposent sur une rondelle (16). 15

8. Structure de raccordement (4) selon l'une des revendications précédentes, dans laquelle les faces de montage (19) au niveau des évidements (17) adjacents forment des échelons. 20

9. Structure de raccordement (4) selon l'une des revendications précédentes, dans laquelle les pièces de raccordement (7, 8) comprennent un manchon (9) et les faces de montage (19) sont situées sur l'intérieur du manchon (9). 25

10. Structure de raccordement (4) selon l'une des revendications précédentes, dans laquelle les pièces de raccordement (7, 8), au niveau de leurs extrémités qui se font face, comprennent chacune un collier (10) qui fait saillie par rapport au manchon et qui détermine une butée pour la partie de poteau (2, 3) qui peut être placée sur le manchon (9). 30

11. Structure de raccordement (4) selon l'une des revendications précédentes, dans laquelle au moins cinq évidements (17) sont régulièrement répartis dans la direction périphérique afin de fournir une indépendance directionnelle dans la direction périphérique. 35

12. Poteau routier (1), comprenant des parties de poteau (2, 3) qui sont alignées et sont raccordées entre elles par une structure de raccordement (4), **caractérisé par** une structure de raccordement (4) selon l'une des revendications précédentes. 40

13. Poteau routier (1) selon la revendication 12, dans lequel l'une des parties de poteau (2, 3) est conçue pour être installée sur ou dans une fondation, et la structure de raccordement (4) est située à une distance au-dessus du niveau du sol (5) de la zone dans laquelle la fondation est située. 45

14. Poteau routier (1) selon la revendication 13, dans lequel les parties de poteau (2, 3) sont raccordées aux pièces de raccordement (7, 8) par un raccorde- 50

ment adhésif.

15. Poteau routier (1) selon l'une des revendications 12 à 14, dans lequel la zone des parties de poteau adjacentes à la structure de raccordement et la structure de raccordement (4) sont recouvertes par une protection de partie de base (26). 5

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Fig 1

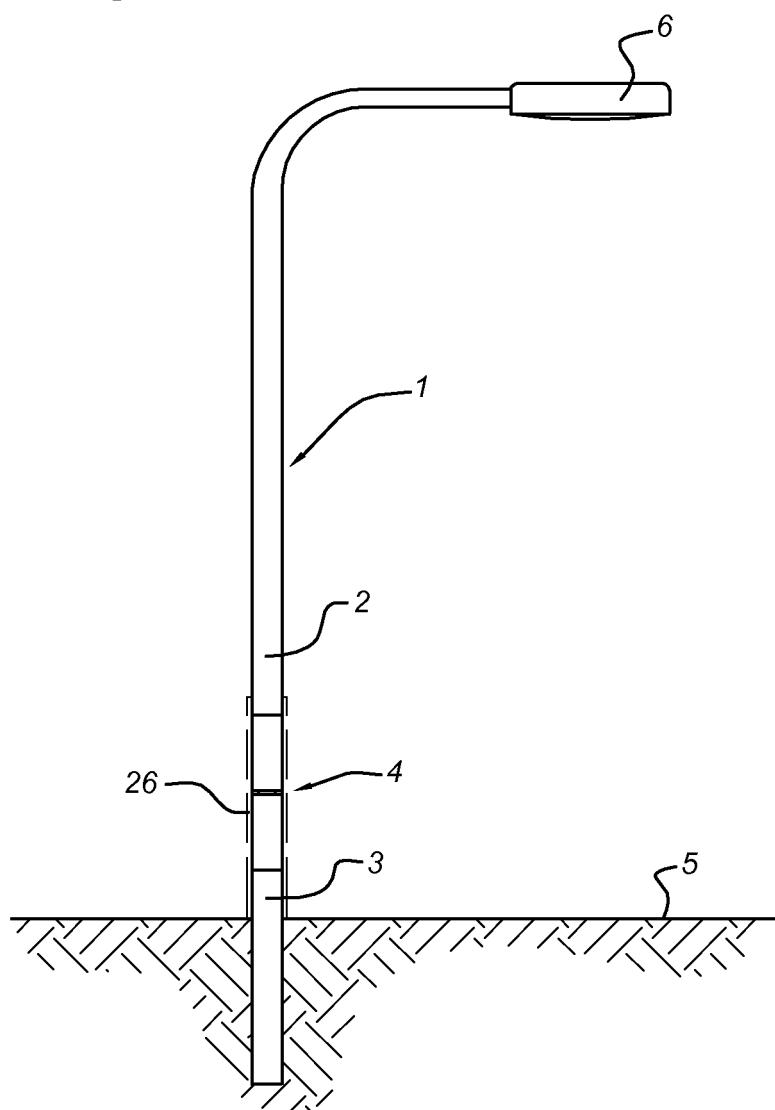


Fig 2

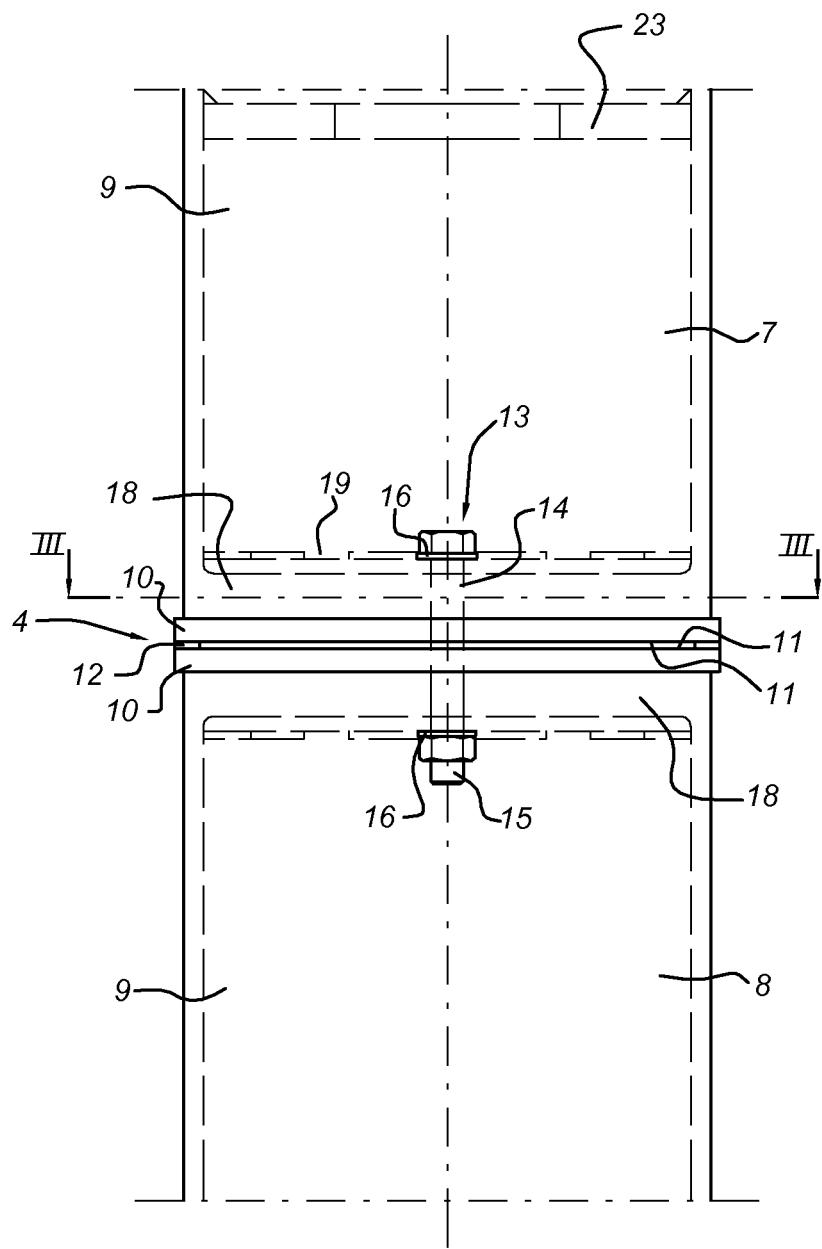


Fig 3

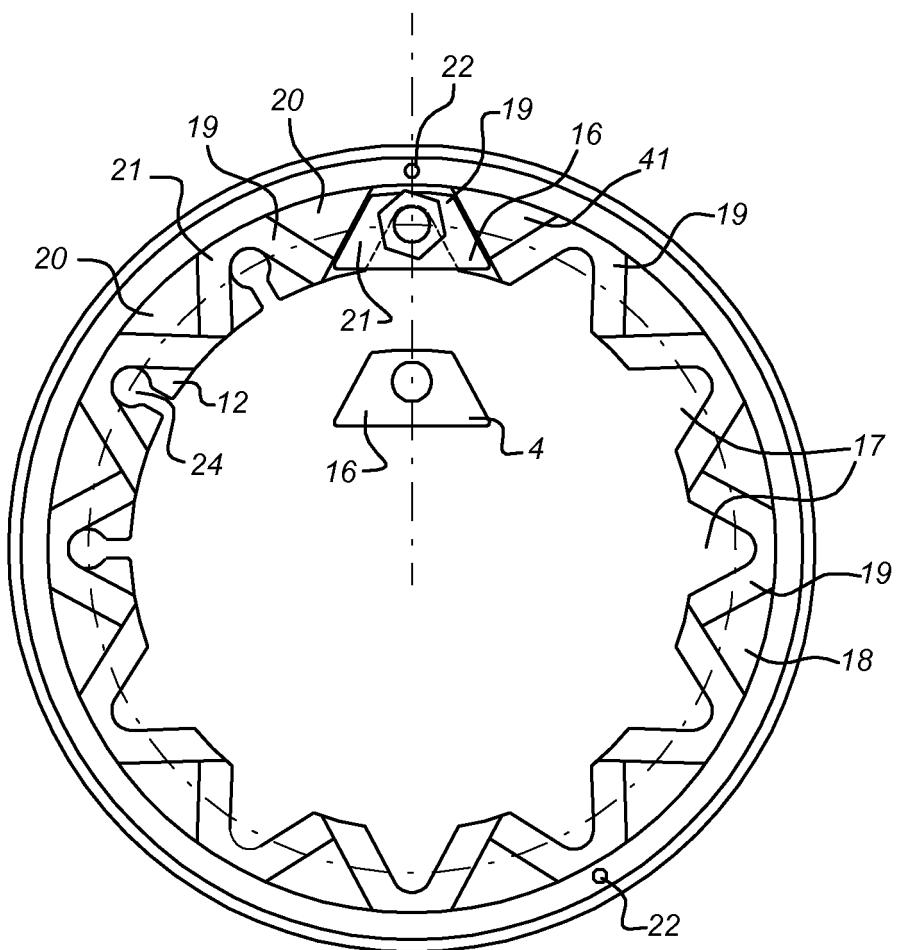
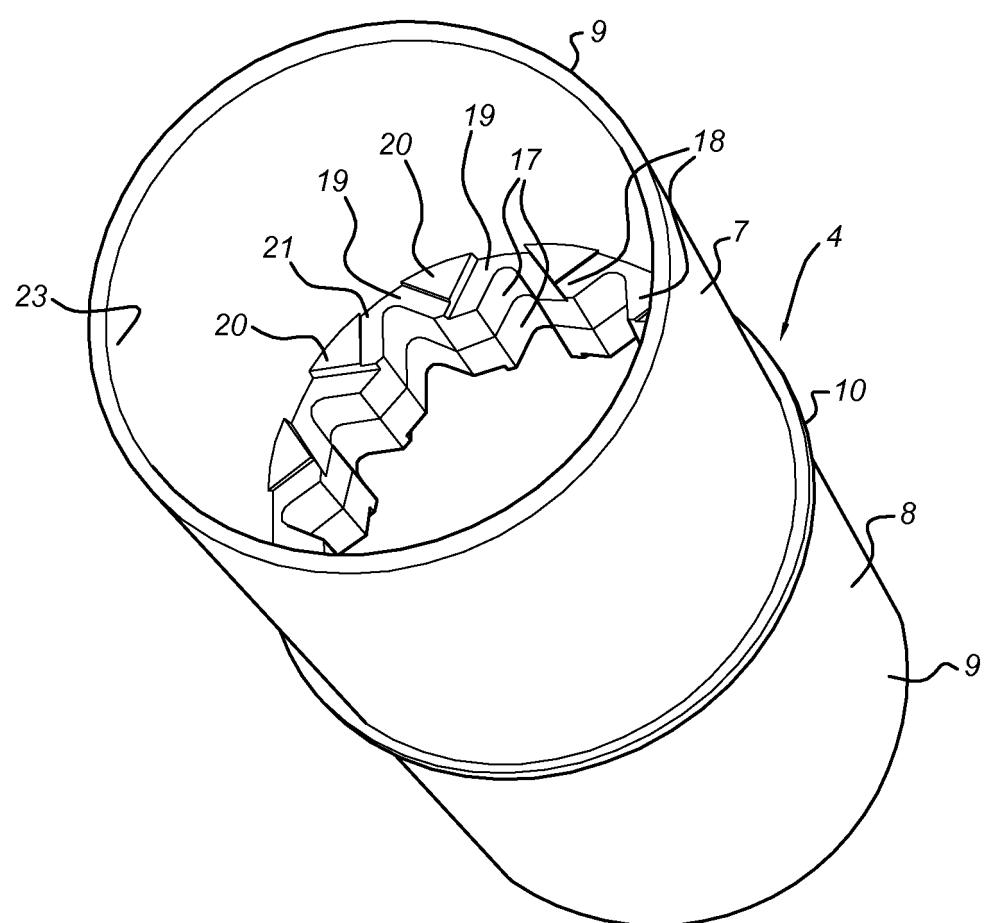


Fig 4



REFERENCES CITED IN THE DESCRIPTION

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