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(54) **SCAFFOLDING SYSTEM, AS WELL AS A COUPLER OF SUCH SYSTEM AND A METHOD FOR THE MANUFACTURE OF THE COUPLER**

GERÜSTSYSTEM, SOWIE KOPPLER EINES DERARTIGEN SYSTEMS UND VERFAHREN ZUR
HERSTELLUNG DES KOPPLERS

SYSTÈME D'ÉCHAFAUDAGE, ET ÉLÉMENT D'ASSEMBLAGE D'UN TEL SYSTÈME ET PROCÉDÉ
DE FABRICATION DE CET ÉLÉMENT D'ASSEMBLAGE

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Description

[0001] The invention relates to a scaffolding system, comprising scaffolding tubes as well as at least one scaffolding coupler for detachably connecting the scaffolding tubes to each other, wherein the scaffolding coupler comprises two tube receiving parts.

[0002] A scaffolding coupler is known from, *inter alia*, Dutch patents NL1021361C1, NL75356, NL7117188 and NL7811721, and is suitable in particular for easy connection of scaffolding tubes, in particular standardized scaffolding tubes according to the NEN-EN 39:2001 standard (such tubes have an external diameter of 48.3 mm). With the known systems, tube clamping is effected by striking home a wedge. In this manner, the scaffolding coupler can be rapidly mounted and demounted. A drawback of the known scaffolding coupler is that parts of the coupler consist of relatively much material, so that the manufacture thereof involves relatively high material costs.

[0003] CA210275A concerns the field of fencing and discloses a wire fence or fabric comprising a plurality of wires of elliptical or like cross section having their major axis disposed in the direction of the shear.

[0004] The object of the invention is an improved scaffolding system. The object of the invention is in particular a system which can be manufactured at relatively low costs and contributes to durability.

[0005] To this end, the invention is defined by the features of claim 1. There is provided a scaffolding coupler for detachably connecting scaffolding tubes of a scaffolding system to each other, characterized in that one or more parts of the scaffolding coupler substantially consist of oval-shaped wire.

[0006] The scaffolding coupler mentioned comprises at least two tube receiving parts, which are each preferably formed by, *inter alia*, two steel, substantially U-shaped profiles, in the state of the art technique formed from round, solid wire. According to an elaboration of the invention, one or more of the U-shaped profiles mentioned are formed by oval-shaped wire (i.e., wire having an oval-shaped cross section). It may then be elected to use oval-shaped drawn wire, or rolled wire, in particular formed from basic wire having a circular cross section.

[0007] An advantage of the invention consists in a considerable reduction of the material use compared to the conventional coupler, with preservation of a desired strength of the coupler. In this manner, a considerable weight reduction can be achieved. When the steel wire is to be galvanized, the galvanizing costs can be reduced considerably due to a decrease in steel surface to be galvanized. Further, the weight reduction is a major advantage for transport and efficient end use of the couplers.

[0008] In a preferred embodiment, the U-shaped profiles define at least a part of a tube clamping space for the scaffolding tubes, of which a tube insert opening is closable by at least one closing element, which is hinge-

able from a release position to a tube clamping position. The hinge axis between a tube receiving part and a closing element may then be provided with a wire having a circular cross section or, for instance, likewise an oval-shaped cross section.

[0009] The closing element can be secured in the tube clamping position by, for example, a wedge, detachably or non-detachably connected to the scaffolding coupler. The wedge connected to the scaffolding coupler may be fastened to the closing element in a non-detachable manner by means of a connection consisting of oval-shaped wire, drawn or not drawn.

[0010] If required, the tube receiving parts may be rotatably connected, resulting in a swivel coupler.

[0011] Further, an aspect of the invention provides a method for manufacturing a scaffolding coupler according to the invention, wherein oval-shaped wire is provided from which at least a part of the coupler is formed. According to an embodiment, the oval-shaped wire is manufactured by drawing base wire, in particular having a circular cross section, into an oval shape. According to an embodiment, the oval-shaped wire is manufactured by rolling base wire, in particular having a circular cross section, into an oval shape. According to an embodiment, the oval-shaped wire is manufactured from base wire having a circular cross section in the range of 12-15 mm, in particular a cross section of 14 mm.

[0012] In clarification of the invention, various exemplary embodiments will be described with reference to the drawings.

Fig. 1 is a side view of an exemplary embodiment of a scaffolding system;

Fig. 2 is a perspective of a cross coupler;

Fig. 3 is a side view from the direction A of the coupler shown in Fig. 2;

Fig. 4 is a cross section along the line V-V of Fig. 3;

Fig. 5 is a perspective of a swivel coupler; and

Fig. 6 is a schematic top plan view of a swivel coupler as shown in Fig. 5.

[0013] Fig. 1 is a side view of an exemplary embodiment of a scaffolding system, which includes, for example, horizontally extending scaffolding tubes a and vertically extending scaffolding tubes b which are connected by means of scaffolding couplers in the form of cross couplers c. In the example, further, scaffolding tubes d are represented which are coupled diagonally to the scaffolding system. These tubes d are connected to other tubes (for example, vertical or horizontal tubes) by swivel couplers e. It will be clear to those skilled in the art that such a system a, b, c, d, e can be implemented in various ways. The tubes mentioned are in particular scaffolding tubes that comply with the NEN-EN 39:2001 standard.

[0014] Figs. 2, 3 and 4 show a scaffolding coupler of the scaffolding system represented in Fig. 1. The coupler serves for detachably connecting scaffolding tubes which are oriented at right angles to each other (also called a

cross coupler).

[0015] In this example, the scaffolding coupler is formed by a first tube receiving part 1a and a second tube receiving part 1b. Each tube receiving part 1a is built up from steel, substantially U-shaped profiles 2a, 2b. In this example, a steel substantially U-shaped profile consists of five sections, viz., a base, two (oppositely extending) side legs which are preferably at right angles to the base, and two end parts/ends which are bent over, at right angles to the side legs or not so. The side legs and base part mentioned can for instance be substantially straight profile sections, but this is not requisite. Use of slightly bent sections is an option too. Further, a substantially U-shaped profile as mentioned can for instance comprise fewer than the five sections mentioned, for instance when one or two end parts as mentioned are absent.

[0016] According to a preferred embodiment, each substantially U-shaped profile consists of oval-shaped wire, in particular steel wire. The term 'oval-shaped wire' may be understood to mean a wire element having a substantially oval cross section (see Fig. 4), where for instance a thickness D1 measured in a first direction (along a first main axis, the long axis, of the oval) deviates considerably from a thickness D2 in a second direction (for instance along a second main axis, the short axis, of the oval), normal to the first direction. The oval mentioned can be, for example, an ellipse, with two axes of symmetry X1, X2 (as in Fig. 4) extending normal to each other.

[0017] In the example, it holds for the thicknesses mentioned that $D1 > D2$. A thickness ratio $D1:D2$ may for example be in the range of 4-1.5, in particular 3-1.5, or another range. According to a preferred embodiment, $D1:D2$ is in the range of 13:8-15:8; the ratio $D1:D2$ can be, e.g., 14:8.

[0018] According to a preferred embodiment, the thickness in the first direction D1 is greater than 13 mm, for example a thickness of 14 mm or 15 mm. According to a preferred embodiment, the thickness in the second direction D2 is less than 11 mm and greater than 5 mm, for example, a thickness D2 of 8 mm or 7 mm.

[0019] According to an especially advantageous embodiment, the thickness in the first direction D1 is 14 mm and the thickness in the second direction D2 is 8 mm.

[0020] It has been found that through the use of the above-mentioned thickness ratios ($D1:D2$) and wires thicknesses (D1, D2), a particularly powerful scaffolding tube coupler configuration can be obtained, with relatively little material consumption. A mass saving of over 10% can thus be obtained with respect to the traditional scaffolding tube coupler. Additionally, in this manner, a considerable reduction of an outer surface of the coupler can be achieved, which provides advantages in a surface treatment (e.g., galvanizing).

[0021] An especially durable configuration is achieved when neighboring sections of a substantially U-shaped profile are mutually bent over in a bending plane which is parallel to a long main axis X1 of the oval (see Figs.

3, 4). The substantially U-shaped profile can for instance be formed by bending wire having an oval-shaped cross section as mentioned, with bending axes being parallel to the short axis X2 of the oval.

[0022] In an alternative, the neighboring sections of a substantially U-shaped profile are, conversely, mutually bent over in a bending plane which is parallel to a short main axis X2 of the oval. In that case, bending over can be carried out using relatively little force with respect to bending in the earlier-mentioned direction, i.e., in the plane parallel to the long main axis X1.

[0023] According to a further elaboration, the first tube receiving part 1a and the second tube receiving part 1b are bonded together by means of a welded connection, whereby the inner side of the bases of two steel, substantially U-shaped profiles 2a, 2b of a tube receiving part 1a are welded to the inner side of the bases of the two steel, substantially U-shaped profiles 2c, 2d of the other tube receiving part 1b. Here, the tube insert openings of the first tube receiving part 1a and the second tube receiving part 1b face away from each other.

[0024] According to a further elaboration (see Figs. 3, 4), the connection is such that - viewed in cross section - long main axes X1 of the two base sections (bases) of the one tube receiving part 1a touch long main axes of the bases of the other tube receiving part 1b. In particular, the connection is such that - viewed in cross section - short main axes X2 of the bases of the one tube receiving part 1a run substantially parallel to the short main axes X2 of the bases of the other tube receiving part 1b, and at a distance from each other. In this manner, an especially durable connection can be achieved, in particular when welding the bases together.

[0025] In particular (see Figs. 3, 4), the bases of the first tube receiving part 1a and the bases of the second tube receiving part (in particular through/during welding) are to some extent sunk into each other/fused together, via mutually facing end faces.

[0026] The two steel, substantially U-shaped profiles 2a, 2b of a receiving part 1a define a part of the tube clamping space, which is closable with a hingeable closing element 3a. The closing element 3a is hingeable from a release position to the tube clamping position about a hinge axis 6a. The hinge axis 6a is for instance non-detachably connected to the tube receiving part 1a, more specifically at right angles to the bent-over parts of the steel substantially U-shaped profiles 2a, 2b, and consists of oval-shaped wire.

[0027] The closing element 3a is fixable in the tube clamping position with a wedge 4a, which is non-detachably connected to the closing element 3a by means of a connection 5a of oval-shaped wire.

[0028] It may be elected to make use of drawn oval-shaped wire for the elements consisting of oval-shaped wire. A method for drawing wire is further elucidated hereinafter.

[0029] Figs. 5 and 6 show an alternative embodiment, viz., a scaffolding coupler for detachably connecting, for

example, horizontally or vertically oriented scaffolding tubes to scaffolding tubes that are diagonally oriented. Tubes B being engaged are drawn-in in Fig. 6. In this example, the scaffolding coupler is formed by a first tube receiving part 1a and a second tube receiving part 1b. Again, each tube receiving part 1a is built up from steel, substantially U-shaped profiles 2a, 2b. In this example, a steel, substantially U-shaped profile consists of five parts: a base, two side legs which are preferably at right angles to the base, and two ends which are bent over, preferably at right angles to the side legs. In this example also, the profile preferably consists of oval-shaped wire, which is bent into the substantially U-shaped form. The first tube receiving part 1a and the second tube receiving part 1b are connected to each other by a rotatable connection R (for instance, comprising two revolving discs rotatably coupled to each other), with the openings of the tube receiving parts 1a, 1b facing away from each other. A rotational axis of the rotatable connection extends in particular at right angles to the bases of the substantially U-shaped profiles, which will be clear to those skilled in the art. In particular, the bases of the tube receiving parts are fixedly welded to revolving plates/flanges of the rotatable connection.

[0030] Here, the tube insert openings of the first tube receiving part 1a and the second tube receiving part 1b face away from each other. The two steel, substantially U-shaped profiles 2a, 2b of a receiving part 1a define a part of the tube clamping space, which is closable by a hingeable closing element 3a. The closing element 3a is hingeable from a release position to the tube clamping position about a hinge axis 6a. The hinge axis 6a is for instance non-detachably connected to the tube receiving part 1a, more specifically at right angles to the bent-over parts of the steel, substantially U-shaped profiles 2a, 2b. The hinge axis 6a consists, for example, of wire having a substantially circular cross section.

[0031] A method for forming the wire mentioned can utilize, for example, wire rolling or wire drawing, whereby a steel base wire (for instance, having a circular cross section) is deformed. The oval-shaped wire can for instance be formed by deformation of steel wire of initially circular cross section, having, for example, a thickness (outer diameter) in the range of 12-15 mm, in particular an outer diameter of 14 mm.

[0032] Wire of this kind has been found to be suitably workable, in particular bendable, to form the substantially U-shaped profiles therefrom. The scaffolding coupler formed with these substantially U-shaped profiles is strong and durable, and thus safe and reliable in use.

[0033] It will be clear to those skilled in the art that the invention is not limited to the exemplary embodiments described. Various modifications are possible within the framework of the invention as set forth in the following claims.

[0034] For instance, the steel wire is preferably galvanized for the purpose of reducing or preventing corrosion. Galvanizing is preferably carried out after formation of

the oval cross section.

Claims

1. A scaffolding coupler for detachably connecting scaffolding tubes of a scaffolding system to each other, wherein said scaffolding coupler comprises two tube receiving parts (1a, 1b), **characterized in that** one or more parts of said scaffolding coupler substantially consist of oval-shaped wire.
2. The scaffolding coupler according to claim 1, **characterized in that** at least one said tube receiving part (1a) is formed by at least two steel substantially U-shaped profiles (2a, 2b).
3. The scaffolding coupler according to claim 2, **characterized in that** one or more of said substantially U-shaped profiles (2a, 2b, 2c, 2d) consist of oval-shaped wire.
4. The scaffolding coupler according to claim 3, **characterized in that** one or more of said substantially U-shaped profiles (2a, 2b, 2c, 2d) consist of oval-shaped drawn wire.
5. The scaffolding coupler according to any one of the preceding claims 2-4, **characterized in that** said substantially U-shaped profiles (2a, 2b) define at least a part of a tube clamping space, of which a tube insert opening is closable by at least one closing element (3a, 3b).
6. The scaffolding coupler according to any one of the preceding claims, wherein said tube receiving parts (1a, 1b) are rotatably connected.
7. The scaffolding coupler according to any one of the preceding claims, **characterized in that** said oval-shaped wire has a thickness which is in the range of 6-20 mm.
8. The scaffolding coupler according to any one of the preceding claims, **characterized in that** said oval shape defines a long axis (X1), wherein a thickness D1 of the wire measured along the long axis (X1) is greater than 12 mm.
9. The scaffolding coupler according to claim 8, wherein said thickness D1 measured along the long axis (X1) is 14 or 15 mm.
10. The scaffolding coupler according to any one of the preceding claims, **characterized in that** said oval shape defines a short axis (X2), wherein a thickness D2 of the wire measured along the short axis (X2) is less than 11 mm and greater than 5 mm.

11. The scaffolding coupler according to claim 10, wherein said thickness D2 measured along the short axis (X2) is 7 or 8 mm.
12. A scaffolding system, including scaffolding tubes as well as at least one scaffolding coupler according to any one of the preceding claims for detachably connecting said scaffolding tubes to each other.
13. A method for manufacturing a scaffolding coupler according to any of claims 1-11, wherein oval-shaped wire is provided from which at least a part of the coupler is formed.
14. The method according to claim 13, wherein the oval-shaped wire is manufactured by drawing base wire, in particular having a circular cross section, into an oval shape.
15. The method according to claim 13, wherein the oval-shaped wire is manufactured by rolling base wire, in particular having a circular cross section, into an oval shape.

Patentansprüche

1. Gerüstkoppler zum lösbaren Verbinden von Gerüstrohren eines Gerüstsystems aneinander, wobei der Gerüstkoppler zwei Rohraufnahmeteile (1a, 1b) umfasst, **dadurch gekennzeichnet, dass** ein oder mehr Teile des Gerüstkopplers im Wesentlichen aus ovalförmigem Draht bestehen.
2. Gerüstkoppler nach Anspruch 1, **dadurch gekennzeichnet, dass** mindestens eines der Röhren aufnehmenden Teile (1a) von mindestens zwei im Wesentlichen U-förmigen Stahlprofilen (2a, 2b) gebildet wird.
3. Gerüstkoppler nach Anspruch 2, **dadurch gekennzeichnet, dass** eines oder mehrere der im Wesentlichen U-förmigen Profile (2a, 2b, 2c, 2d) aus ovalförmigem Draht besteht.
4. Gerüstkoppler nach Anspruch 3, **dadurch gekennzeichnet, dass** eines oder mehrere der im Wesentlichen U-förmigen Profile (2a, 2b, 2c, 2d) aus ovalförmigem Draht besteht.
5. Gerüstkoppler nach einem der vorhergehenden Ansprüche 2-4, **dadurch gekennzeichnet, dass** die im Wesentlichen U-förmigen Profile (2a, 2b) mindestens einen Teil eines Rohrklemmraums definieren, von dem eine Rohreinsetzöffnung durch mindestens ein Verschleißelement (3a, 3b) verschließbar ist.
6. Gerüstkoppler nach einem der vorhergehenden An-

sprüche, wobei die Rohraufnahmeteile (1a, 1b) drehbar verbunden sind.

7. Gerüstkoppler nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der ovalförmige Draht eine Dicke hat, die im Bereich von 6-20 mm ist.
8. Gerüstkoppler nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die ovale Form eine lange Achse (X1) definiert, wobei eine Dicke D1 des Drahtes, gemessen entlang der langen Achse (X1), größer als 12 mm ist.
9. Gerüstkoppler nach Anspruch 8, wobei die Dicke D1, gemessen entlang der langen Achse (X1) größer als 14 oder 15 mm ist.
10. Gerüstkoppler nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die ovale Form eine kurze Achse (X2) definiert, wobei eine Dicke D2 des Drahtes, gemessen entlang der kurzen Achse (X2), kleiner als 11 mm und größer als 5 mm ist.
11. Gerüstkoppler nach Anspruch 10, wobei die Dicke D2, gemessen entlang der kurzen Achse (X2), 7 oder 8 mm ist.
12. Gerüstkopplersystem, umfassend Gerüstrohre sowie mindestens einen Gerüstkoppler nach einem der vorhergehenden Ansprüche zum lösbaren Verbinden der Gerüstrohre aneinander.
13. Verfahren zur Herstellung eines Gerüstkopplers nach einem der Ansprüche 1-11, wobei ovalförmiger Draht bereitgestellt wird, aus dem mindestens ein Teil des Kopplers geformt wird.
14. Verfahren nach Anspruch 13, wobei der ovalförmige Draht durch Ziehen von Basisdraht, der insbesondere einen kreisförmigen Querschnitt hat, zu einer ovalen Form geformt wird.
15. Verfahren nach Anspruch 13, wobei der ovalförmige Draht durch Walzen von Basisdraht, der insbesondere einen kreisförmigen Querschnitt hat, zu einer ovalen Form hergestellt wird.

Revendications

1. Élément d'assemblage d'échafaudage pour raccorder de manière détachable des tubes d'échafaudage d'un système d'échafaudage entre eux, dans lequel ledit élément d'assemblage d'échafaudage comprend deux parties de réception de tube (1a, 1b), **caractérisé en ce qu'**une ou plusieurs parties dudit élément

- d'assemblage d'échaudage se composent sensiblement de fil de forme ovale.
2. Élément d'assemblage d'échafaudage selon la revendication 1, **caractérisé en ce qu'**au moins l'une desdites parties de réception de tube (1a) est formée par au moins deux profilés d'acier sensiblement en forme de U (2a, 2b). 5
 3. Élément d'assemblage d'échafaudage selon la revendication 2, **caractérisé en ce qu'**un ou plusieurs desdits profilés sensiblement en forme de U (2a, 2b, 2c, 2d) se composent de fil de forme ovale. 10
 4. Élément d'assemblage d'échafaudage selon la revendication 3, **caractérisé en ce qu'**un ou plusieurs desdits profilés sensiblement en forme de U (2a, 2b, 2c, 2d) se composent de fil tréfilé de forme ovale. 15
 5. Élément d'assemblage d'échafaudage selon l'une quelconque des revendications 2 à 4, **caractérisé en ce que** lesdits profilés sensiblement en forme de U (2a, 2b) définissent au moins une partie d'un espace de serrage de tube, dont une ouverture d'insert de tube peut être fermée par au moins un élément de fermeture (3a, 3b). 20 25
 6. Élément d'assemblage d'échafaudage selon l'une quelconque des revendications précédentes, dans lequel lesdites parties de réception de tube (1a, 1b) sont raccordées de manière rotative. 30
 7. Élément d'assemblage d'échafaudage selon l'une quelconque des revendications précédentes, **caractérisé en ce que** ledit fil de forme ovale a une épaisseur qui est dans la plage de 6 à 20 mm. 35
 8. Élément d'assemblage d'échafaudage selon l'une quelconque des revendications précédentes, **caractérisé en ce que** ladite forme ovale définit un axe long (X1), dans lequel une épaisseur D1 du fil mesurée le long de l'axe long (X1) est supérieure à 12 mm. 40
 9. Élément d'assemblage d'échafaudage selon la revendication 8, dans lequel ladite épaisseur (D1) mesurée le long de l'axe long (X1) est de 14 ou 15 mm. 45
 10. Élément d'assemblage d'échafaudage selon l'une quelconque des revendications précédentes, **caractérisé en ce que** ladite forme ovale définit un axe court (X2), dans lequel une épaisseur D2 du fil mesurée le long de l'axe court (X2) est inférieure à 11 mm et supérieure à 5 mm. 50 55
 11. Élément d'assemblage d'échafaudage selon la revendication 10, dans lequel ladite épaisseur D2 mesurée le long de l'axe court (X2) est de 7 ou 8 mm.
 12. Système d'échaudage comprenant des tubes d'échaudage ainsi qu'au moins un élément d'assemblage d'échafaudage selon l'une quelconque des revendications précédentes, pour raccorder de manière détachable lesdits tubes d'échaudage entre eux.
 13. Procédé pour fabriquer un élément d'assemblage d'échafaudage selon l'une quelconque des revendications 1 à 11, dans lequel on prévoit un fil de forme ovale à partir duquel au moins une partie de l'élément d'assemblage est formée.
 14. Procédé selon la revendication 13, dans lequel le fil de forme ovale est fabriqué en tréfilant un fil de base, en particulier ayant une section transversale circulaire, en une forme ovale.
 15. Procédé selon la revendication 13, dans lequel le fil de forme ovale est fabriqué en laminant le fil de base, en particulier ayant une section transversale circulaire, en une forme ovale.

Fig. 1

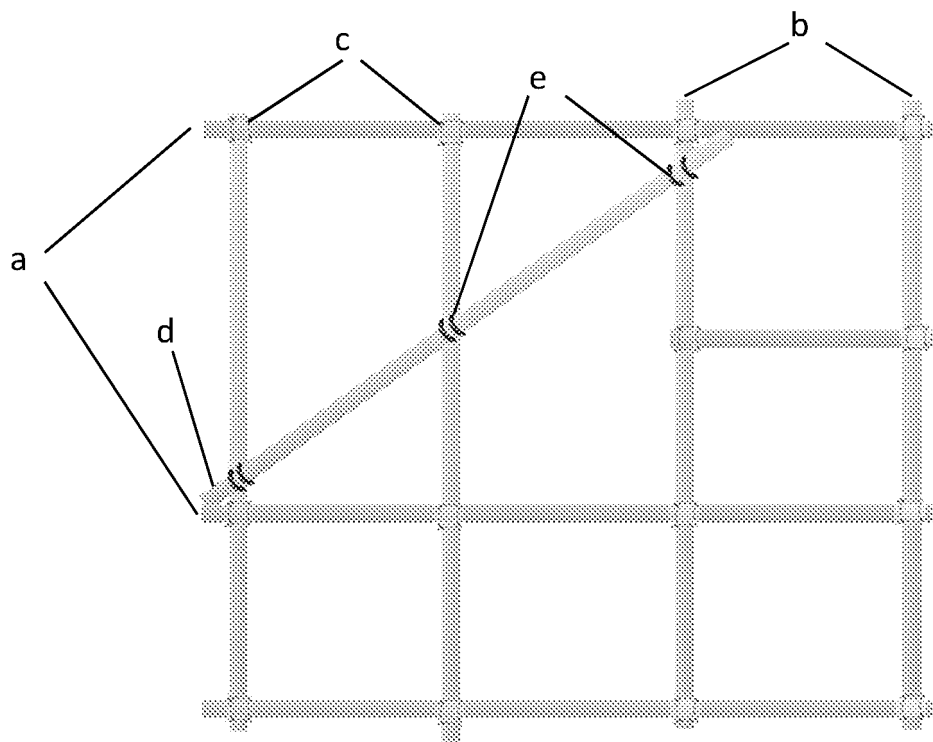
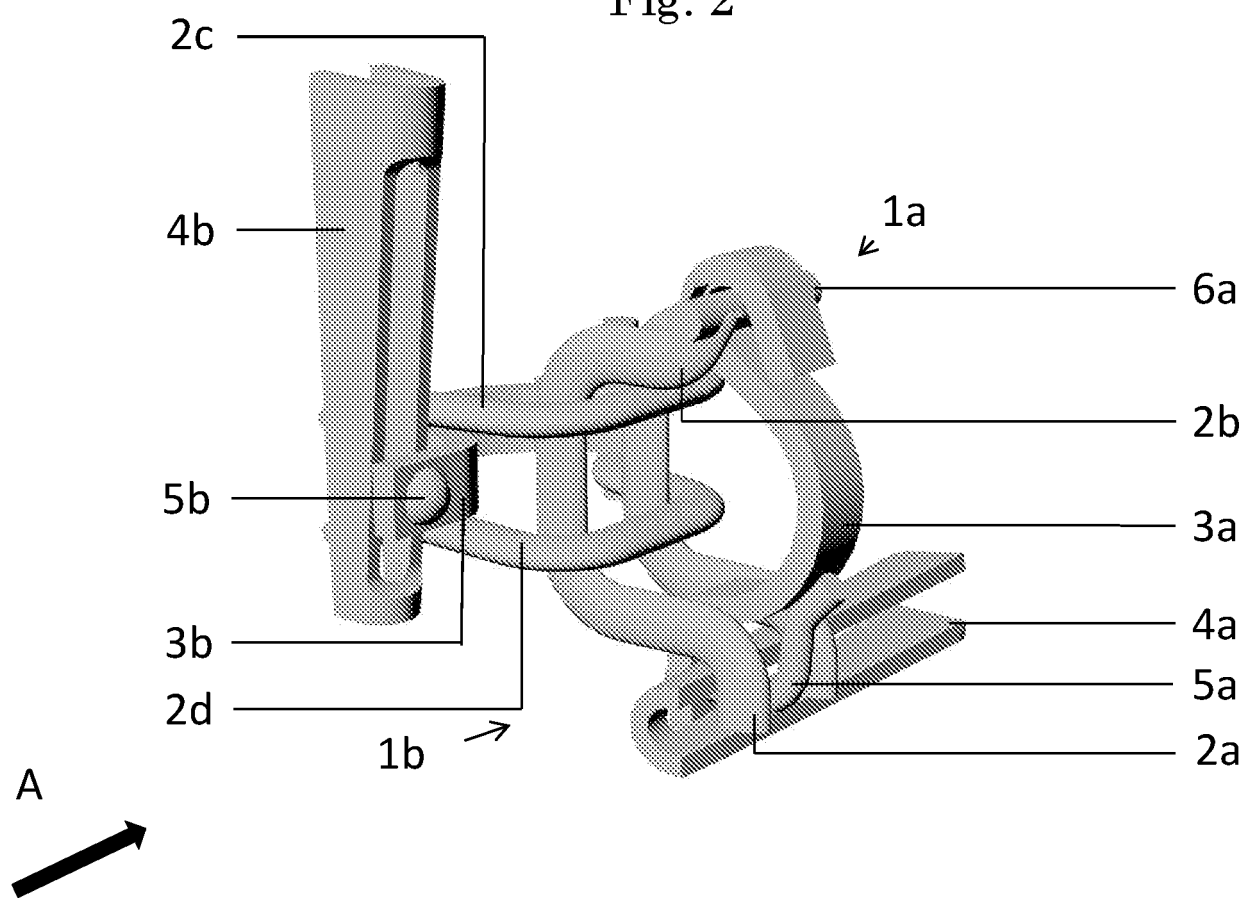
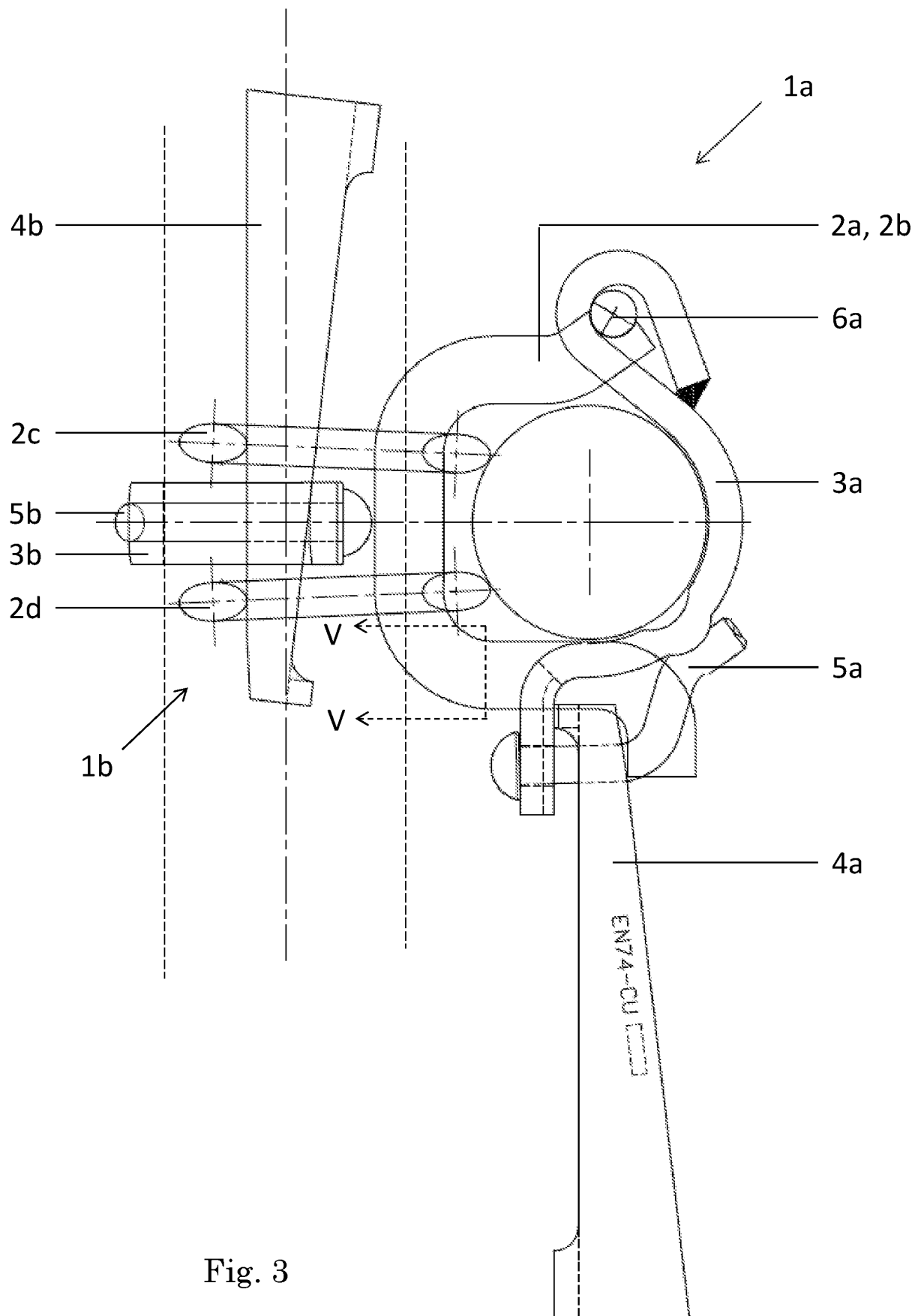


Fig. 2





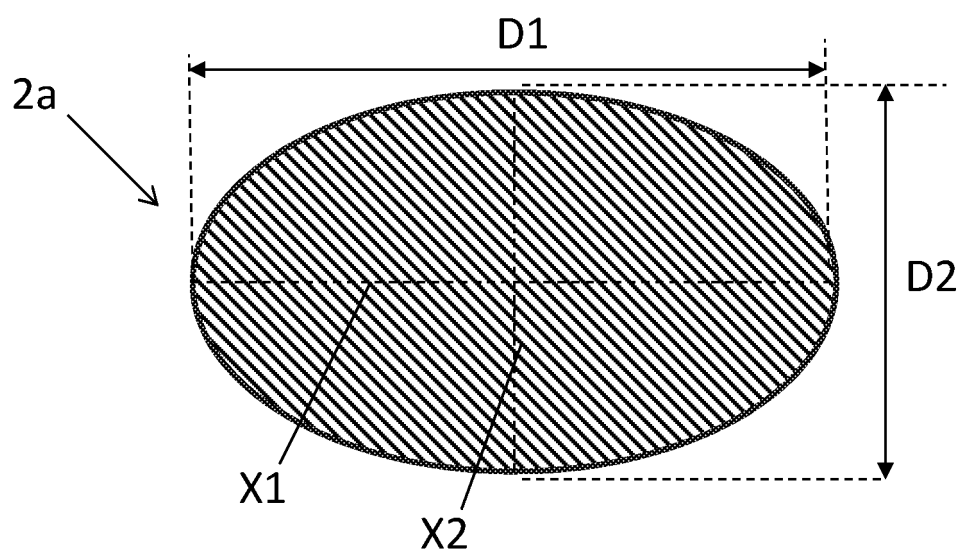


Fig. 4

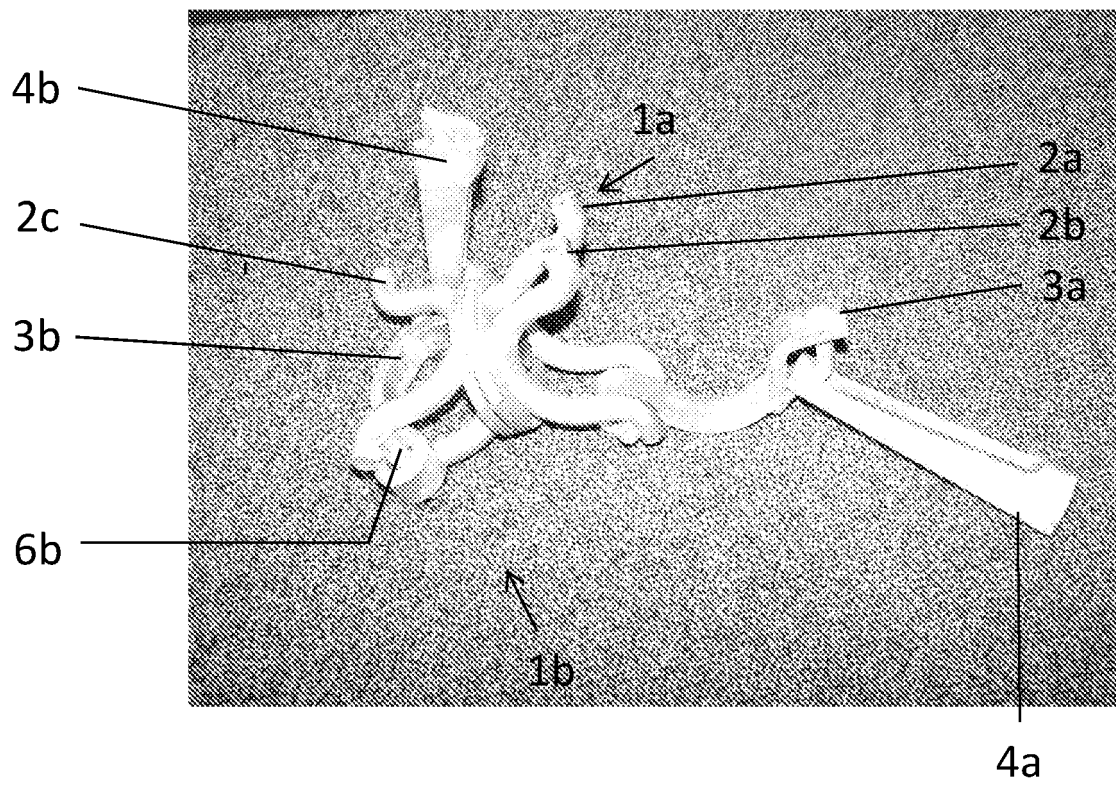


Fig. 5

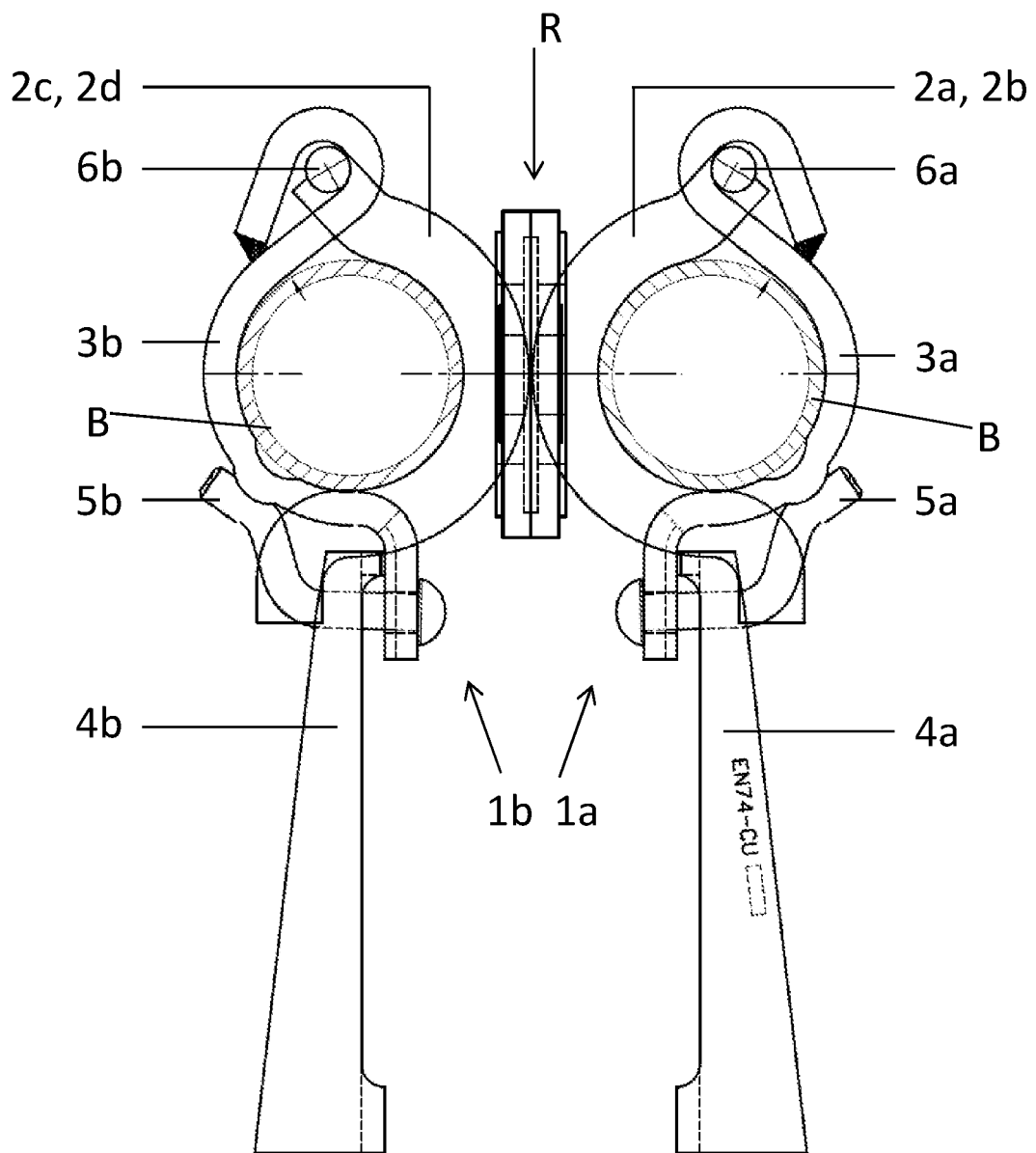


Fig. 6

REFERENCES CITED IN THE DESCRIPTION

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