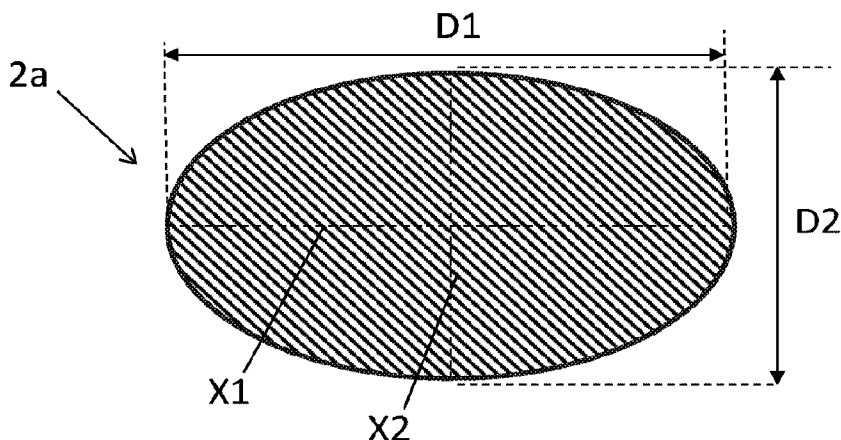




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(54) Title: SCAFFOLDING SYSTEM, AS WELL AS A COUPLER OF SUCH SYSTEM AND A METHOD FOR THE
MANUFACTURE OF THE COUPLER



(57) Abrégé/Abstract:

A scaffolding system comprising scaffolding tubes and at least one scaffolding coupler for detachably connecting the scaffolding tubes to each other, wherein the scaffolding coupler comprises two tube receiving parts (1a, 1b), characterized in that one or more parts of the scaffolding coupler substantially consist of oval-shaped wire. The invention further provides a coupler as mentioned and a method for manufacturing the coupler.

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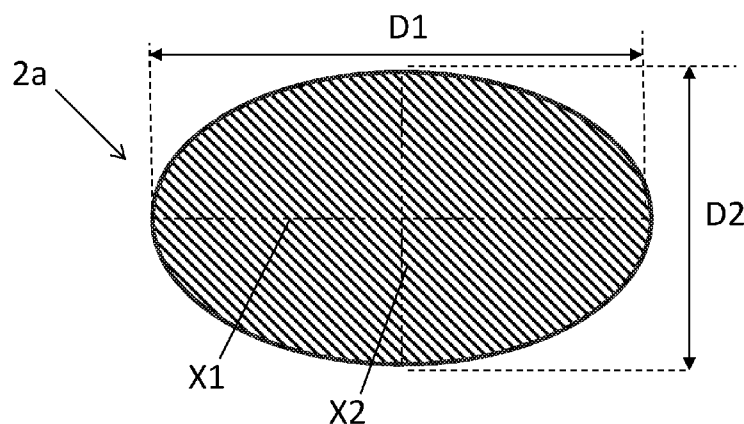


Fig. 4

(57) Abstract: A scaffolding system comprising scaffolding tubes and at least one scaffolding coupler for detachably connecting the scaffolding tubes to each other, wherein the scaffolding coupler comprises two tube receiving parts (1a, 1b), characterized in that one or more parts of the scaffolding coupler substantially consist of oval-shaped wire. The invention further provides a coupler as mentioned and a method for manufacturing the coupler.



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Title: Scaffolding system, as well as a coupler of such system and a method for the manufacture of the coupler

5

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.

10 A scaffolding coupler is known from, *inter alia*, Dutch patents 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
15 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.

20 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. To this end, the scaffolding system comprising scaffolding tubes and at least one scaffolding coupler for detachably connecting the scaffolding tubes to
25 each other is characterized, according to the invention, in that one or more parts of the scaffolding coupler substantially consist of oval-shaped wire.

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
5 elected to use oval-shaped drawn wire, or rolled wire, in particular formed from basic wire having a circular cross section.

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
10 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.

In a preferred embodiment, the U-shaped profiles define at least a part
15 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 hingeable 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,
20 likewise an oval-shaped cross section.

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
25 of a connection consisting of oval-shaped wire, drawn or not drawn.

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

Further, an aspect of the invention provides a coupler of a system according to the invention. With it, the above mentioned advantages can be achieved.

5 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;

10 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.

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. Theses tubes d are connected to other tubes (for example, vertical or horizontal tubes) by swivel
15
20
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.

25 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).

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.

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.

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.

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.

5 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.

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
10 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).

15 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
20 bending axes being parallel to the short axis X2 of the oval.

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
25 the earlier- mentioned direction, i.e., in the plane parallel to the long main axis X1.

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
5 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.

According to a further elaboration (see Figs. 3, 4), the connection is such
10 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
15 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.

In particular (see Figs. 3, 4), the bases of the first tube receiving part 1a
20 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.

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
25 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.

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
5 by means of a connection 5a of oval-shaped wire.

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.

Figs. 5 and 6 show an alternative embodiment, viz., a scaffolding coupler
10 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
15 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
20 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
25 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.

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
5 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
10 example, of wire having a substantially circular cross section.

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
15 section, having, for example, a thickness (outer diameter) in the range of 12-15 mm, in particular an outer diameter of 14 mm.

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
20 strong and durable, and thus safe and reliable in use.

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.

25 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 system, comprising scaffolding tubes as well as at least one scaffolding coupler for detachably connecting said scaffolding tubes 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 system 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 system 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 system 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 system according to any one of 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 system according to claim 5, characterized in that said closing element (3a, 3b) is hingeable from a release position to a tube clamping position.
7. The scaffolding system according to claim 6, characterized in that said closing element (3a, 3b) is fixable in the tube clamping position with a wedge (4a, 4b) detachably or non-detachably connected to the scaffolding coupler.
8. The scaffolding system according to any one of claims 6 or 7, characterized in that a hinge axis (6a, 6b) between a tube receiving part (1a, 1b) and the closing element (3a, 3b) is provided with the oval-shaped wire.
9. The scaffolding system according to claim 6 or 7, characterized in that a hinge axis (6a, 6b) between a tube receiving part (1a, 1b) and a

closing element (3a, 3b) has a substantially circular cross section.

10. The scaffolding system according to any one of claims 7-9, characterized in that the wedge (4a, 4b) connected to the scaffolding coupler is fastened to the closing element (3a, 3b) in a non-detachable manner by means of a connection (5a, 5b) of the oval-shaped wire.
11. The scaffolding system according to claim 10, characterized in that the connection (5a, 5b) consists of drawn oval-shaped wire.
12. The scaffolding system according to any one of claims 1-11, wherein said tube receiving parts (1a, 1b) are rotatably connected.
13. The scaffolding system according to any one of claims 1-12, characterized in that said oval-shaped wire has a thickness which is in the range of 6-20 mm.
14. The scaffolding system according to any one of claims 1-13, 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.
15. The scaffolding system according to claim 14, wherein said thickness D1 measured along the long axis (X1) is 14 or 15 mm.
16. The scaffolding system according to any one of claims 1-15, 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.
17. The scaffolding system according to claim 16, wherein said thickness D2 measured along the short axis (X2) is 7 or 8 mm.
18. A coupler of a system according to any one of claims 1-17 wherein the scaffolding coupler comprises two tube receiving parts (1a, 1b), wherein one or more parts of the scaffolding coupler substantially consist of oval-shaped wire.
19. A method for manufacturing a scaffolding coupler according to any one of claims 1-18, wherein the oval-shaped wire is provided from which at least a part of the coupler is formed.
20. The method according to claim 19, wherein the oval-shaped wire is manufactured by drawing base wire.
21. The method according to claim 19, wherein the oval-shaped wire is manufactured by rolling base wire.

22. The method according to claim 19, 20 or 21, wherein the oval-shaped wire is manufactured from base wire having a circular cross section in the range of 12-15 mm.

Fig. 1

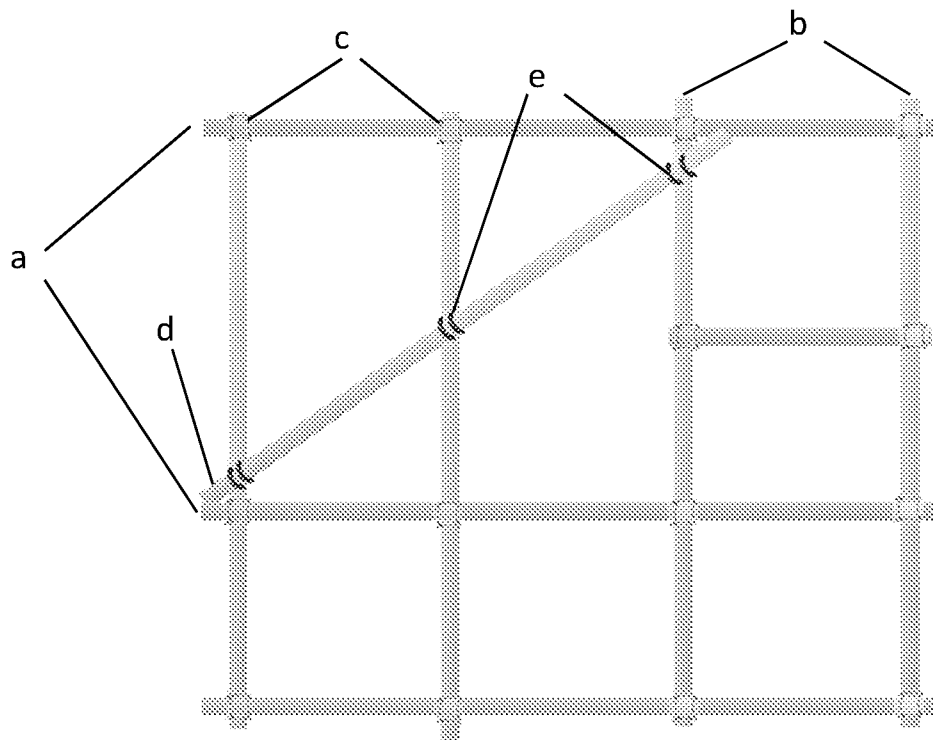
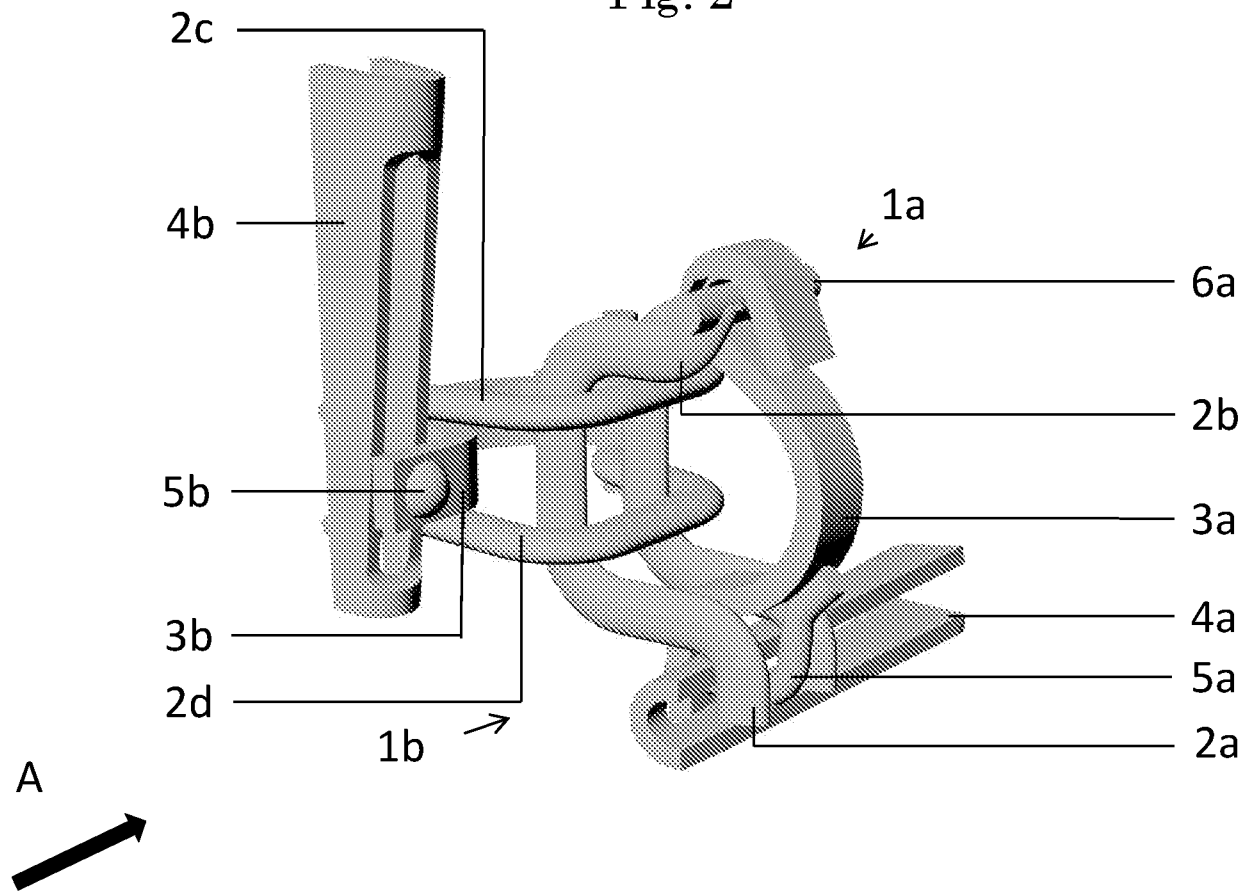


Fig. 2



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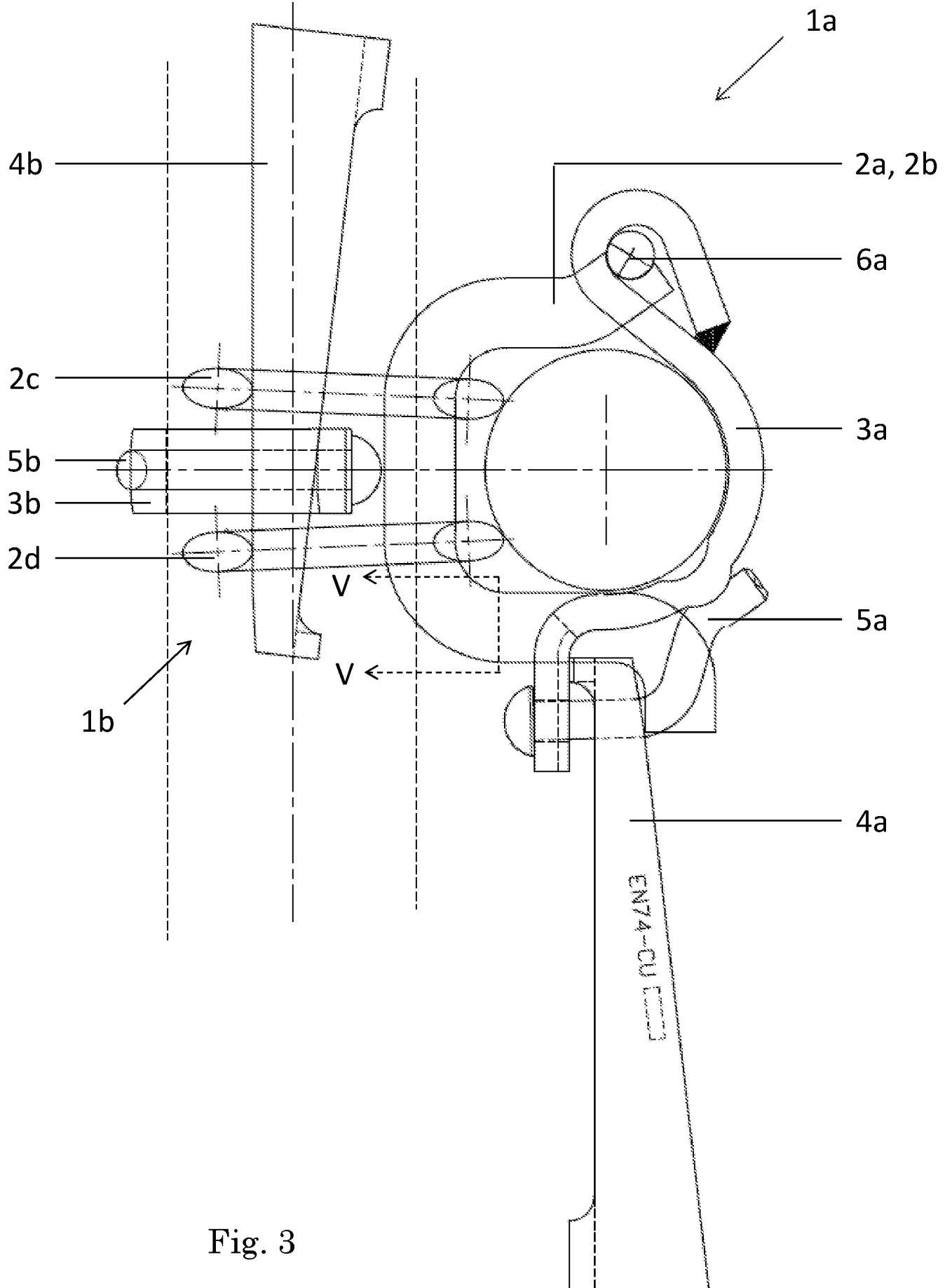


Fig. 3

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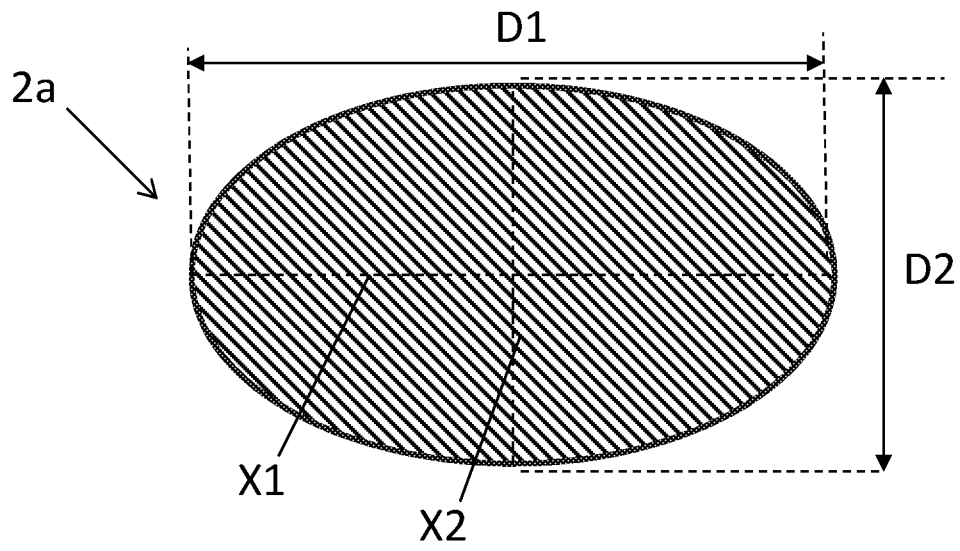


Fig. 4

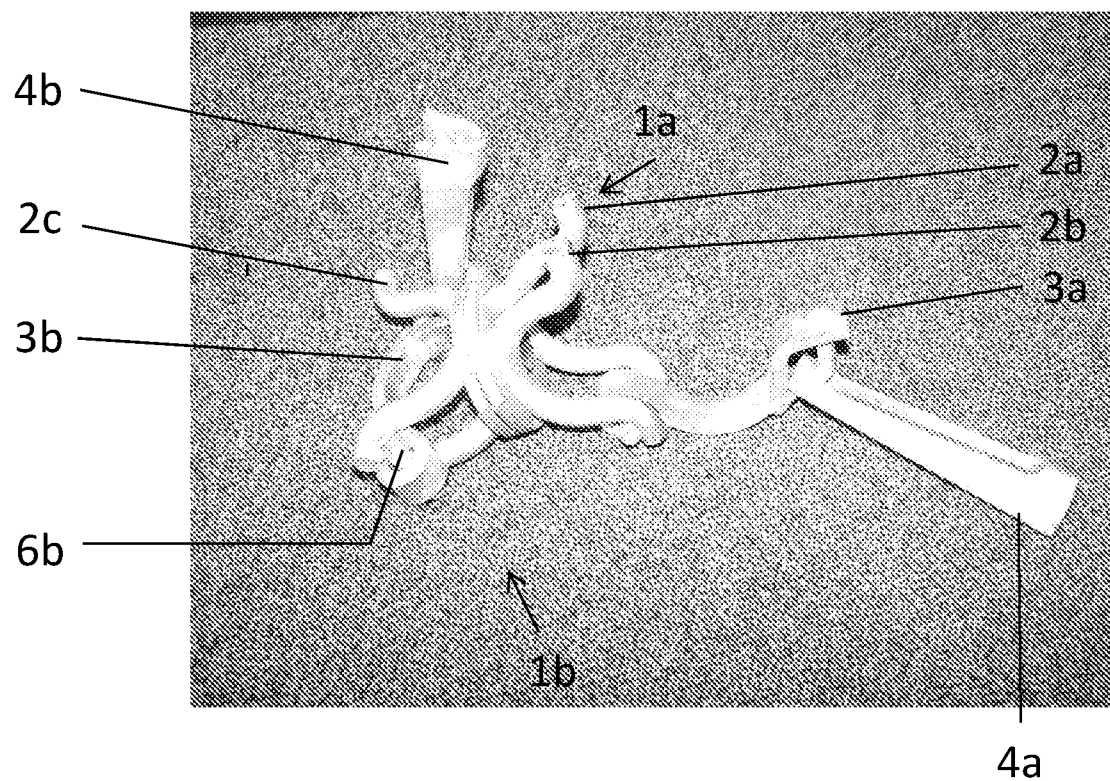


Fig. 5

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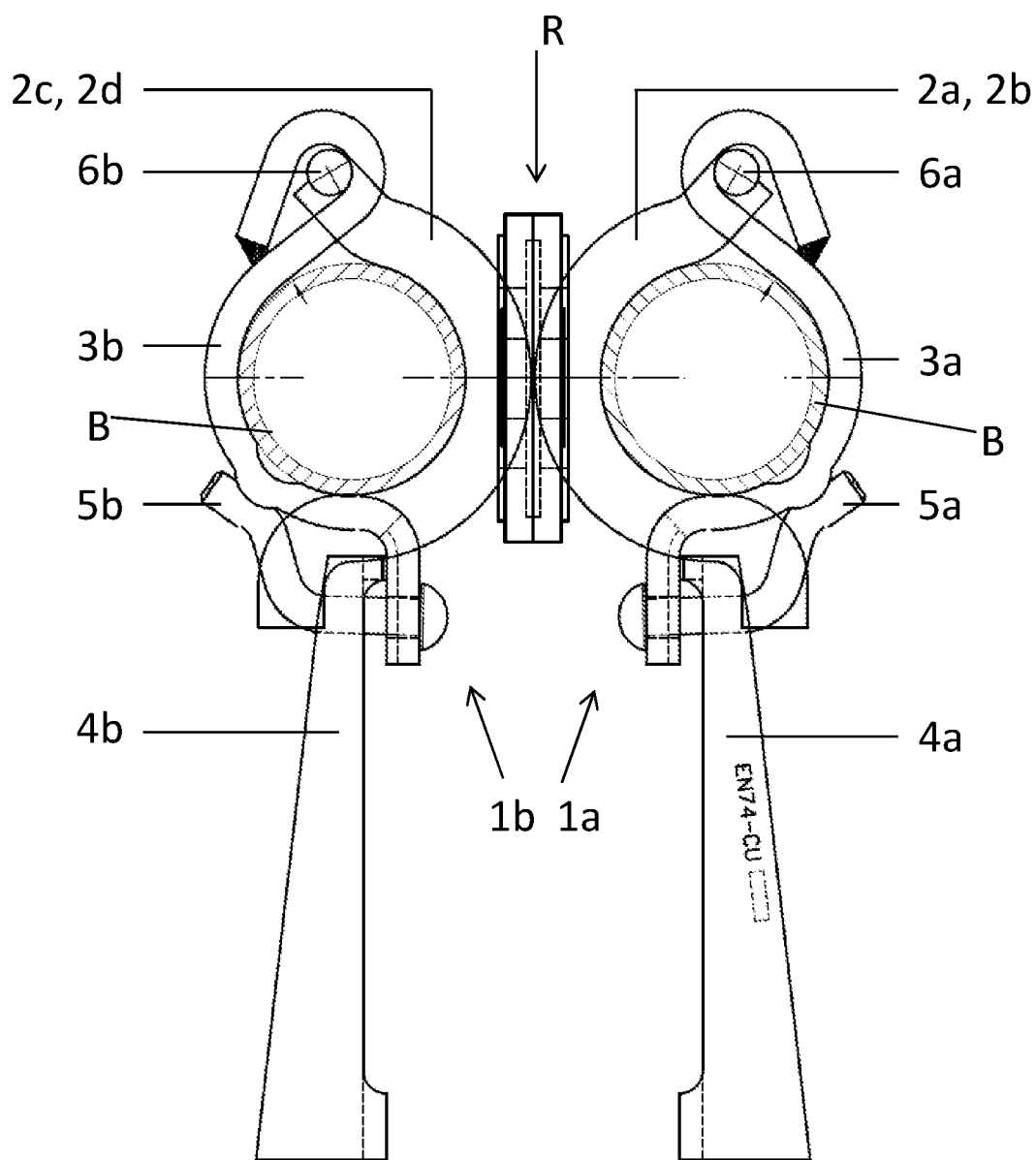


Fig. 6

