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(54) **REINFORCEMENT FOR CASTING COMPRISING ESSENTIALLY PLANE REINFORCEMENT ELEMENTS FORMED WITH RING-SHAPED PORTIONS**

VERSTÄRKUNG ZUM GIESSEN VON IM WESENTLICHEN EBENEN BEWEHRUNGSELEMENTEN MIT RINGFÖRMIGEN TEILEN

RENFORT POUR PIÈCE MOULÉE COMPORTANT ÉLÉMENTS DE RENFORT ESSENTIELLEMENT PLANS FORMÉS AVEC DES PARTIES EN ANNEAUX

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EP 2 697 445 B1

Description

[0001] The present invention relates-to a reinforcement . In particular, it relates to such a reinforcement for casting.

Background of the invention

[0002] Reinforcements with ring-shaped reinforcement elements are known and have the advantage that the ring-shaped structure provides a high load resistance. One example is shown in US1610996A, disclosing a reinforcement having ring-shaped reinforcement elements which are linked together to form a byrnie. Linking the reinforcement elements together requires individual handling of each ring-shaped element, which is costly and time-consuming. WO 99/39887 A1 discloses a reinforcement comprising essentially plane reinforcement elements wherein one element is arranged inside an opening portion of the other element.

[0003] Therefore, an object of the invention is to provide a reinforcement being formed such that assembling of reinforcement elements to an integral reinforcement is facilitated.

[0004] These and other objects are achieved by a reinforcement according to the characterizing parts of the independent claims.

Summary of the invention

[0005] The invention relates to a reinforcement for casting comprising essentially plane reinforcement elements 1 a-d, 2a-e formed with ring-shaped portions 3a-e arranged in a row along a line and connected to each other with necks. The reinforcement comprises at least one set of smaller reinforcement elements 1 a-d, 2e and one set of larger reinforcement elements 2a-d, wherein the outer diameter of the ring-shaped portions of the smaller reinforcement elements is essentially the same size as the inner diameter of the ring-shaped portions of the larger reinforcement elements. At least one ring-shaped portion of a smaller reinforcement element is arranged inside a ring-shaped portion of a larger reinforcement element.

[0006] In a particularly advantageous embodiment, the outer diameter of the ring-shaped portions of the smaller reinforcement elements is slightly larger than the inner diameter of the ring-shaped portions of the larger reinforcement elements, such that the reinforcement is pre-tensioned when the smaller reinforcement elements are arranged inside the larger reinforcement elements.

[0007] In another advantageous embodiment, the smaller reinforcement elements comprise locking portions 4 arranged to lock the smaller reinforcement elements together with the larger.

[0008] The locking portions may be formed as pairs of teeth with a gap therebetween, wherein the locking portions are arranged on the periphery of the ring-shaped portions 3a-e farthest away from the center line of the smaller reinforcement elements.

Short description of the figures

[0009]

Fig. 1 shows a view obliquely from above of a first embodiment of the reinforcement.

Fig. 2 shows a side view of a second embodiment of the reinforcement.

Fig. 3 shows a second embodiment of a reinforcement.

Description of preferred embodiments

[0010] Fig. 1 shows a first embodiment of the reinforcement seen obliquely from above. The reinforcement comprises four larger reinforcement elements 1 a-d arranged in parallel and four smaller reinforcement elements 2a-d arranged in parallel. The four smaller reinforcement elements, which are arranged in parallel, are arranged side by side with a distance between two adjacent smaller reinforcement elements, and the four larger reinforcement elements, which are arranged in parallel, are correspondingly arranged side by side with a distance between two adjacent larger reinforcement elements. Both types of reinforcement elements are formed by elongated, essentially plane elements. The longest direction of extension of the reinforcement elements constitute the lengthwise direction of the elements, and the lengthwise direction of the larger reinforcement elements is arranged at a right angle to the lengthwise direction of the smaller reinforcement elements.

[0011] Both types of reinforcement elements are formed by a row of essentially ring-shaped portions arranged along a straight line and connected to each other with necks. These necks are, in the illustrated embodiment, formed by portions with smoothly curved edges, i. e. without sharp corners which may constitute indications of fracture, but the ring-shaped elements may of course be formed in other ways.

[0012] The smaller reinforcement elements 2a-d extend through the ring-shaped portions of the larger reinforcement elements 1 a-d. The top and bottom of each ring-shaped portion of the smaller reinforcement elements 2a-d are tangent to the inner edge of a corresponding ring-shaped element of the larger reinforcement elements. In each reinforcement element, the smaller reinforcement elements are connected to the larger reinforcement elements with a weld spot or by pretensioning.

[0013] The ring-shaped elements of the larger reinforcement elements 1 a-d have, in the illustrated embodiment, an inner diameter which correspond to the outer diameter of the ring-shaped elements of the smaller ring-shaped elements 2a-d, and it is thus suitable to attach the smaller reinforcement elements to the larger reinforcement elements by welding. The ring-shaped ele-

ments of the larger reinforcement elements may also have an inner diameter which is slightly smaller than the outer diameter of the ring-shaped elements of the smaller reinforcement elements 2a-d. The smaller reinforcement elements must consequently be forced into the larger reinforcement elements and will then be fixed in position only by the spring action of the ring-shaped elements. This also makes the reinforcement pre-tensioned which provides the reinforcement with advantages for certain types of loads.

[0014] Fig. 2 shows a second embodiment of the reinforcement seen from the side such that the larger reinforcement elements are illustrated in profile, while the smaller reinforcement elements are shown from the end. Here it is more clearly illustrated how the ring-shaped elements of the smaller reinforcement elements fit into the ring-shaped elements of the larger reinforcement elements.

[0015] Fig. 3 shows a second embodiment of a smaller reinforcement element 2e. The reinforcement element is, in the same manner as in the first and second embodiments of the reinforcement, formed by ring-shaped elements 3a-e arranged on a straight line and connected to each other with necks. Each ring-shaped element has a top and a bottom arranged farthest away from the center line of the reinforcement element. A locking portion 4 is arranged at the top and bottom of each ring-shaped element, wherein the locking portion comprises two teeth with a gap therebetween. When the smaller reinforcement elements are thread into the larger, the larger reinforcement elements are received between a pair of such teeth such that the reinforcement element is locked in the gap between the teeth. The ring-shaped elements of the larger reinforcement elements may, in this embodiment as well, have an inner diameter which is equal to or slightly smaller than the outer diameter of the ring-shaped elements of the smaller reinforcement elements 2a-d.

Claims

1. A reinforcement for casting comprising essentially plane reinforcement elements (1a-d, 2a-e) formed with ring-shaped portions (3a-e) arranged in a row along a line and connected together with necks, the reinforcement comprises at least one set of smaller reinforcement elements (1a-d, 2e) and one set of larger reinforcement elements (2a-d), wherein the outer diameter of the ring-shaped portions of the smaller reinforcement elements is essentially the same as the inner diameter of the ring-shaped portions of the larger reinforcement elements, and wherein at least one ring-shaped portion of a smaller reinforcement element is arranged inside a ring-shaped portion of a larger reinforcement element.

2. A reinforcement according to claim 1, **characterized in that** the outer diameter of the ring-shaped portions of the smaller reinforcement elements is slightly larger than the inner diameter of the ring-shaped portions of the larger reinforcement elements, such that the reinforcement is pre-tensioned when the smaller reinforcement elements are arranged inside the larger reinforcement elements.

3. A reinforcement according to claim 1 or 2, **characterized in that** the smaller reinforcement elements comprise locking portions (4) that locks the smaller reinforcement elements together with the larger reinforcement elements.

4. A reinforcement according to claim 3, **characterized in that** the locking portions (4) are formed as a pair of teeth with a gap therebetween, wherein the locking portions are arranged on the periphery of the ring-shaped portions (3a-e) arranged farthest away from the center line of the smaller reinforcement elements.

Patentansprüche

1. Verstärkung zum Gießen, umfassend im Wesentlichen ebene Bewehrungselemente (1 a-d, 2a-e), die mit ringförmigen Teilen (3a-e) ausgebildet sind, welche in einer Reihe entlang einer Linie angeordnet und mit Hälsen miteinander verbunden sind, wobei die Verstärkung zumindest einen Satz von kleineren Bewehrungselementen (1 a-d, 2e) und einen Satz von größeren Bewehrungselementen (2a-d) umfasst, wobei der Außendurchmesser der ringförmigen Teile der kleineren Bewehrungselemente im Wesentlichen derselbe wie der Innendurchmesser der ringförmigen Teile der größeren Bewehrungselemente ist, und wobei zumindest ein ringförmiges Teil eines kleineren Bewehrungselements innerhalb eines ringförmigen Teils eines größeren Bewehrungselements angeordnet ist.

2. Verstärkung nach Anspruch 1, **dadurch gekennzeichnet, dass** der Außendurchmesser der ringförmigen Teile der kleineren Bewehrungselemente geringfügig größer als der Innendurchmesser der ringförmigen Teile der größeren Bewehrungselemente ist, sodass die Verstärkung vorgespannt ist, wenn die kleineren Bewehrungselemente innerhalb der größeren Bewehrungselemente angeordnet sind.

3. Verstärkung nach einem der Ansprüche 1 oder 2, **dadurch gekennzeichnet, dass** die kleineren Bewehrungselemente Verriegelungsteile (4) umfassen, die die kleineren Bewehrungselemente mit den größeren Bewehrungselementen verriegeln.

4. Verstärkung nach Anspruch 3, **dadurch gekenn-**

zeichnet, dass die Verriegelungsteile (4) als Zahnpaar mit einem Spalt dazwischen ausgebildet sind, wobei die Verriegelungsteile am Umfang der ringförmigen Teile (3a-e) angeordnet sind, die am weitesten von der Mittellinie der kleineren Bewehrungselemente angeordnet sind.

Revendications

1. Renfort pour pièce moulée comportant des éléments de renfort essentiellement plans (1 a-d, 2a-e) formés avec des parties en anneaux (3a-e) disposées dans une rangée le long d'une ligne et reliés les uns aux autres par des cols, le renfort comprenant au moins un ensemble d'éléments de renfort plus petits (1 a-d, 2e) et un ensemble d'éléments de renfort plus grands (2a-d), le diamètre extérieur des parties en anneaux des éléments de renfort plus petits étant essentiellement égal au diamètre intérieur des parties en anneaux des éléments de renfort plus grands, et au moins une partie en anneau d'un élément de renfort plus petit étant disposée à l'intérieur d'une partie en anneau d'un élément de renfort plus grand.

2. Renfort selon la revendication 1, **caractérisé en ce que** le diamètre extérieur des parties en anneaux des éléments de renfort plus petits est légèrement supérieur au diamètre intérieur des parties en anneaux des éléments de renfort plus grands, de sorte que le renfort est prétendu lorsque les éléments de renfort plus petits sont disposés à l'intérieur des éléments de renfort plus grands.

3. Renfort selon la revendication 1 ou 2, **caractérisé en ce que** les éléments de renfort plus petits comprennent des parties de verrouillage (4) verrouillant les éléments de renfort plus petits ensemble avec les éléments de renfort plus grands.

4. Renfort selon la revendication 3, **caractérisé en ce que** les parties de verrouillage (4) sont formées comme une paire de dents avec un interstice, les parties de verrouillage étant disposées sur la périphérie des parties en anneaux (3a-e) les plus éloignées de la ligne médiane des éléments de renfort plus petits.

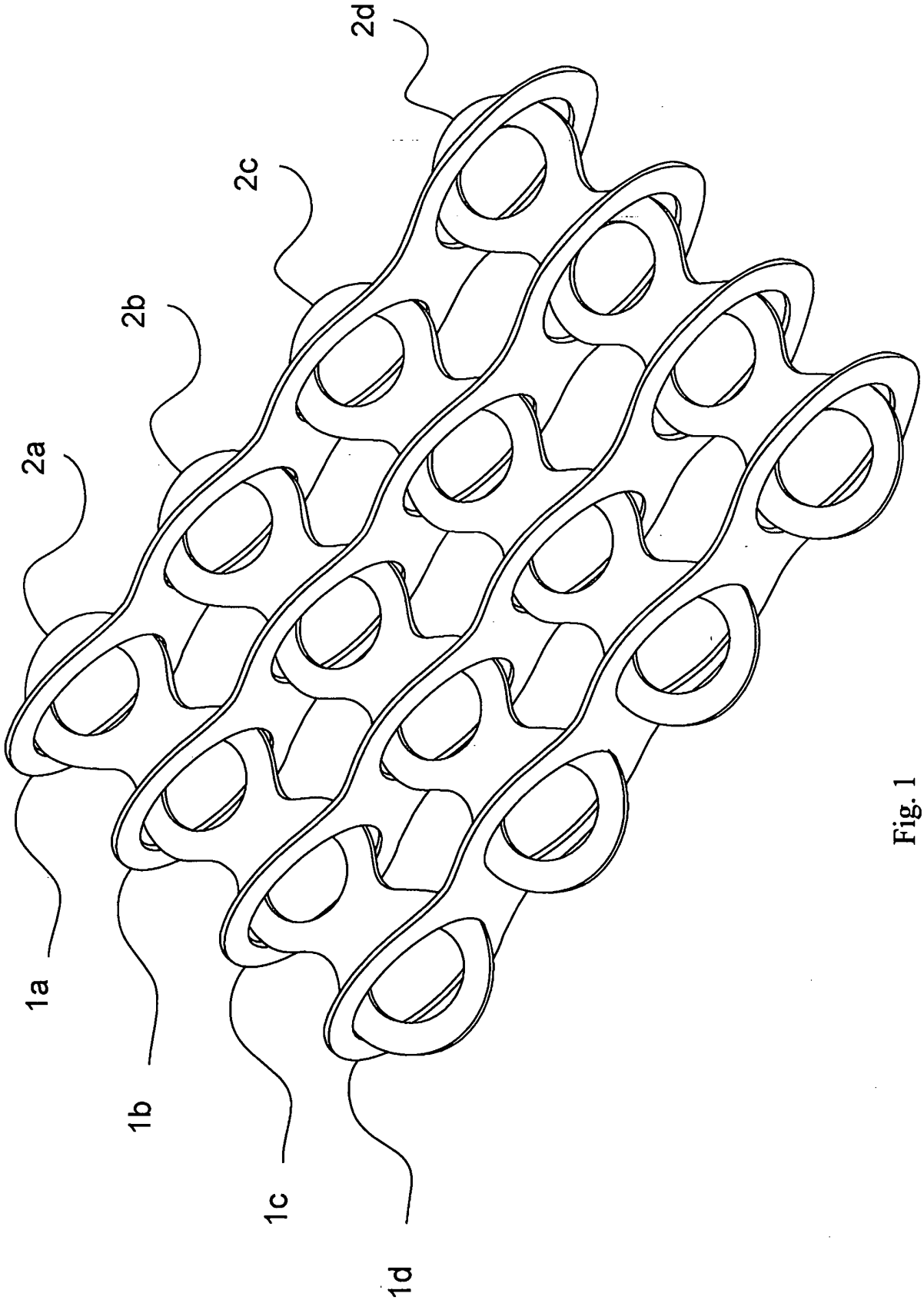

Fig. 1

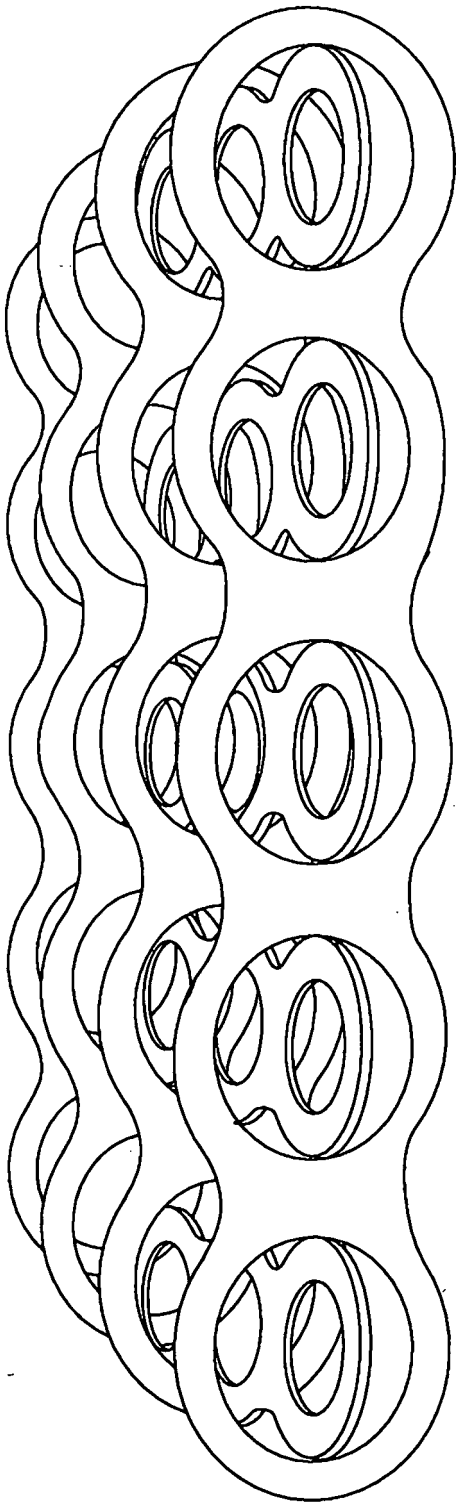

Fig. 2

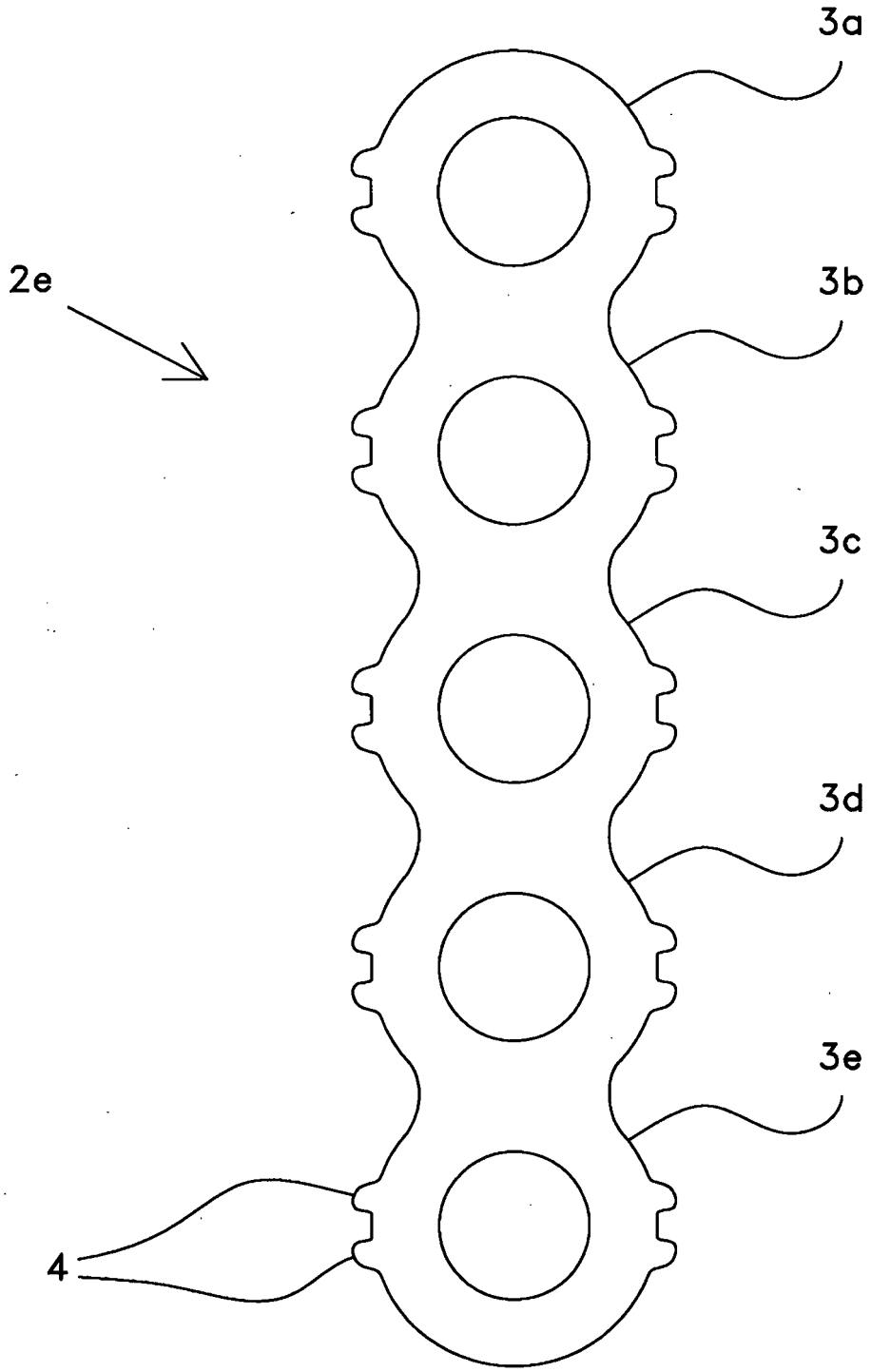

Fig. 3

REFERENCES CITED IN THE DESCRIPTION

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