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 sets of smaller reinforcement elements (1 a-d, 2e) and sets 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. The ring-shaped portions of the smaller reinforcement elements are arranged inside ring-shaped portions of the larger reinforcement elements. In an 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. In another embodiment, the smaller reinforcement elements comprise locking portions (4) arranged to lock the smaller reinforcement elements together with the larger. The locking portions (4) 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.
REINFORCEMENT FOR CASTING COMPRISING ESSENTIALLY PLANE REINFORCEMENT ELEMENTS FORMED WITH RING-SHAPED PORTIONS

The present invention relates to a reinforcement according to the preamble of the independent claim. In particular, it relates to such a reinforcement for casting.

5 **Background of the invention**

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 US161 0996A, 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.

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.

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

20 **Summary of the invention**

The invention relates to 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 to each other 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 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.
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.

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

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**

Fig. 1 shows a first embodiment of the reinforcement seen obliquely from above. The reinforcement comprises four larger reinforcement elements 1a-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.

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.

The smaller reinforcement elements 2a-d extend through the ring-
shaped portions of the larger reinforcement elements 1a-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.

The ring-shaped elements of the larger reinforcement elements 1a-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
elements 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.

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.

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, characterized in that 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.
A. CLASSIFICATION OF SUBJECT MATTER

IPC: see extra sheet
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)

IPC: E04C

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

SE, DK, FI, NO classes as above

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

EPO-Internal, PAJ, WPI data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Further documents are listed in the continuation of Box C.

See patent family annex.

Date of the actual completion of the international search
20-06-201 2

Date of mailing of the international search report
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International Patent Classification (IPC)
E04C 5/04 (2006.01)
E04C 5/01 (2006.01)
E04C 5/02 (2006.01)
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Cited literature, if any, will be enclosed in paper form.
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