

(12) PATENT
(19) AUSTRALIAN PATENT OFFICE

(11) Application No. **AU 199526320 B2**
(10) Patent No. **706603**

(54) Title
A method for production of reinforcement chairs and a mould for use in the production

(51)⁶ International Patent Classification(s)
B28B 007/34 E04C 005/20

(21) Application No: 199526320 (22) Application Date: 1995 .05 .26

(87) WIPO No: W096/37351

(43) Publication Date : 1996 .12 .11
(43) Publication Journal Date : 1997 .01 .30
(44) Accepted Journal Date : 1999 .06 .17

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(56) Related Art
US 5667192
US 4842241
US 4378203

OPI DATE 11/12/96 APPLN. ID 26320/95
AOJP DATE 30/01/97 PCT NUMBER PCT/NO95/00082



AU9526320

II

(51) International Patent Classification ⁶ : B28B 7/34 // E04C 5/20	A1	(11) International Publication Number: WO 96/37351 (43) International Publication Date: 28 November 1996 (28.11.96)
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(21) International Application Number: PCT/NO95/00082

(22) International Filing Date: 26 May 1995 (26.05.95)

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(81) Designated States: AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TT, UA, US, UZ, VN, ARIPO patent (KE, MW, SD, SZ, UG), European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).

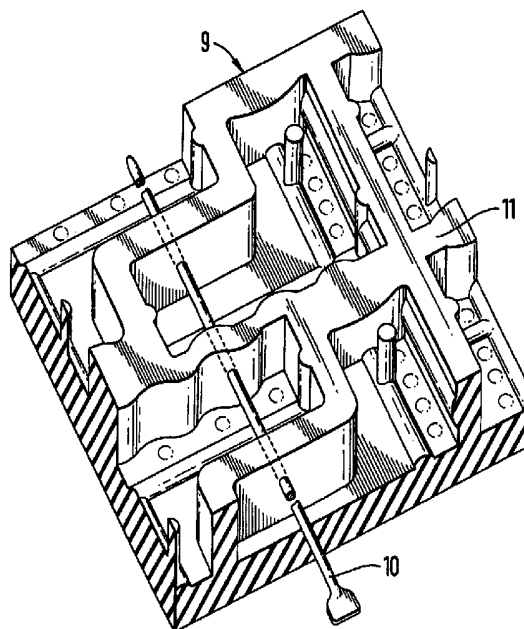
Published

*With international search report.
In English translation (filed in Norwegian).*

(54) Title: A METHOD FOR PRODUCTION OF REINFORCEMENT CHAIRS AND A MOULD FOR USE IN THE PRODUCTION

(57) Abstract

The invention concerns a method for production of reinforcement chairs in concrete for use in steel-armoured concrete structures, wherein the reinforcement chairs are cast in a mould (9) of a material which is elastic, preferably a two-component rubber mass, and that after hardening the reinforcement chairs are removed by elastically bending the mould's wall parts (11). The invention also concerns a mould for use in production of reinforcement chairs wherein the mould has walls adapted to the shape of the reinforcement chairs, which are made of an elastic material, especially a two-component rubber mass, and that a releasable metal rod (10) is provided perpendicularly through the mould's wall parts, for production of through-going mounting holes in the reinforcement chair.



A method for production of reinforcement chairs and a mould for use in the production.

The present invention concerns a method for production of reinforcement chairs in concrete for use in steel-armoured concrete structures, together with a mould for use in production of
5 the reinforcement chairs.

Reinforcement chairs are used in order to position reinforcement steel which is provided in casting moulds, both before and during filling of the casting moulds with concrete. The reinforcement chairs can be made of various materials, such as, eg., plastic, extruded
10 concrete. The problems involved in using known reinforcement chairs can be divided into the following two categories:

1. Reinforcement chairs made of materials which have different physical properties from concrete. In the event of temperature changes, due to different expansion coefficients,
15 these will lead to the occurrence of openings/cracks between concrete and reinforcement chair, thus causing water to penetrate into the concrete, which in turn can cause corrosion damage in the reinforcement steel. This drawback is further reinforced if there is not adequate adhesion between the concrete and the reinforcement chair.
20
2. Reinforcement chairs made of concrete which do not have the strength necessary in order to withstand the loads to which they are exposed in the casting moulds. Production processes currently in use restrict the possibilities of giving the reinforcement chairs the design necessary in order to satisfy requirements for securing
25 them in the casting moulds, and requirements that the reinforcements should not fall out of the completed structure, thereby permitting water to penetrate into the concrete, even without adhesion between reinforcement chair and concrete.

30 The object of the present invention is to provide a method for production of reinforcement chairs which avoids the above-mentioned disadvantages, and a mould for use in connection with the method.



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In accordance with the invention, there is provided a method for production of reinforcement chairs in concrete for use in steel-armoured concrete structures, characterized in that the reinforcement chairs are cast in a mould of a material which is elastic, and that after hardening the reinforcement chairs are removed by elastically bending the mould's wall parts.

5 In another aspect, there is provided a mould for use in the production of reinforcement chairs in accordance with the above described method, wherein the mould has walls adapted to the shape of the reinforcement chairs, characterized in that it is made of an elastic material. By means of the invention a method is obtained by simple means for the production of reinforcement chairs which substantially increases the strength and reduces the production

10 time for reinforcement chairs.

The design according to the invention increases the contact surface between concrete and reinforcement chair, and by means of cut-outs and through-going holes the reinforcement chair is secured against sliding out of the completed concrete structure.

15 In short the principle of the invention consists in the fact that the method for production of reinforcement chairs for use in steel-armoured concrete structures and the casting mould for use in the production of the reinforcement chairs is designed in such a manner that completed reinforcement chairs both cut-outs and holes can be removed without having to destroy the

20 casting mould.

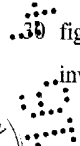
The invention will now be described in more detail by means of an embodiment which is illustrated in the drawing, in which:



25 fig.1 is a perspective view of a reinforcement chair.



fig.2 is a perspective view of a plaster model of a reinforcement chair provided in a simple wooden casting mould for the production of prototypes, preferably of plaster, and



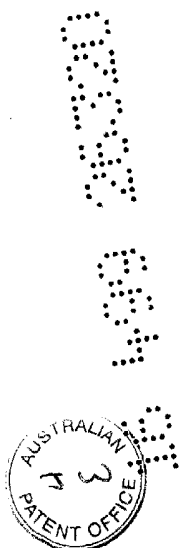
30 fig.3 is a perspective view of a partial section of an elastic casting mould according to the invention.



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Fig. 1 illustrates a reinforcement chair 1 which consists of a base part 2 to abut against the
5 foundation and which in a first upper surface 3, opposite the base part 2, is provided with a
cut-out or recess to abut against a reinforcement steel (not shown), and where in a second
upper surface, opposite the base part 2, there is provided a through-going hole 4 for mounting
it on to the foundation, eg. by means of nails. In the largest side surfaces there is further
provided a through-going hole 5 in the area of the

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cut-out 3, for mounting the reinforcement chair 1 by means of binding wire to the reinforcement bar. The reinforcement chair 1 is also provided with further cut-outs or grooves 6 and recesses 7 in order to increase the contact surface between reinforcement chair and concrete and thereby provide maximum
5 binding power to the surrounding concrete. In order to simplify the production of the reinforcement chairs, one of the largest side surfaces is completely flat.

As illustrated in fig. 2, the base part 2 is designed with least possible contact with the formwork in order to reduce the surface of the part of the
10 reinforcement chair which will be aligned with the completed concrete, and thereby reduce the penetration of moisture between reinforcement chair and the surrounding concrete.

Fig. 3 is a partial section of a casting mould 9 for the production of reinforcement chairs in concrete.

15 The method for production of reinforcement chairs in concrete for use in steel-armoured concrete structures is implemented in the following manner:

1. A plaster model in the desired shape, e.g. according to the design in fig. 1, is produced manually.
2. The plaster model is then arranged in a simple wooden mould 8, see fig.
20 2, and a mixture of two-component rubber mass is then poured down into the mould.
3. The negative impression of the reinforcement chair thus constitutes a casting mould for the production of further plaster models/prototypes, which are then moulded in the desired number corresponding to the size of the
25 actual main mould.
4. The plaster models are then glued to the bottom of the main mould, which is also made of wood, according to an optimum pattern, e.g. according to fig. 3, thus providing room for as many plaster models as possible. The main mould is thus intended for production of several chairs at a time, e.g.
30 50-150. The wooden mould is then filled with a two-component rubber mass 9.

5. The moulding mass is then hardened for approximately 12 hours, whereupon the plaster models are easily released from the elastic mould.

6. For the production of the through-going hole 4 for nails, holes are drilled in the rubber mould 9, thus enabling, e.g., a teflon-coated metal rod/-shaft 10, which is coated with a thin layer of oil, to be arranged horizontally in the mould, cf. fig. 3. With regard to the through-going holes 5 for binding wire, these are provided by the design of the rubber mould in the form of bosses which extend perpendicularly upwards from the bottom of the mould.

7. The main form is then filled with concrete, which is vibrated and hardened for approximately 8 hours at 40°C. The metal rods 10 are then removed from the rubber mould and completed reinforcement chairs can be easily loosened from the mould 9 by elastically bending the mould's wall parts 11. Since the rubber mould 9 consists of an elastic material, and the completed reinforcement chairs are removed after hardening by elastically bending the mould's wall parts 11, and without the mould being destroyed, the rubber mould can be used repeatedly and is thereby particularly suited to mass production of reinforcement chairs.

With respect to steps 1 to 6, these apply to production of the actual rubber mould 9, while step 7 concerns the actual production of reinforcement chairs in concrete for use in steel-armoured concrete structures.

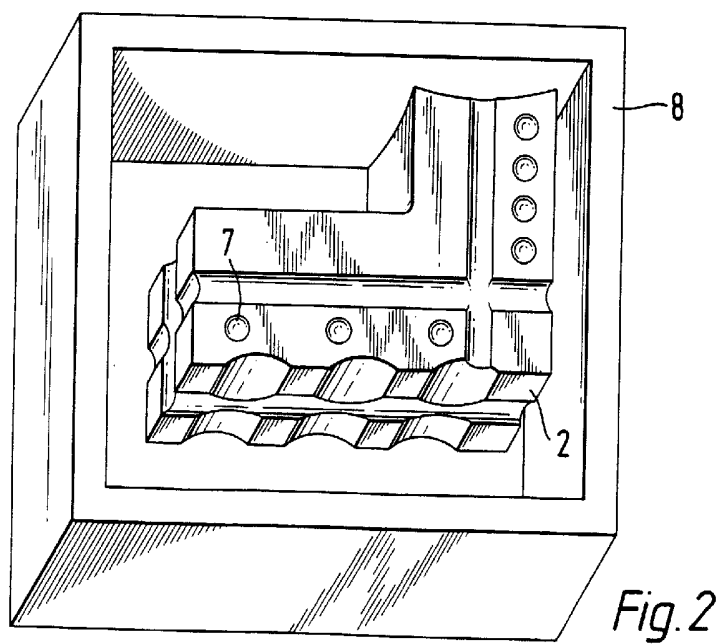
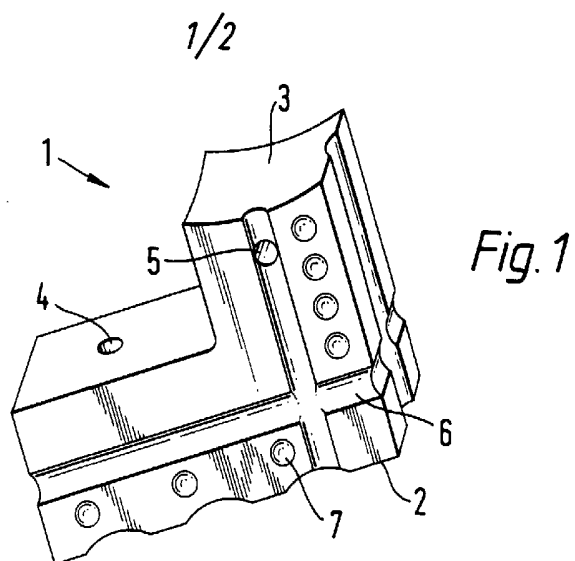
Since the reinforcement chairs are cast in moulds made of two-component rubber mass, which makes the casting moulds very flexible, it is thereby possible to produce reinforcement chairs supplied with cut-outs 6, recesses 7 and through-going holes 4,5, while at the same time the nature of the rubber moulds as opposed to known designs permits the moulds to be re-used.

The strength of the reinforcement chairs is particularly due to the fact that they are cast in moulds of heat-insulating materials, and thus maintain a stable temperature during the hardening process.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

- 5 1. A method for production of reinforcement chairs in concrete for use in steel-armoured concrete structures, characterized in that the reinforcement chairs are cast in a mould of a material which is elastic and that after hardening the reinforcement chairs are removed by elastically bending the mould's wall parts.
- 10 2. A method according to claim 1, characterized in that reinforcement chairs are cast in the mould which is formed by casting the mould walls in a box, in which there are provided one or more models, eg. plaster models of the reinforcement chairs.
3. A mould for use in production of reinforcement chairs according to claim 1, wherein
15 the mould walls adapted to the shape of the reinforcement chairs, characterized in that it is made of an elastic material.
4. A mould according to claim 3, characterized in that there is provided a releasable metal rod perpendicularly through the mould's wall parts, for the production of
20 through-going mounting holes in the reinforcement chair.
5. A mould according to claim 3, characterized in that it is designed for casting several reinforcement chairs at a time.
- 25 6. A mould according to any one of claims 3 to 5, wherein the mould is formed of a two-part rubber mass.
7. A method for production of reinforcement chairs, substantially as hereinbefore described with reference to the drawings.
- 30 8. A mould substantially as hereinbefore described with reference to the drawings.





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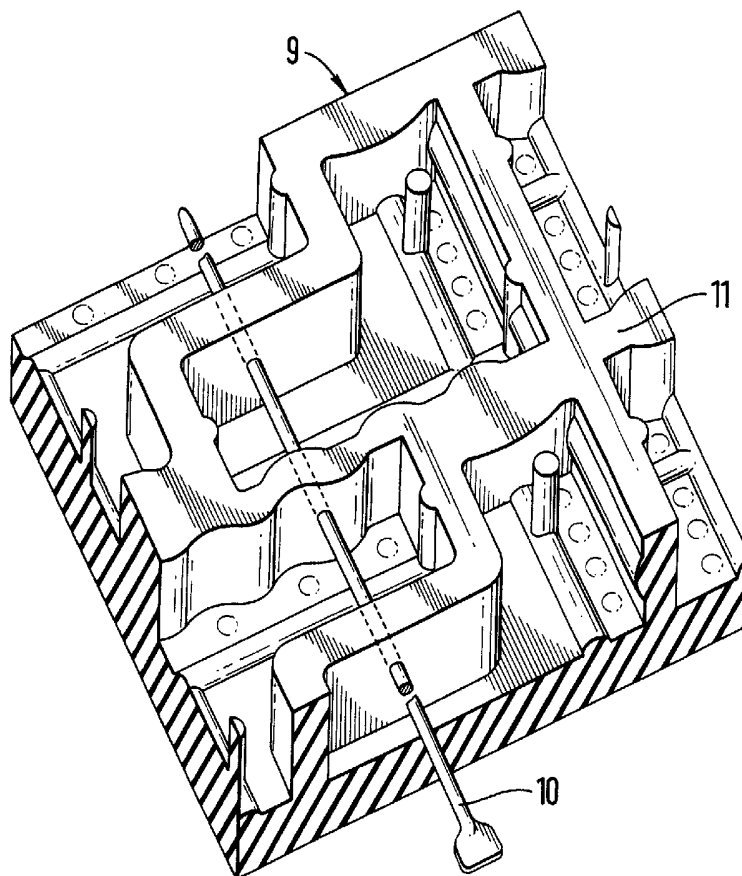


Fig. 3