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(71) Applicant: **DANSK INDUSTRI SYNDIKAT A/S**
No. 15-17, Herlev Hovedgade
DK-2730 Herlev(DK)

(72) Inventor: **Mogensen, Vagn**
Sassvej 6
DK-2820 Gentofte(DK)

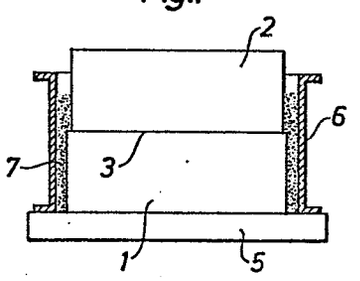
(72) Inventor: **Petersen, Carl Herbert**
Kodrivervej 4
DK-4600 Koege(DK)

(74) Representative: **Westwood, Edgar Bruce et al,**
STEVENS, HEWLETT & PERKINS 5, Quality Court
Chancery Lane
London WC2A 1HZ(GB)

(54) A method for stabilizing boxless molds.

(57) To mutually stabilize two connecting, boxless mold parts (1, 2) of sand or a similar material, a cavity (7) with stable walls is provided adjacent to both mold parts, and a flowable filling material is added into this cavity for mutual fixation of the walls and thus exclusion of shifting of the mold parts in relation to each other.

Fig.1



EP 0 129 375 A2

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A METHOD FOR STABILIZING BOXLESS MOLDS

The invention relates to a method for stabilizing boxless sand molds or molds of a similar material and composed of at least two separately manufactured mold parts.

Using modern foundry machines it is possible to manufacture such mold parts with a high degree of precision and to close them up accurately with each other, e.g. in pairs of two to form a horizontally parted mold consisting of two parts or in a random number to form a vertically parted mold transported forwards. At handling subsequent to close-up, such as transfer to and transportation on a pouring and cooling belt carrying molds to the shake-out, there is however a risk of slight shifting between individual pairs of molds, which may result in scrapping, and to counteract this a variety of proposals have been made to obtain interdependent stabilization of mold parts.

Thus, in the case of solitary two-part molds with four free sides, the use of bracing jackets is known. These jackets, which are lowered down over the mold until closing up with its side faces and transported together with the mold, at least until solidification of the casting has commenced, and in molds with a number of tightly closed up mold parts having horizontal or vertical parting lines, movable side plates or side rails can be used by analogy, said side plates or side rails being of such a nature that they clamp and de-clamp the detached sides of the mold. However, both of these proposals call for fairly substantial investments and also lead to increased operating costs, one of the reasons being the frequent cleaning of jackets, plates or rails in order to remove sticking molding sand.

Moreover, it is known to use various types of locators, either in the form of separate pins in the one mold part to mate with exactly corresponding holes in the other part, or in the form of one or more integral projections on the parting face of the one part and corresponding recesses in the parting face on the other part. In practice, it cannot

be assumed to be certain that this will ensure a clamping which excludes shifting of mold parts under all circumstances, and in both cases special measures are required with respect to the pattern plates used in manufacturing the mold parts.

The method of the invention differs from the said prior art in that a cavity adjacent to both mold parts is filled after close up of the said mold parts with a flowable, almost non-compressible filling material, mainly dried mold material.

In this case it is only a requirement that the said cavity is limited by stable walls, whereas it does not matter whether the cavity has been made with a higher or smaller degree of precision, as the filling material assumes its shape according to the cavity, thus preventing a change of the shape of the cavity corresponding to a shifting between the mold parts. The filling material, which so to speak can be said to constitute a self-adjustable guide pin, may be extremely inexpensive, and its positioning in the cavity after close-up of the mold parts only calls for simple auxiliary equipment, which does not require manual operation. In addition, the filling material can be recycled, as it can either be removed from the cavity before shake-out of the casting, in the event that mixing with molding sand is undesirable, or on the contrary be mixed with the mold material during shake-out to be recycled with it.

Various examples of the application of the method are explained in more detail below with reference to the drawing in which

Figs. 1 and 2 show a partly sectional side view and a plane view of a solitary, horizontally parted two-part mold with a surrounding bracing jacket.

Fig. 3 shows a side view of a plurality of similar molds

suitably spaced and provided with lateral supporting sheets,

Fig. 4 shows a cross-section along the line IV-IV in Fig. 3,

Figs. 5 and 6 show the sides of the mold lower part and associated upper part, facing each other.

Fig. 7 shows a section along the lines VII-VII in Figs. 5 and 6 after mold close-up, and

Figs. 8 and 9 show a similar section in modified molds for stabilization by the method of the invention.

The mold shown in Figs. 1 and 2 consists of a lower part 1 and an upper part 2, which can be randomly manufactured and are closed up to form one or more mold cavities (not shown) at the horizontal parting line 3. Fig. 2 shows an inlet 4 to this or these cavities. The closed-up mold rests on a base 5 and is surrounded by a bracing jacket 6, which also rests on the base 5 and reaches somewhat above the parting line 3. The internal dimensions of this jacket are somewhat larger than the side dimensions of the mold 1, 2, so that together with the jacket it defines an annular cavity 7, which has stable side walls, and which is partly filled with a flowable material, e.g. dried mold material, shots or another substantially non-compressible filling material, which excludes a change in the shape of the cavity 7, thus contributing to stabilization of the mold, in part by excluding shifting of the mold parts 1 and 2, both in relation to each other and to the bracing jacket 6, in part by contributing to an evenly distributed transfer of the laterally directed pressure from the not yet solidified, poured material to this frame, so that the wall thickness of the mold parts around the mold cavity can be reduced.

Fig. 3 shows a linear row of molds 1, 2 of the same type as shown in Figs. 1 and 2 and resting on a common base 5 with a relatively narrow space 7' between the individual molds.

Stiffening walls are provided along their opposite external sides, which in a known manner can consist of sheets 8, supported by rigid straps 9, but contrary to the known stiffening walls they have a fixed interspacing, which is moreover slightly larger than the cross-section of the molds. In this way, spaces 7" are formed along the mold sides, and like the mold spaces 7' they are filled with a flowable material, which stabilizes the spaces in question and thus the molds 1, 2.

While Figs. 1-4 show molds with external spaces to receive stabilizing filling material, which can be simply added from the top, Figs. 5-9 show molds with corresponding internal spaces and thus without external bracing jacket or stiffening walls.

The mold upper part 2 shown in Figs. 6 and 7 contains a fixed, stable guide 10, which in the shown embodiment is made in one piece and forms a rectangular frame around the cavity of the mold part and protrudes somewhat in relation to the parting line 3, while the associated lower part 1, Figs. 5 and 7, is designed with a corresponding annular, channel-shaped pocket 12, whose cross-section is slightly larger than the cross-section of the protruding part of the frame 10, so that a free space is left in the pocket around this part. Filling material may be added through one or more inlets 13, e.g. by suction through one or more outlets 14 in connection with the opposite side of the channel 12, and after the cavity has thus been filled, the mold parts 1 and 2 will be locked together against shifting in relation to each other.

Fig. 8 shows a similar arrangement in a double embodiment, with the lower part 1 and the upper part 2 both being provided with fixed, frame-shaped guides 10' and 10", which protrude into pockets 12' and 12" in the opposite part. This ensures that at the same time the guides 10' and 10" can serve to reinforce the mold ready for pouring.

Also Fig. 9 shows such a double arrangement, but in this case the filling material should be filled into the pockets 12' and 12" through one or more funnel-shaped inlets 14 facing upwards.

5

An arrangement like the one shown in Fig. 4 can also be used in molds of the above-mentioned type with vertical parting lines between the individual mold parts.

PATENT CLAIMS

1. A method for stabilizing boxless molds of sand or a similar material composed of at least two separately produced mold parts, (1, 2) c h a r a c t e r i z e d in that a cavity (7, 12) adjacent to both mold parts is filled after closing the mold parts with an almost non-compressible filling material, preferably dried mold material.

2. A method as claimed in Claim 1 for stabilizing horizontally parted molds (1, 2) using a bracing jacket (6) placed around the closed mold, c h a r a c t e r i z e d in that the cavity (7) intended to receive the filling material is provided as a space between the bracing jacket (6) and at least part of the external side faces of the mold parts (1, 2).

3. A method as claimed in Claim 1 for stabilizing a linear row of horizontally parted molds (1, 2) using stiffening walls (8) positioned along the sides of the row of molds, c h a r a c t e r i z e d in that the cavity intended to receive the filling material is provided as a space (7", 7') partly between the stiffening walls (8) and at least part of the side faces of the mold parts (1, 2) facing these walls, partly between individual molds.

4. A method as claimed in Claim 1 for stabilizing horizontally parted molds (1, 2), c h a r a c t e r i z e d in that at least one stable guide (10) is incorporated in at least the one mold part (2), said guide protruding in relation to the parting line (3) of the mold, and that at the parting line the other mold part (1) is provided with a pocket (12) to accepts the protruding part of the guide (10), thus creating a space around it to receive the filling material.

5. A method as claimed in Claim 4, c h a r a c t e r i z e d in that a frame-shaped guide (10) and a corresponding

annular pocket (12) are used, said pocket having at least one opening (13) for entry of filling material and at least one opening (14) for connecting a vacuum source.

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Fig.1

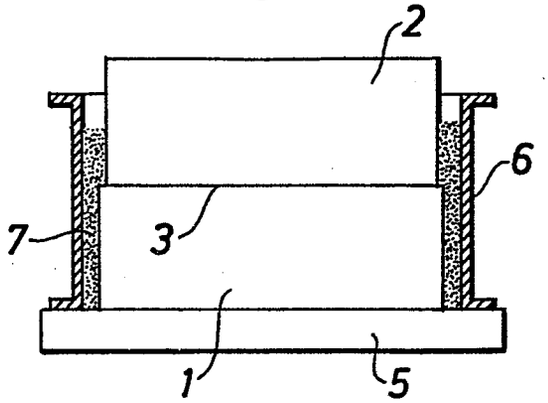

Fig.2

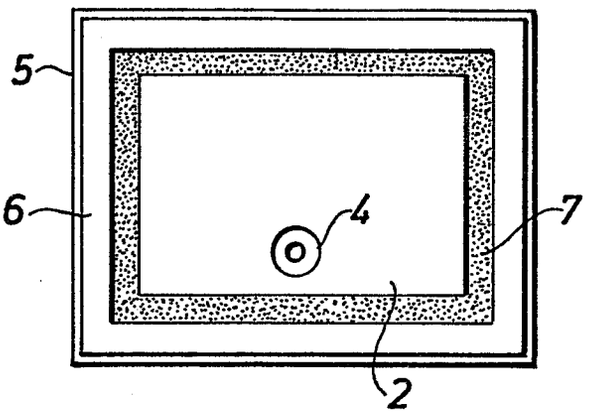

Fig.3

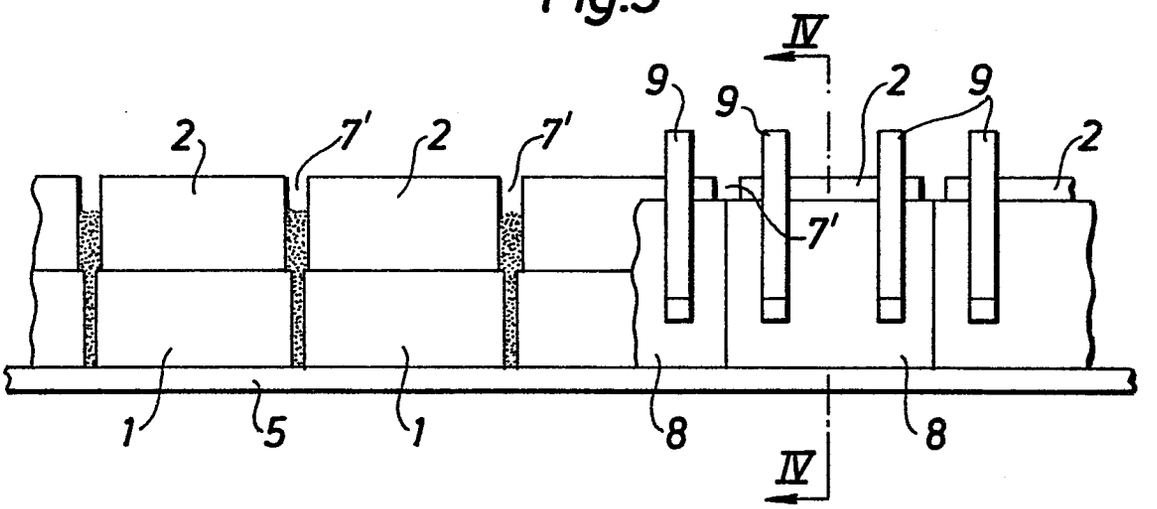

Fig.4

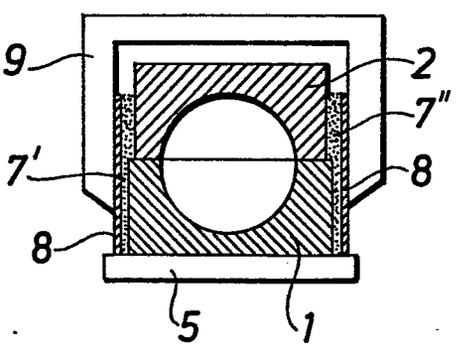

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Fig.5

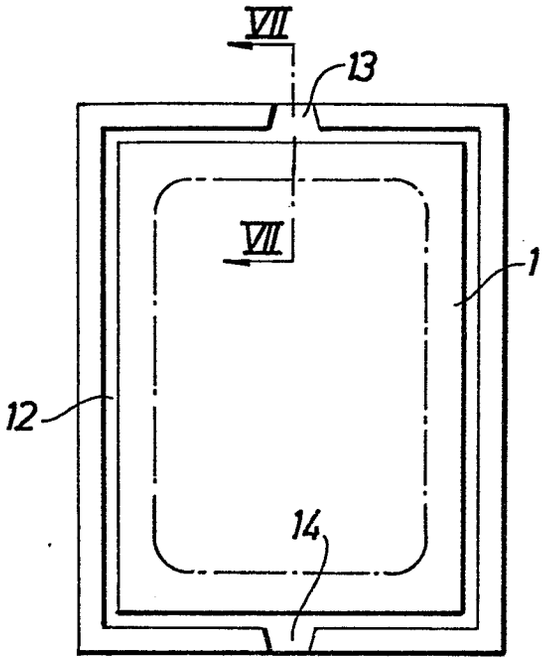

Fig.6

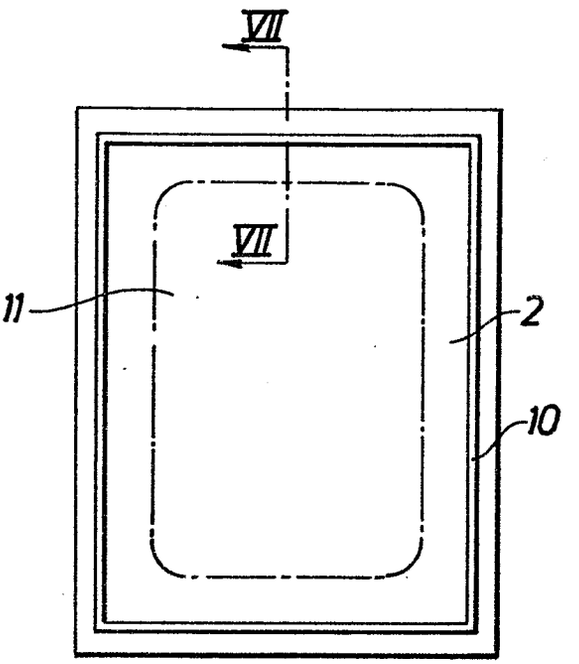

Fig.7

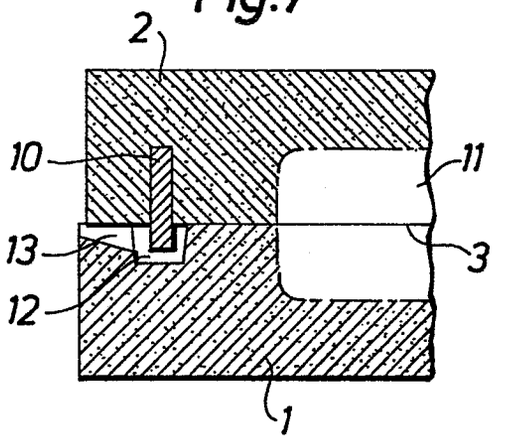

Fig.8

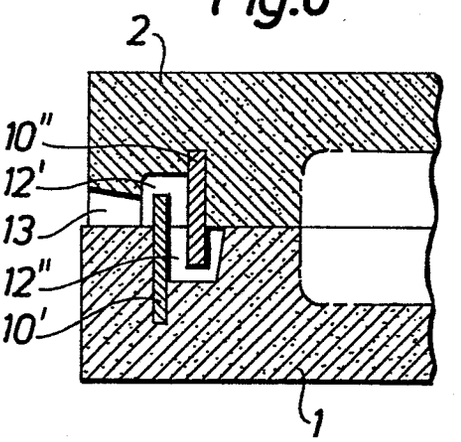

Fig.9