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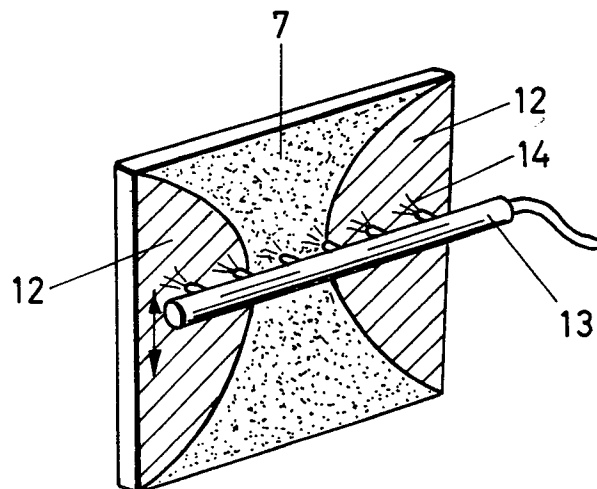
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54 **Method of producing concrete elements with an exposed pattern.**

57 A method of producing concrete elements, for example, concrete paving tiles, having an exposed pattern on one surface thereof. The concrete with a coarse aggregate is filled into an open mold (8) and is put under pressure by means of a ram (10) on the open side of the mold. A sheet (12) of a suitable material, such as paper, plastic, metal or the like, is placed in the bottom of the mold. The sheet has an opening or openings corresponding to the pattern (7) which is to be exposed. The body after removal from the mold is scoured with a liquid until the coarse aggregate in the surface pattern has become exposed. The sheet subsequently is removed.



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DESCRIPTIONMETHOD OF PRODUCING CONCRETE ELEMENTS WITH AN EXPOSED PATTERN

The present invention pertains to a method of producing concrete elements, for example, concrete paving tiles, having an exposed pattern on one surface thereof, wherein concrete is poured into an open mold and is put under pressure by means of a ram on
5 the open side of the mold.

The term "exposed pattern" means that the fine substances in the concrete, sand and cement, are removed such that the underlying aggregate, i.e., the coarser filler material such as ground stone or round gravel, is exposed on one surface of the concrete
10 body.

In the prior art, two different methods have been devised for exposing a pattern on one surface of a concrete object. The simplest and least expensive method is to scour a finished molded concrete object with liquid, holding a screen or mesh with openings corresponding to the desired pattern between the concrete
15 object and the spray nozzle. One is clearly limited in this method as to the choice of pattern; for example, it is difficult to produce a pattern in which sections of exposed surface are disposed vertically above a surface section which is supposed to remain untouched. If such is the case, the scouring liquid from the
20 section that is to be exposed will wash down over the section that is to remain untouched, and the result is a product with an unacceptable appearance. Thus, this method requires expensive auxiliary mechanical equipment to remedy this deficiency.

The second method presently in use comprises placing in
25 the bottom of the mold a sheet of material to which "concrete poison" (retarder) has been applied in a pattern corresponding to the desired pattern for the exposed portion of the surface. Following removal from the mold, the concrete object is allowed to
30 harden, at least partially, and the sheet is removed and the sheet is removed and the object scoured. The concrete will not set on those portions of the surface to which concrete poison has been applied, and the finer particles can thus be flushed away. This is an expensive method, however, because such sheets of paper
35 impregnated with concrete poison are costly.

The purpose of the present invention is to provide a method of producing concrete bodies having an exposed pattern on

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one surface thereof which is inexpensive, permits rapid and efficient production, and provides a finished product of entirely satisfactory appearance.

This is achieved by means of a method wherein concrete
5 is poured into an open mold and subjected to pressure from a ram on the open side of the mold, and the characterizing features of the method are that a sheet of a suitable material, such as paper, plastic, metal, etc., is placed in the bottom, on top, or in one of the sides of the mold, the margins of said
10 sheet corresponding to the surface which is not to be exposed, and that the concrete body, following its removal from the mold, is scoured with liquid until the aggregate in the surface uncovered by the sheet is exposed, after which the sheet is removed.

In a modified embodiment of the invention, the pattern-
15 forming opening or openings in the sheet material are covered by easily-removable sheet material. A preferred embodiment of this modification is characterized in that the sheet material covering the opening or openings is part of the original sheet material, its margins being defined by a series of non-continuous through
20 cuts or perforations.

In practice, it has proved most practical to cover the entire bottom surface of the mold with sheet material, the sheet material having through cuts along a line bordering the sections which are to be exposed. The through cuts can be broken at brief
25 intervals such that the sheet material hangs together, but is easy to tear off along the line of perforations.

Conventionally, a loose bottom of relatively thin plastics material has been placed in the mold cavity. This loose plastic bottom facilitates the transfer of the finished paving
30 tile from the mold to the drying site. By covering the entire bottom of the mold with paper, provided with perforation lines which define an opening or openings corresponding to the regions of the tile which are to be exposed, one can omit the extra loose mold bottom, the paper then serving as a loose bottom.

35 The primary focus of the invention is the production of flat concrete members, such as paving tiles, bridge-construction members and the like. Such elements are preferably produced under

high pressure. The reason for this is that one uses a relatively dry concrete mixture, and high pressure is necessary in order for this mass to become compressed. One of the reasons that dry raw concrete is utilized is that the objects should be able to be set
5 on edge immediately following their removal from the mold, in the wet state. It is of course much more efficient if the tiles or the like can leave the molding step in an upright position. They can then be placed directly onto a transport pallet and harden in the upright position, closely adjacent to each other.
10 After the tiles have hardened, they are strapped together and transported on the pallet. The method of the invention is excellently suited to the treatment of upright concrete objects, in that the so-called gray surfaces, i.e., the unexposed surfaces, are completely covered and protected against the particles which
15 wash down from the scouring of the exposed portion.

The method of the invention might very well also be used when the concrete tiles are molded by the vacuum method. In this case, a very easily flowing concrete is utilized. After the concrete has been filled into the mold, it is put under high
20 pressure and the water is pressed out. The finished product is lifted out by means of vacuum hoists. The scouring of the tile might then be executed from the bottom and upwards. This can easily be done utilizing the method of the invention.

The sheet material can be made of an inexpensive material
25 such as paper or plastic. The main point is that the sheet material must adhere well to the wet concrete and remain adhered thereto during the scouring of the portion which is to be exposed.

The invention will be elucidated in more detail in the following with reference to the drawings, where

30 Figures 1 and 2 show examples of surface patterns for concrete objects,

Figure 3 is a schematic cross section through a mold for a concrete paving tile, and

Figure 4 shows a concrete tile being scoured to expose
35 portions of the surface.

Shown on Figure 1 is a concrete tile 1 with a pattern on one surface thereof, the pattern dividing the tile approximately



in half diagonally. The surface half 2 is to have a smooth, untouched surface, and the other half 3 is to be exposed, i.e., the latter section is to be scoured such that the aggregate material becomes exposed. A pattern of this type can be produced
5 successfully by means of the prior art method described introductorily, the surface 2 being covered by a screen which lies between the tile and the scouring tool. The material which is washed away from the surface portion 3 will run down and away from the tile.

10 The concrete tile 4 in Figure 2 has a pattern consisting of two opposing crescent-shaped sections 5 and 6, which are to remain unscoured, and an intermediate section 7, which is to be exposed. In this case one cannot utilize the prior art method, because liquid containing fine particles will run down from the
15 upper portions of the exposed pattern and spoil the appearance of the sections 5 and 6, which are supposed to remain untreated.

Figure 3 shows how a concrete tile is produced by means of a mold 8 with a bottom 9 and a ram 10. Wet concrete 11 is poured into the open mold, i.e., with the ram 10 removed. Before
20 the concrete 11 is poured into the mold, however, a sheet 12 which has an opening or openings corresponding to the pattern which is to be exposed on the surface of the tile is laid against the bottom 9 of the mold. After the mold has been filled with concrete, the ram 10 is pressed down with great force, such that the concrete
25 11 is subjected to high pressure. During this operation, the sheet 12 will become firmly attached to the lower surface of the tile. The ram 10 is then removed and the bottom mold member, which is movable in the mold, is pushed upwards and thus lifts the tile 11 out of the mold. The tile is then set on edge, as shown
30 in Figure 4. The sheet or sheet portions 12 cover those portions of the tile surface which are not to be exposed. In this state, the entire surface of the tile is scoured by a sprayer pipe 13 which directs jets of liquid 14 toward the surface. The scouring pipe 13 can be moved up and down along the surface of the tile,
35 and as this is done, the loose particles in the surface portion 7 will be flushed away, while the portions 5 and 6 lie beneath the sheet portions 12 and will thus remain untouched and unaffected

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by the scouring. After the surface portion 7 has been sufficiently exposed, the spray is stopped and the sheet portions 12 removed.

A modified method for obtaining the same result is characterized in that the sheet with openings is adhered to a support foil with a water soluble adhesive, that the sheet and support foil are placed in the mold with the foil in the bottom of the mold, and that the support foil is removed after the concrete body has been taken out of the mold. In this way, also, the entire bottom of the mold will be covered during the casting, and one thus has no problem releasing the concrete body from the mold. The water soluble adhesive permits one easily to remove the support foil, thus exposing the design sheet.



CLAIMS

1. A method of producing concrete elements, for example, concrete paving tiles, having an exposed pattern on one surface thereof, wherein concrete with a coarse aggregate is filled into an open mold and is put under pressure by means of a ram on the open side of the mold, characterized in that a sheet of a suitable material, such as paper, plastic, metal or the like, is placed in the bottom of the mold, said sheet having an opening or openings corresponding to the pattern which is to be exposed, and that the body after removal from the mold is scoured with a liquid until the coarse aggregate in the surface pattern has become exposed, the sheet subsequently being removed.
2. A method according to claim 1, characterized in that the opening or openings are covered by an easily removable sheet material.
3. A method according to claim 2, characterized in that the sheet material which covers the opening or openings is part of the original sheet material, the margins of the opening being defined by perforating lines or cutouts interrupted by narrow connecting sections.
4. A method according to claim 1, characterized in that the sheet with openings is adhered to a support foil with a water soluble adhesive, that the sheet and support foil are placed in the mold with the foil in the bottom of the mold, and that the support foil is removed after the concrete body has been taken out of the mold.

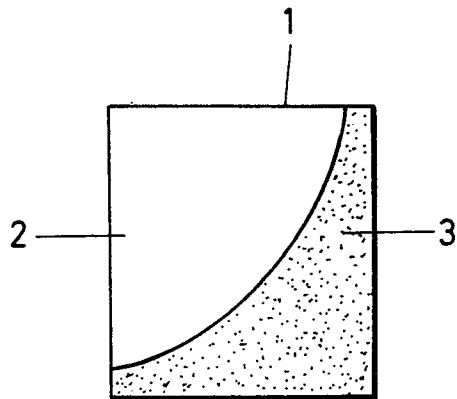


Fig. 1

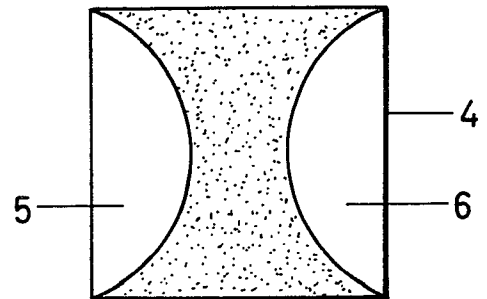


Fig. 2

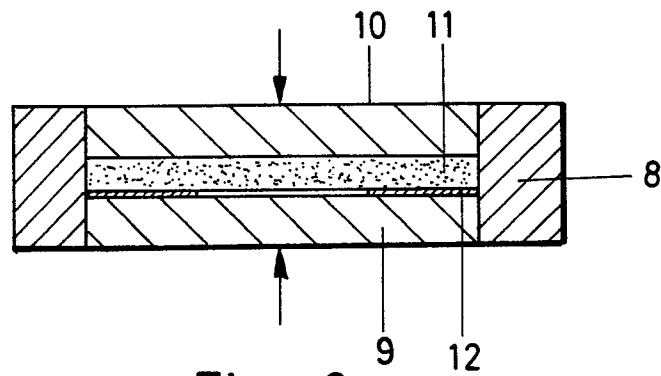


Fig. 3

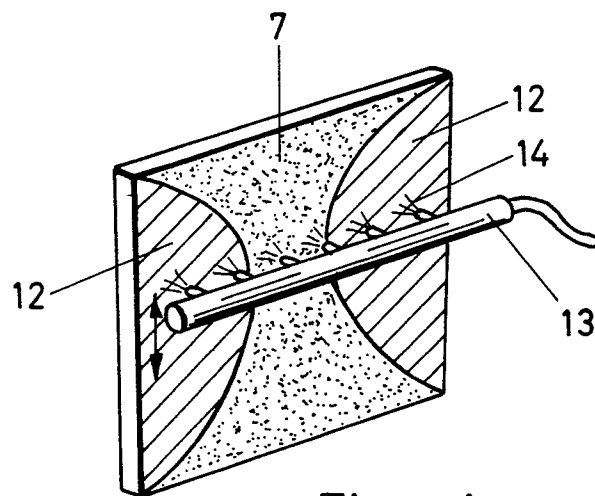


Fig. 4



European Patent
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EUROPEAN SEARCH REPORT

0030250 Application Number

EP 79 85 0108

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
A	<u>DE - A - 1 801 746</u> (WILLIAMS, PARRY, AMOS) * Whole document *	1	B 28 B 7/36
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A	<u>DE - A - 2 020 339</u> (BASAMENTWERKE BOCKE) * Whole document *	1	
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A	<u>DE - A - 2 545 940</u> (SPREEBERG) * Whole document *	1	

			TECHNICAL FIELDS SEARCHED (Int.Cl. 3)
			B 28 B E 04 C C 04 B
			CATEGORY OF CITED DOCUMENTS
			X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
			&: member of the same patent family, corresponding document
☒ The present search report has been drawn up for all claims			
Place of search	Date of completion of the search	Examiner	
The Hague	04-08-1980	ROLLEN	