DECISION
of 14 December 2005

Case Number: T 0050/04 - 3.2.07
Application Number: 97310031.6
Publication Number: 0947299
IPC: B28B 3/02
Language of the proceedings: EN

Title of invention:
Process and apparatus for making concrete products with exposed aggregates

Patentee:
Entwicklungsgesellschaft Wolfgang Hoesch GdbR

Opponent:
Schwenk Lösch Betontechnik GmbH & Co. KG

Headword:
-

Relevant legal provisions:
EPC Art. 54, 56, 114(1)

Keyword:
"Late filed documents - admitted"
"Novelty (yes)"
"Inventive step (yes)"

Decisions cited:
-

Catchword:
-
Case Number: T 0050/04 - 3.2.07

DECISION
of the Technical Board of Appeal 3.2.07
of 14 December 2005

Appellant: Schwenk Łośc Betontechnik GmbH & Co. KG
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Decision under appeal: Interlocutory decision of the Opposition
Division of the European Patent Office posted
28 November 2003 concerning maintenance of the
European patent No. 0947299 in amended form.

Composition of the Board:
Chairman: C. Holtz
Members: K. Poalas
P. O'Reilly
Summary of Facts and Submissions

I. The appellant (opponent) lodged an appeal against the decision of the Opposition Division to maintain European patent No. 0 947 299 in amended form.

II. An opposition had been filed against the patent as a whole and was based on Article 100(a) EPC (lack of novelty and lack of inventive step).

III. Oral proceedings before the Board of Appeal were held on 14 December 2005.

   (a) The opponent requested that the decision under appeal be set aside and that the patent be revoked.

   (b) The respondent (patentee) requested that the decision under appeal be set aside and that the patent be maintained with the patent documents filed during the oral proceedings.

IV. Independent claim 1 and independent claim 5 as amended read as follows:

"1. A method of manufacturing a cementitious product from a cementitious mix including fine particles and aggregate coarse particles in which the cementitious mix is subjected to a pressing process which forms the product and causes coarse particles adjacent to a surface of the mix to stand proud of fine particles, characterised in that fine particles (4) comprising sand and cement, and aggregate coarse particles (5) are mixed with water to form a cementitious mix (2) and in that the pressing process includes pressing a flowable..."
mass (32) against the surface (37) of the mix (2), initially acting to compact the mix (2) until the aggregate course [sic] particles (5) are in a close packed arrangement and further by applying continued pressure deforming the flowable mass (32) so that it flows around the uppermost aggregate coarse particles (5) and uppermost fine particles (4) are driven into the areas between the aggregate coarse particles."

"5. A pressing apparatus for making cementitious products from a cementitious mix including fine particles and aggregate coarse particles, said pressing apparatus including pressing means which presents a pressing surface for engagement with a surface of the cementitious mix, the pressing apparatus (20) comprising a flowable mass (32) having a pressing surface (36) which engages with the surface (37) of a cementitious mix (2) including fine particles (4) and aggregate coarse particles (5) and water, characterised in that the flowable mass (32) is a composite flowable mass and in that the composite material comprises an intermediate layer (52) in the form of a liquid, a gas, a gel or a particulate material sealed by an envelope formed by two other said layers (51, 53)".

V. The documents cited in the present decision are the following:

A9: JP 07-164 420 A (patent abstract in English),
A10: JP 04-201 510 A (patent abstract in English),
A18: DE 31 09 108 A,
A19: DE 76 06 699 U and
A20: Report about tests made by "Güteschutz Beton- und Fertigteilwerke Baden-Württemberg e.V."
VI. The appellant argued essentially as follows:

(a) Admittance of documents A19 and A20 into the proceedings

Documents A19 and A20 were filed with the appeal grounds as a reaction to the decision of the Opposition Division.

Document A19 states specifically in the 1st paragraph of page 4 that already the pressing step makes the coarse particles protrude from the face of the concrete slabs. This statement weakens the argument of the Opposition Division in its decision (page 6, first paragraph) that for "Waschbetonplatten" the protrusion of coarse particles from the surface is achieved only by the secondary processing step of washing out the fine particles.

Document A20 evidences that a concrete product made according to document A18, but without the process step of washing out the fine particles, has the same surface characteristics as the one produced according to the method of claim 1 of the patent in suit. Therefore, document A20 is proof that the method according to claim 1 of the patent in suit is implicitly known from document A18.

For the above mentioned reasons documents A19 and A20 should be admitted into the proceedings.
(b) Claim 1 - Novelty (Article 54 EPC)

According to first complete paragraph on page 12 of the originally filed application the term "cementitious mix" also covers a mix of fine particles of clay and coarse aggregate particles. Therefore, the term "cementitious mix" in claim 1 does not mean that the used "cementitious mix" automatically discloses cement. It can also comprise particles of clay or of other materials. By such an interpretation of the term "cementitious mix" the subject-matter of claim 1 is not novel over the disclosure of each of the documents A9 or A10.

Document A19 indicates in its first paragraph that the application of pressure to a cementitious mix by using an elastic rubber matrix causes the coarse material to protrude from the surface due to the compression applied thereby making the removal of the fine particles easier during the subsequent treatment of "Abwaschen". Therefore, the method of claim 1 of the patent in suit is implicitly disclosed in document A19 and corresponds to the treatment of the cementitious mix according to document A19 before applying the process step of "Abwaschen".

This argumentation is also supported by the test results of document A20 showing that a cementitious product made according to document A18, i.e. made with a process similar to the one described in document A19 but without the process step of washing out the fine particles, has the
same surface characteristics as the one produced according to the method of claim 1 of the patent in suit.

For these reasons, the subject-matter of claim 1 of the patent in suit is not novel over the disclosure of document A19.

Figure 6 of document A18 shows a cementitious plate having a rough surface structure at its edges as a result of the use of an elastic rubber pressure matrix. This implies that the method steps as defined in claim 1 of the patent in suit have been applied to a cementitious plate made according to the teaching of document A18. This argumentation is also supported by the test results of document A20 showing that a cementitious product made according to document A18 but without the process step of washing out the fine particles has the same surface characteristics as the one produced according to the method of claim 1 of the patent in suit.

Therefore, the subject-matter of claim 1 of the patent in suit is not novel over the disclosure of document A18.

(c) Claim 1 - Inventive step (Article 56 EPC)

Starting from a cementitious product being compressed by a conventional steel press to the shape shown in Figure 2 of the patent in suit, having thereby a flat surface 9, the skilled person trying to provide the exposed surface of
the cementitious product with visible aggregate particles and trying to minimise at the same time the need for a secondary processing like the washing out of the fine particles would follow the teaching of the first paragraph of document A19 and use as a pressing surface an elastic rubber matrix in order to achieve that the coarse particles protrude from the face of the concrete slab. By increasing the pressure in the pressing apparatus the rubber matrix would then inevitably flow around the uppermost aggregate coarse particles, thereby driving the uppermost fine particles into the areas between the aggregate coarse particles.

Therefore, starting from a pressure situation as shown in Figure 2 of the patent in suit the skilled person is led by the teaching of document A19 to the method of claim 1 of the patent in suit without exercising any inventive activity.

Starting from a pressure situation as shown in Figure 2 of the patent in suit the skilled person is led by the teaching one of the documents A18, A9 or A10, for the same reasons as mentioned above for document A19, to the method of claim 1 of the patent in suit without exercising any inventive activity.

Therefore, the subject-matter of claim 1 does not involve an inventive step.

(d) Claims 5 to 11 - Novelty and inventive step

(Articles 54 and 56 EPC)
Novelty and inventive step of the subject-matter of claims 5 to 11 are not questioned by the appellant.

VII. The respondent argued essentially as follows:

(a) Admittance of documents A19 and A20 into the proceedings

Documents A19 and A20 filed with the appeal grounds are late filed. They are also not as relevant as the other documents in the proceedings and therefore they should not be admitted into the proceedings. Also the objectivity of the institute which carried out the tests reported in A20 is doubtful.

(b) Claim 1 - Novelty (Article 54 EPC)

The cementitious mix claimed in claim 1 of the patent in suit includes fine particles comprising sand and cement. Since none of the documents A9 or A10 refers to a material including cement, none of these documents can question the novelty of the subject-matter of claim 1 of the patent in suit.

Furthermore, the process step of applying continued pressure after having compacted the cementitious mix until the aggregate course particles are in a close packed arrangement so that said continued pressure deforms the flowable mass so that it flows around the uppermost aggregate coarse particles and drives the
uppermost fine particles into the areas between the aggregate coarse particles is not mentioned in any of the documents A9, A10, A18 or A19.

The subject-matter of claim 1 of the patent in suit is therefore novel.

(c) Claim 1 - Inventive step (Article 56 EPC)

Since none of the documents A9, A10, A18 or A19 discloses the above-mentioned differentiating feature of applying continued pressure after having compacted the cementitious mix until the aggregate course particles are in a close packed arrangement, said continued pressure deforming thereby the flowable mass so that it flows around the uppermost aggregate coarse particles and drives the uppermost fine particles into the areas between the aggregate coarse particles it is evident that also none of these documents can render such a feature obvious.

Therefore, the subject-matter of claim 1 of the patent in suit is also inventive.

Reasons for the Decision

1. Amendments (Article 123(2) EPC)

Amended independent claim 5 is a combination of the granted claims 5, 8 and 11.
Amended dependent claims 8, 9, 10 and 11 correspond to granted claims 9, 10, 12 and 13.

The amendments in the description bring the description into conformity with the present claims.

Therefore, the patent as amended fulfils the requirements of Articles 123(2), 84 and Rule 27(1)b) EPC. This was not disputed by the appellant.

2. Admittance of documents A19 and A20 into the proceedings

Documents A19 and A20 were filed with the letter setting out the appeal grounds as a reaction to the decision of the Opposition Division.

Document A19 states specifically in the 1st paragraph of page 4 that already the pressing step makes the coarse particles protrude from the face of the concrete slabs. This feature whereby coarse particles protrude from the face of the concrete slabs when the slabs are compressed by an elastic pressing shoe is not disclosed in document A18.

Therefore, the Board finds that document A19, having this additional feature over document A18, which was the main document in the decision of the Opposition Division, should be admitted into the proceedings.

Document A20 evidences that a concrete product made according to document A18 but without the process step of washing out the fine particles has a similar surface
to the one produced according to the method of claim 1 of the patent in suit.

The Board finds that since document A18 was the main document in the decision of the Opposition Division and document A20 is used as evidence for the implicit disclosure of this document, document A20 should be admitted into the proceedings.

For the above mentioned reasons the Board admits documents A19 and A20 into the appeal proceedings in accordance with Article 114(1) EPC.

3. Claim 1 - Novelty (Article 54 EPC)

3.1 Document A9 describes a process for manufacturing ceramic tiles. Ceramic raw material 4 is pressed by an upper mold 5 having elastic pressing members 6. At the parts of the ceramic material in contact with the elastic members 6, coarse sand 4a protrudes from the ceramic tile surface and the protruding surfaces 7b become coarse.

A9 does not refer to a cementitious mix including fine particles and aggregate coarse particles, whereby said fine particles comprise sand and cement, as is specified in claim 1 of the patent in suit. Furthermore, A9 does not disclose any information about the way the elastic members 6 apply pressure and deform themselves during the pressurising phase of the ceramic raw material. Therefore, A9 does not contain any reference to a first compressing of the raw material so that it is compacted until the aggregate coarse particles are in a close packed arrangement and to a
further application of continued pressure to then deform the elastic members so that they flow around the uppermost aggregate coarse particles and so to drive uppermost fine particles into the areas between the aggregate coarse particles.

3.2 Document A10

Document 10 describes a process for manufacturing exterior tiles using a clay mixture having aggregate particles. The mixture is pressed by an elastic pressing section 4. Small projections are formed on surface 8.

A10 directed to a clay mixture does not refer to a cementitious mix including fine particles and aggregate coarse particles, whereby said fine particles comprise sand and cement, as is specified in claim 1 of the patent in suit.

Further, A10 does not disclose any information about the way the elastic pressing section 4 applies pressure and deforms itself during the pressurising phase of the clay raw material. Therefore, A10 does not disclose any reference to a first compression of the raw material so that it is compacted until the aggregate coarse particles are in a close packed arrangement followed by a further continued pressure to then deform the elastic pressing section so that it flows around the uppermost aggregate coarse particles and drives uppermost fine particles into the areas between the aggregate coarse particles.
The appellant's argument that since the first complete paragraph on page 12 of the originally filed application defines that the term "cementitious mix" also covers mixes not including cement so that the term "cementitious mix" in claim 1 can also be interpreted as a mix without cement, cannot be followed by the Board for the following reasons.

According to the first complete paragraph on page 12 of the originally filed application the term "cementitious mix" used in the specification defines mixes which can comprise cement but which do not necessarily have to comprise cement. The kind of "cementitious mix" claimed in claim 1 is a mix which must have fine particles comprising sand and cement. Therefore, the "cementitious mix" claimed in claim 1 is a mix comprising cement and as such is not disclosed in document A9 or in document A10.

Document A19 describes a process for manufacturing "Waschbetonplatten" (exposed aggregate concrete plates) by using a metal matrix having recesses filled with elastic material. According to the method of A19 the cementitious mix used therein is subjected to a pressing process so that the coarse material protrudes from the surface due to the compression applied, thereby making the removal of the fine particles easier during the subsequent treatment of "Abwaschen" (see second part of the first paragraph of the description). This means that after the compression process the particles remaining on the top of the coarse material have to be washed out during an additional process.
step. A compression step causing a deformation of the used rubber so that it flows around the uppermost aggregate coarse particles, thereby driving the uppermost fine particles into the areas between the aggregate coarse particles, is not mentioned in A19.

The appellant has argued that by applying compression to a concrete plate using an elastic matrix according to document A19 such that the coarse material protrudes from the surface then the used elastic matrix inevitably flows around the uppermost aggregate coarse particles, thereby driving the uppermost fine particles into the areas between the aggregate coarse particles.

This argument cannot be followed by the Board for the following reasons.

The first paragraph of the description of A19 stating that the elastic matrix allows the coarse material to protrude from the surface of the cementitious mix does not disclose any information about the deformation of said elastic matrix during the application of pressure. No information about the grade of deformation of the elastic matrix used during the pressuring phase is given in this document. The appellant's allegation that the elastic plate during pressure flows around the uppermost aggregate coarse particles, thereby driving the uppermost fine particles into the areas between the aggregate coarse particles is an assumption which does not found support in the document and hence cannot be accepted.
3.5 Document A18

A18 describes a method and an apparatus for producing a shaped cementitious product (or concrete slab) which is suitable for use on walkways or roads. The apparatus of A18 comprises a mould including a base plate of resilient rubber of a specified hardness and which imparts a bevel shape to the upper edges of the formed concrete slab. When the slab is ejected from the mould, the resilient rubber is "peeled off" the product to reveal the upper surface of the slab. The bevelled concrete slab, once removed from the mould, is left to cure and then subjected to ageing via secondary processing to produce an exposed aggregate surface.

According to the method of claim 1 of the patent in suit coarse particles adjacent to the surface of the cementitious mix are cleaned from the fine particles comprising sand and cement during the formation of the cementitious product, i.e. during the application of pressure to the cementious product. This means that no separate secondary treatment of the coarse particles adjacent to the surface of the cementitious mix is needed.

The flowable mass according to the patent in suit exerting a pressing action on the surface of the cementitious mix initially acting to compact the mix until the aggregate coarse particles are closely packed, and further conforms to the surface of the mix, flowing around the surface of the exposed aggregate coarse particles, and thereby effecting a cleaning action by removing the thin layer of "fines" (i.e. sand and cement) from the exposed aggregate particles.
It is neither stated nor suggested anywhere in A18 that the pressing process by which the shaped concrete product of A18 is formed produces a surface where aggregate coarse particles stand proud of fine particles. Furthermore, none of the figures in A18 shows a concrete slab having a surface with protruding aggregate coarse particles. The side view of the finished concrete block in Figure 6 of A18 shows that the visible upper surface of the block has no protruding particles. This is further illustrated by the diagrams of the block at various stages of manufacture shown in Figure 3.

In the penultimate paragraph of page 5 of A18 it is stated that "the pebbles (i.e. aggregate coarse particles) embedded in [the region of the bevel] are surrounded by more concrete composition (i.e. fine particles of sand and cement) compared to the state of the art, so that they are better protected against impact". According to this statement the resilient rubber intermediate layer of A18, far from cleaning fine particles from aggregate coarse particles, actually encourages the formation of a layer of fine particles around and over the aggregate coarse particles.

Therefore, it is not known from document D18 to use a flowable mass which initially acts to compact the mix until the aggregate coarse particles are in a close packed arrangement and further by applying continued pressure deforms so that it flows around the uppermost aggregate coarse particles and uppermost fine particles.
are driven into the areas between the aggregate coarse particles.

3.6 Document A20

Document A20 is filed as evidence that a concrete slab made according to the method of A18 may have a "Waschbeton"-similar-surface. Document A20 gives the results of using five different pressing methods on three different compositions. Therefore, even if a slab made according to A20 has a surface similar to the one produced according to the method of claim 1 of the patent in suit, this similarity of the produced products is not evidence for a similarity or identity between the method of claim 1 and the method of A18. It is well known that different methods can produce identical products. Therefore, document A20 provides no proof about the similarity between the methods disclosed in documents A18 or A19 and the method according to claim 1 of the patent in suit.

3.7 For the above mentioned reasons, the subject-matter of claim 1 is novel, thus fulfilling the requirements of Article 54 EPC.

4. Claim 1 - Inventive step (Article 56 EPC)

4.1 Closest prior art

The Board follows the appellant's argument that the process described in column 2, line 33 to column 3, line 14 of the patent in suit referring to the cementitious mixes shown in figures 1 and 2 of the patent in suit represents the closest prior art.
4.2 Problem

The problem to be solved in the present case is to improve the above mentioned known method so that it provides the cementitious product with an exposed surface having visible aggregate particles which would normally be obtained by secondary processing, thereby at least reducing the need for such a secondary processing.

4.3 Solution

In accordance with claim 1 the above-mentioned problem is solved in that the cementitious mix is subjected to a pressing process which forms the product and causes coarse particles adjacent to a surface of the mix to stand proud of fine particles, in that the pressing process includes pressing a flowable mass against the surface of the mix, initially acting to compact the mix until the aggregate course particles are in a close packed arrangement and further by applying continued pressure deforming the flowable mass so that it flows around the uppermost aggregate coarse particles and so that uppermost fine particles are driven into the areas between the aggregate coarse particles.

4.4 The above mentioned solution is not rendered obvious by the documents presented by the appellant for the following reasons:
4.4.1 Document A19

As stated under point 3.4 above, document A19 teaches in the first paragraph of its description the use of an elastic pressure shoe applying pressure to a cementitious mix so that it causes coarse particles adjacent to a surface of the mix to stand proud of fine particles. The same document fails, however, to disclose the features of pressing a flowable mass against a surface of the mix, initially acting to compact the mix until the aggregate course particles are in a close packed arrangement and further by applying continued pressure deforming the flowable mass so that it flows around the uppermost aggregate coarse particles and uppermost fine particles are driven into the areas between the aggregate coarse particles.

Since the last mentioned features are missing from document A19, the skilled person receives no indication from document A19 to incorporate these features into the state of the art method corresponding to figures 1 and 2 of the patent in suit.

4.4.2 Document A18

As stated under point 3.5 above according to document A18 it is the washing out process of an outer surface of the concrete plates applied after the pressing process, which causes the coarse particles adjacent to said surface of the mix to stand proud of fine particles.

Therefore, the feature of the preamble of claim 1 that the cementitious mix is subjected to a pressing process
which forms the product and causes coarse particles adjacent to a surface of the mix to stand proud of fine particles is not known from document A18.

Also, it is neither known nor suggested from document A18 to press a flowable mass against the surface of the mix, initially acting to compact the mix until the aggregate course particles are in a close packed arrangement and to continue applying pressure, thereby deforming the flowable mass so that it flows around the uppermost aggregate coarse particles and uppermost fine particles are driven into the areas between the aggregate coarse particles.

Since A18 does not disclose any of these features, the skilled person also can not be led by document A18 to add such process steps to the state of the art method corresponding to figures 1 and 2 of the patent in suit.

4.4.3 Document A9

Document A9 discloses a method of press forming a dry mixture of fine particles in the form of raw ceramic clay and coarse-grained sand aggregate particles by means of elastic elements in a pressing die with a predetermined pattern on its contact surface which are bitten into by the coarse-grained sand aggregate particles so that coarse-grained sand aggregate particles stand proud of fine particles after the product has been fired to produce a non-slip exposed surface on the final product.

This method is neither directed to the treatment of a cement containing raw mixture nor proposes the pressing
of a flowable mass against the surface of said mix, initially acting to compact the mix until the aggregate course particles are in a close packed arrangement and further by applying continued pressure deforming the flowable mass so that it flows around the uppermost aggregate coarse particles and uppermost fine particles are driven into the areas between the aggregate coarse particles.

A9 without these missing features can therefore itself give no indication to the person skilled in the art to incorporate these missing features into the state of the art method corresponding to figures 1 and 2 of the patent in suit.

4.4.4 Document A10

A10, which is similar to A9, discloses a method of press forming a dry mixture of fine particles in the form of prepared clay powder and highly refractory aggregate coarse particles by means of an elastic pressing membrane such that aggregate coarse particles stand proud of fine particles after the product has been fired to produce a non-slip exposed surface on the final product.

Also in A10 not only the use of a raw mixture containing cement is missing, but also the pressing of a flowable mass against the surface of such a mix, initially acting to compact the mix until the aggregate course particles are in a close packed arrangement and further by applying continued pressure deforming the flowable mass so that it flows around the uppermost aggregate coarse particles and uppermost fine particles
are driven into the areas between the aggregate coarse particles.

Therefore, since A10 does not mention any of the above mentioned features, A10 also cannot give an indication to the person skilled in the art to incorporate said features into the state of the art method corresponding to figures 1 and 2 of the patent in suit.

4.4.5 The appellant argued that each one of the documents A9, A10, A18 or A19 teaches the skilled person the use of a pressing shoe having an elastic material. By pressing a cementitious mix using thereby such a pressing shoe the elastic material first compacts the mix until the aggregate course particles are in a close packed arrangement. Then, by applying further continued pressure the elastic material automatically deforms and flows around the uppermost aggregate coarse particles driving thereby uppermost fine particles into the areas between the aggregate coarse particles. Therefore, the skilled person seeking to improve the state of the art method corresponding to figures 1 and 2 of the patent in suit so that the exposed surface of the cementitious mix has visible aggregate particles without the need of secondary treatment, would modify said method according to the teaching of one of the documents A9, A10, A18 or A19, namely by using a pressing shoe made of an elastic material. The skilled person thus arrives at the method according to claim 1 of the patent in suit without exercising any inventive activity, since the application of a pressure via an elastic material causes automatically the compacting of the mix and the displacement of the uppermost fine particles into the areas between the aggregate coarse particles.
The Board cannot follow these arguments for the following reasons:

None of the documents A9, A10, A18 or A19 discloses any information about the pressure regime under which the elastic material of the pressure shoe applies pressure to a cementitious mix or about how the elastic material deforms by applying a continued pressure to said cementitious mix.

Therefore, there is no basis to be found in the above mentioned documents for the appellant's unsubstantiated allegation that each of the used elastic masses first compacts the mix until the aggregate course particles are in a close packed arrangement and that further by applying continued pressure it flows around the uppermost aggregate coarse particles and uppermost fine particles are driven into the areas between the aggregate coarse particles.

4.5 For the above-mentioned reasons, the subject-matter of claim 1 of the present application involves an inventive step within the meaning of Article 56 EPC.

5. **Claims 2 to 4 - Novelty and inventive step**

Dependent claims 2 to 4 define further preferred embodiments of the method of claim 1.

Therefore, the subject-matter of claims 2 to 14 is also novel and inventive.
6. **Claims 5 to 11 - Novelty and inventive step**

The appellant did not questioned the novelty and inventive step of the subject-matter of claims 5 to 11 and the Board sees no reason to do it by its own motion.

**Order**

**For these reasons it is decided that:**

1. The decision under appeal is set aside.

2. The case is remitted to the first instance with the order to maintain the patent based on the following documents:

   - claims: 1 to 11,
   - description: pages 2 to 6,
   - drawings: figures 1 to 10,

   all submitted in the oral proceedings on 14 December 2005.

The Registrar: G. Nachtigall

The Chairman: C. Holtz