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**Datasheet for the decision  
of 17 October 2023**

**Case Number:** T 2759/19 - 3.2.03

**Application Number:** 04425886.1

**Publication Number:** 1538277

**IPC:** E04G9/05, E04G17/02

**Language of the proceedings:** EN

**Title of invention:**

Re-usable modular formwork with improved ribs

**Patent Proprietor:**

GEOPLAST S.p.A.

**Opponent:**

PERI SE

**Headword:**

**Relevant legal provisions:**

EPC Art. 83, 84, 56, 123(2)

**Keyword:**

Sufficiency of disclosure - undue burden (no) - main request  
(yes)

Claims - clarity - auxiliary request (yes) - clarity in  
opposition appeal proceedings

Inventive step - ex post facto analysis - could-would approach  
- non-obvious combination of known features - auxiliary  
request (yes)

Amendments - intermediate generalisation - allowable (no)

**Decisions cited:**

G 0003/14

**Catchword:**



**Beschwerdekammern**

**Boards of Appeal**

**Chambres de recours**

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Case Number: T 2759/19 - 3.2.03

**D E C I S I O N**  
**of Technical Board of Appeal 3.2.03**  
**of 17 October 2023**

**Appellant:** GEOPLAST S.p.A.  
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**Decision under appeal:** **Interlocutory decision of the Opposition  
Division of the European Patent Office posted on  
19 July 2019 concerning maintenance of the  
European Patent No. 1538277 in amended form.**

**Composition of the Board:**

**Chairman** C. Herberhold  
**Members:** R. Baltanás y Jorge  
C. Schmidt  
M. Olapinski  
R. Winkelhofer

## Summary of Facts and Submissions

- I. European patent No. 1 538 277 B1 relates to a "*re-usable modular formwork with improved ribs*".
- II. An opposition was filed against the patent based on Articles 100(b) EPC and 100(a) EPC in conjunction with Articles 54 EPC and 56 EPC.
- III. The appeals are against the interlocutory decision of the opposition division which found that auxiliary request 6 filed during oral proceedings fulfilled the requirements of the EPC. The opposition division found, *inter alia*, that the subject-matter of claim 1 of the amended main request and auxiliary requests 1 to 5 extended beyond the content of the application as originally filed (Article 123(2) EPC).
- IV. This decision was appealed by the opponent and the patent proprietor. Since both parties are appellants and respondents, they are referred to as the opponent and patent proprietor for the sake of simplicity.
- V. In a communication pursuant to Article 15(1) of the Rules of Procedure of the Boards of Appeal (RPBA 2020), the Board indicated its preliminary opinion on the case.
- VI. Oral proceedings were held on 17 October 2023.
- VII. Requests

The patent proprietor requests that the decision under appeal be set aside and that the patent be maintained on the basis of the amended main request filed with the

submission dated 28 January 2019, alternatively, one of auxiliary requests 1 to 5 filed with the same submission, one of auxiliary requests 6 to 8 filed during the oral proceedings before the opposition division or one of auxiliary requests 9 to 17 filed with the submission dated 30 April 2021.

The opponent requests that the decision under appeal be set aside and that the patent be revoked.

VIII. Claim 1 of the main request, including feature numbering based on that adopted by the parties, reads as follows (amendments compared to originally filed claim 1 are marked in bold; amendments compared to granted claim 1 are underlined):

- 1.1 *Modular formwork in plastic material,*
- 1.2 *comprising a panel (P)*
- 1.3 ***with a first and second side having, on the first side (P2) opposite to the second side (P1) in contact with the concrete, some edge ribs (Nb)***
- 1.4 *and main transversal ribs (Nt1),*
- 1.5 ~~*characterized in that*~~ ***said edge (Nb) or main transversal ribs (Nb) are being*** *made of two walls (Nb-a, Nt1-a)*
- 1.6 *parallel one to the other*
- 1.7 *and perpendicular to the panel (P)*
- 1.8 *between which of said two walls (Nb-a, Nt1-a) there is a plurality of plates (Nb-b, Nt1-b) connecting said two parallel walls (Nb-a, Nt1-a),*
- 1.9 ~~*characterised in that it]*~~ ***wherein said modular formwork comprises some aligned holes (Nf) on the two walls (Nb-a, Nt1-a) of the edge ribs (Nb),***

- 1.10 *and wherein said holes (Nf) are disposed along the edge ribs (Nb) in a way that, when coupling or aligning various modular elements, said holes (Nf) on the walls (Nb-a, Nt1-a) of two coupled edge ribs (Nb) of the various coupled or aligned modular elements are aligned one with the other, for the insertion of fastening means (C) that over pass said holes (Nf) on the two walls (Nb-a, Nt1-a) of two coupled edge ribs (Nb),*
- 9.1 *characterized in that: said modular formwork is closed with another similar formwork by the fastening means in form of a closing key,*
- 9.2 *wherein said closing key (C) is made of a cylindrical body (C1)*
- 9.3 *with, at one end, an handgrip (C2)*
- 9.4 *and at the opposite end two or more radial relieves (C3),*
- 1.11 *and wherein the two parallel walls connected by plates are substantially equivalent, as for the stiffness provided to the panel, to a full rib of equal width, but they require less plastic material and are lighter.*

IX. Claim 1 of auxiliary request 1 has been amended compared to claim 1 of the main request by the addition of the feature "*wherein said radial relieves are inclined*" at the end of feature 9.4.

X. Claim 1 of auxiliary request 2 comprises the same amendment as claim 1 of auxiliary request 1. Furthermore, the feature "*so as to produce a compression between the edge ribs (Nb) of the coupled modular formworks when said closing key (C) is rotated*" has been added to the additional feature mentioned above.

XI. Claim 1 of auxiliary request 3 has been amended compared to claim 1 of the main request by the addition of the feature "*and wherein said cylindrical body (C1) has diameter equal to the diameter of the holes (Nf) of the edge ribs (Nb) of the modular formwork, and length larger than the thickness of two edge ribs (Nb)*" at the end of feature 9.4.

XII. Claim 1 of auxiliary request 4 is a combination of claim 1 of auxiliary requests 1 and 3.

XIII. Claim 1 of auxiliary request 5 is a combination of claim 1 of auxiliary requests 1 to 3 (i.e. 2 and 3).

XIV. Claim 1 of auxiliary request 6 (maintained version) is based on claim 1 of the main request in which features 9.2 to 9.4 have been replaced by the following features:

**9.2a** *wherein said closing key (C) is made of a cylindrical body (C1)*

**9.3a** *and has, at one end, a handgrip (C2) perpendicular to said body (C1)*

**9.4** *and at the opposite end two or more radial relieves (C3),*

**9.5** *and wherein said cylindrical body (C1) has diameter equal to the diameter of the holes (Nf) of the edge ribs (Nb) of the modular formwork, and length larger than the thickness of two edge ribs (Nb),*

**9.6** *and wherein said radial relieves (C3) have preferably the shape of an annular segment in order to pass through the grooves (Nf1) of the holes (Nf) of the edge ribs (Nb) of the modular formwork,*

XV. Granted claim 9, including feature numbering based on that adopted by the parties, reads as follows:

- 9.0 *Modular formwork in plastic material, according to any of the previous claims,*
- 9.1a *characterized in that it is closed with another similar formwork by the fastening means in form of a closing key,*
- 9.2b *wherein said closing key (C) for modular formworks is made of a cylindrical body (C1)*
- 9.3a *and has, at one end, a handgrip (C2) perpendicular to said body (C1)*
- 9.4 *and at the opposite end two or more radial relieves (C3),*
- 9.5 *and wherein said cylindrical body (C1) has diameter equal to the diameter of the holes (Nf) of the edge ribs (Nb) of the modular formwork, and length larger than the thickness of two edge ribs (Nb),*
- 9.6 *and wherein said radial relieves (C3) have preferably the shape of an annular segment in order to pass through the grooves (Nf1) of the holes (Nf) of the edge ribs (Nb) of the modular formwork.*

XVI. Originally filed claim 9 reads as follows:

- 9.0a *Closing key (C) for modular formworks,*
- 9.2c *characterized in that it is made of a cylindrical body (C1)*
- 9.3b *with, at one end, an [sic] handgrip (C2) perpendicular to said body (C1)*
- 9.4 *and at the opposite end two or more radial relieves (C3),*



- 9.5** *and wherein said cylindrical body (C1) has diameter equal to the diameter of the holes (Nf) of the edge ribs (Nb) of the modular formwork, and length larger than the thickness of two edge ribs (Nb),*
- 9.6** *and wherein said radial relieves (C3) have preferably the shape of an annular segment in order to pass through the grooves (Nf1) of the holes (Nf) of the edge ribs (Nb) of the modular formwork.*

XVII. Prior art

Alleged prior uses D1a and D1b were presented during the opposition proceedings and were also referred to by the parties in their appeal submissions.

The following documents were filed during the opposition period and were cited both in the opponent's grounds of appeal and during the opposition proceedings:

- D1: WO 2004/060623 A2 [patent application allegedly relating to the product of prior uses D1a and D1b; published after the priority of the patent]
- D2: KR 20030059721 A
- D3: JP 06087562 U
- D8: CN 2167149Y
- D9: EP 0831 186 A1
- D10: FR 2.147.654 A

The following documents were filed after the opposition period and were cited both in the opponent's grounds of appeal and during the opposition proceedings:

- D1b: "ARCH-CRETE, Innovations in Textured Concrete Forming Systems", Architectural Concrete Creations
- A2: "Geoplast Patent Comparison", Polytech GmbH, 12 February 2018
- A3g: Pictures related to D1a
- A3h: Affidavit of Mr Yi-Ting Huang, 12 January 2019

The opponent filed the following documents for the first time with the grounds of appeal:

- A2a: "Object : Geopanel VS Patent EP 1 538 277 B1", Polytech S.r.l., 12.11.2019
- A3i: Picture related to A3h
- A3j: Pictures related to D1b
- A3k: Video provided by the proprietor in support of an inventive-step argument

Further document:

Annex ABC: drawings by Mr Hatem Hannawa during the witness testimony before the opposition division.

XVIII. The opponent's arguments can be summarised as follows.

(a) Main request, sufficiency of disclosure

Feature 1.11 ("wherein the two parallel walls connected by plates are substantially equivalent, as for the stiffness provided to the panel, to a full rib of equal width, but they require less plastic material and are lighter") could not be interpreted by referring to the envisaged use of the formwork given the different constraints to which the formwork could be subject. The

very same formwork was used for a small construction element implying low loads or for larger construction elements subject to heavier loads, always within the limits of the permissible load, which were usually indicated on a panel. Consequently, the point of reference for interpreting feature 1.11 could not be the load to which it was subject in use since this was variable and would not allow clearly ascertaining the scope of protection.

Thus, the skilled person would not understand feature 1.11 as a functional feature but as requiring a numerical comparison between the stiffnesses achieved by the rib comprising two parallel walls vs a full rib of the same width. This was the only way to provide an objective interpretation of the feature, which merely defined a result to be achieved.

The originally filed application did not disclose how to achieve this claimed result. Documents A2 and A2a showed that an edge rib comprising two parallel walls and plates according to claim 1 simply could not provide the same stiffness as a full rib of equal width and comprising more plastic material. The skilled person would thus face the undue burden of having to carry out a complete research programme to find out how to implement feature 1.11 - if this was possible at all. This was not in accordance with the requirements of sufficiency of disclosure.

(b) Main request, added subject-matter

Features 9.5 ("wherein said cylindrical body has diameter equal to the diameter of the holes of the edge ribs of the modular formwork, and length larger than the thickness of two edge ribs") and 9.6 ("wherein said

radial relieves have preferably the shape of an annular segment in order to pass through the grooves of the holes of the edge ribs of the modular formwork") of originally filed claim 9 had been omitted when combining the subject-matter of this claim with claim 1. This resulted in an unallowable intermediate generalisation.

The other features of amended claim 1, in particular feature 9.1 ("said modular formwork is closed with another similar formwork by the fastening means in form of a closing key"), could not imply that the diameters of the cylindrical body and the holes were the same since it was technically possible that the diameter of the cylindrical body was substantially smaller while still ensuring a closure of the formworks. The diameters being the same size was related to a different effect, namely the guidance of the closing key upon insertion, which was thus made easier.

Moreover, according to the patent proprietor in the parallel infringement proceedings, the term "cylindrical body" had to be understood in a strictly mathematical manner, and thus the cross-section of the cylinder did not have to be circular. However, the cylindrical body of circular cross-section was the only disclosure of a "cylindrical body" in the patent application. Thus, given the interpretation of the patent proprietor in the parallel infringement proceedings, the subject-matter was unallowably extended.

(c) Auxiliary request 6, clarity

The skilled person would understand from the "**the** grooves of the holes" feature in granted claim 9 that

this claim depended on claim 7, which first introduced the feature "grooves". Since claim 9 had been combined with claim 1 omitting the features of granted claim 7, the amendment resulted in a lack of clarity since the skilled person could no longer, upon reading the claims, correct this lack of clarity by referring to the wording of claim 7 as they could in the granted claims. Consequently, the considerations of G 3/14 did not apply in this case since the lack of clarity was caused by the amendment.

(d) Auxiliary request 6, added subject-matter

Amended claim 1 omitted the restriction that the grooves were "diametrically opposite" as defined in granted claim 7. The reference to "the" grooves in granted claim 9 made reference to the preceding definition of the grooves in claim 7 (see also the clarity objection above). The omission of this feature - which the skilled person reading granted claim 9 would have regarded as necessary because of the only previous mention of "the" grooves in claim 7 - resulted in subject-matter which extended beyond the teaching of the application as originally filed.

(e) Auxiliary request 6, inventive step

The distinguishing features of amended claim 1 compared to prior use D1a taken as the closest prior art were those related to the closing key (9.1, 9.2a, 9.3a, 9.4, 9.5 and 9.6).

The objective technical problem was the simplification of the connection between formworks.

The skilled person would find a solution for solving the posed problem in D10, D8 or D9, which each disclosed a closing key comprising all distinguishing features for simplifying the connection between formworks. The fact that according to the teaching of D1a additional spacer elements had to be arranged on the closing keys in between the formworks to be connected did not pose a problem.

The alleged weakening of the spacers would not have discouraged the skilled person from combining prior use D1a with the teaching of D10.

Firstly, this weakening - which was marginal, if present at all - was not so important that it would outweigh the clear advantages provided by the closing key of D10 in terms of the simplification of the connection. Furthermore, A3i disclosed that other points of "weakening" were present in the spacers in order to allow their removal after pouring and hardening of the concrete. Secondly, the contested patent left open the precise construction of the relieves and their size, and the skilled person knew how to provide relieves of the right dimensions to avoid the alleged weakening.

Thirdly, even if the proprietor's argument was accepted that the grooves had to be arranged vertically for safety reasons, while Figure 4 of D10 suggested their horizontal arrangement, adapting the orientation of the grooves was a modification well within the capabilities of the skilled person.

A similar line of attack could be developed starting from prior use D1b, which had not been admitted in the opposition proceedings by the opposition division. The

formworks of prior use D1b were basically the same as those of prior use D1a.

Alternatively, the skilled person would start from document D2, which disclosed a formwork comprising an edge rib with two parallel walls connected by plates (122) and aligned wedge holes (20a) on the two walls of the edge ribs. The skilled person would apply the same logic as when starting from prior use D1a and would combine the closing key of D10, D9 or D8 with this formwork, thus arriving at the subject-matter of claim 1.

Document D3 was also a valid starting point for the skilled person which would lead them in an obvious way towards the invention when combining it with the teaching of D10, D8 or D9. As the patent proprietor marketed products in which the turning keys were rotated 30° to achieve a connection between formworks, the skilled person would not see it as a problem that the turning keys disclosed in documents D8 to D10 - if implemented in D3 - could not be rotated further.

Finally, the skilled person would start also from document D8, which disclosed full edge ribs. The objective technical problem in this case would be to provide a lighter formwork. The skilled person would realise that the ribs of prior use D1a were lighter than the massive ribs of D8 and would select this feature to be combined with the formwork of D8.

XIX. The patent proprietor's arguments can be summarised as follows.

(a) Main request, sufficiency of disclosure

The reasoning of the opponent was based on the assumption of the existence of a single "ideal full rib", but this was not correct. There were different suitable full ribs depending on the intended application of the formwork, and it was in comparison with such a specific suitable full rib that the stiffness in feature 1.11 had to be interpreted. Thus, the formworks to be considered for interpreting feature 1.11 were different, depending on the application considered in each case.

Figure 1 and the description of the originally filed application disclosed an example of making a formwork lighter by implementing feature 1.11. According to the example provided, an edge rib comprising two parallel walls connected by plates could provide a "substantially equivalent" stiffness to that provided by a full edge rib. The wording "substantially equivalent" did not mean identical but sufficient to withstand the loads arising from the intended use of the formwork. The opponent's interpretation was purely linguistic and driven by a mind willing to misunderstand what was claimed. The skilled person was aware of the different applications of a formwork and the related loads it was required to withstand according to its specification. They also knew how to provide a lighter construction edge rib following the teaching in the application.

(b) Main request, added subject-matter

Feature 1.10 ("wherein said holes are disposed along the edge ribs in a way that, when coupling or aligning various modular elements, said holes on the walls of



two coupled edge ribs of the various coupled or aligned modular elements are aligned one with the other, for the insertion of fastening means that over pass said holes on the two walls of two coupled edge ribs") already implied the omitted "length larger than the thickness of two edge ribs" feature.

The features of amended claim 1, and in particular feature 9.1 ("said modular formwork is closed with another similar formwork by the fastening means in form of a closing key"), further implied the omitted features "cylindrical body has diameter equal to the diameter of the holes of the edge ribs" and "relieves pass through the grooves of the holes of the edge ribs". This was because only if the diameters of the cylindrical body and the holes were equal could a stable and working closure of the formworks be ensured. As the cylindrical body had to have a diameter equal to the diameter of the holes, grooves had to be provided for the relieves, even if foldable as argued by the Board in its preliminary opinion. This was originally disclosed also in paragraph [0021] of the A2 publication, which disclosed that the holes were suitable for the insertion and closure of the closing keys.

The arguments brought forward in infringement proceedings had nothing to do with the interpretation of the "cylindrical body" feature in appeal proceedings. This feature was originally disclosed in a literal manner in claim 9 and paragraph [0044] of the A2 publication, and this disclosure encompassed all possible interpretations.

(c) Auxiliary request 6, clarity

Claim 1 was amended by combining granted claims 1 and 9. The allegedly unclear features belonged to granted claim 9, which was directly dependent on claim 1. Consequently, the examination of the clarity of this subject-matter was precluded in accordance with G 3/14.

(d) Auxiliary request 6, added subject-matter

Amended claim 1 had a basis in originally filed claims 1 and 9, where no "diametrically opposite" grooves were defined.

(e) Auxiliary request 6, inventive step

The distinguishing features over prior use D1a and the posed objective technical problem formulated by the opponent were correct.

The circular holes in the spacers for receiving the bolts were the minimum size possible for this purpose in order not to weaken the spacers more than strictly necessary. The fact that the skilled person **could** enlarge the holes to provide the necessary grooves compatible with the closing key of D10 was not the question to be posed. The pertinent question was whether the skilled person **would** actually do so while knowing that weakening would occur. This was clearly not the case as the enlargement would need to be exactly in the direction which would weaken the spacers the most given the forces to be expected when pouring the concrete.

The same logic applied to the proposed line of attack starting from prior use D1b.

The lines of attack starting from D2, D3 or D8 could likewise not succeed for the following reasons.

- D2 did not disclose aligned holes on the two walls forming the edge ribs (feature 1.9). Furthermore, the adoption of the bulky keys of D10, D8 or D9 would require increasing the size of the holes (20a) such that the regions (122) would be weakened.
- The construction of the ribs in D3 implied that the turning keys could not rotate further than  $30^\circ$  if implemented in this formwork. This was not compatible with the implementation of turning keys, which required in all cases a rotation angle larger than  $45^\circ$ .
- The arguments for the line of attack starting from D8 were based on an inadmissible ex-post facto analysis. D8 disclosed fewer transversal ribs than the formwork of prior use D1a. The formwork of D8 was thus lighter than that of prior use D1a, and the skilled person would have had no reason to try reducing the weight by adopting the geometry of the ribs in a heavier arrangement. Furthermore, the skilled person would adopt the whole solution disclosed in prior use D1a and not only some isolated features.

## **Reasons for the Decision**

1. Main request
- 1.1 Sufficiency of disclosure - Article 83 EPC
- 1.1.1 Interpretation of feature 1.11 and claim 1

Feature 1.11 - which is part of granted claim 1 - reads: "wherein the two parallel walls connected by plates are substantially equivalent, as for the stiffness provided to the panel, to a full rib of equal width, but they require less plastic material and are lighter".

The Board agrees with the opponent that feature 1.11 defines a result to be achieved. Moreover, the unspecific weakening of the requirement by the terms "substantially" and "equivalent" may cast doubt on the clarity of the feature.

However, feature 1.11 was part of granted claim 1 and it must be lived with (see G3/14, headnote and Reasons 55) since clarity is not a ground for opposition. What must be established to assess whether the invention is sufficiently disclosed is how to interpret this feature.

The skilled person reading claim 1 understands that the formwork is to be used at a construction site for its normal purpose (i.e. containing poured concrete for a period of time). As submitted by the parties, formwork panels usually have technical specifications printed on them which inform the user about the loads for which they can be used. The skilled person understands that feature 1.11 makes reference to the stiffness required

for the load when using a respective formwork comprising full edge ribs according to this indication. Thus, the skilled person would not interpret feature 1.11 as requiring that the stiffness provided by the edge rib comprising two parallel walls connected by plates be enough to withstand any possible load but to withstand the usual load at work of a particular formwork, according to its specification.

Moreover, the expression "substantially equivalent" does not require that the stiffness provided to the panel by the "two parallel walls connected by plates" be **the same** as provided by a full rib of equal width in a mathematical or numerical sense but that the "two parallel walls connected by plates" provide the panel with a stiffness comparable to that of a panel with a conventional full rib having a particular specification (i.e. with the loads required in this context). That is, the parallel walls with plates must provide an **"equivalent"** stiffness such that they make the panel of the formwork sufficiently stiff for purpose.

#### 1.1.2 Implementation of feature 1.11

In view of the above understanding, the skilled person was in a position to carry out feature 1.11.

They were able to achieve a **"substantially equivalent"** stiffness **of the panel** compared to the same panel with a given full rib of specific dimensions intended for a particular load. The figures show how such an arrangement can look in principle. Furthermore, modifications, of e.g. the number of connecting plates or the distance between the parallel walls, are well within the capabilities of the skilled person. In fact, the skilled person knows from their general technical

knowledge examples of formworks made from plastic materials in which ribs with parallel walls and reinforcing elements in between are used to withstand a particular load. Such structures achieve sufficient structural strength for performing the intended function of the formwork and require less plastic material. Hence, in the Board's view, it does not represent an undue burden for the skilled person to define a formwork falling within the terms of claim 1.

Whether the strength provided to the formwork is - or can be - **exactly** the same as that provided by a solid rib of equal width, or up to which value the required "**substantially** equivalent" stiffness can be considered fulfilled, is a question of clarity, not sufficiency of disclosure (see point 1.1.1).

Moreover, sufficiency of disclosure of feature 1.11 cannot be contested by tests showing that, for a **particular** geometry, two parallel walls connected by plates do not provide an **equal** stiffness to a particular "full rib", in particular when the tests focus on the stiffness of the rib instead of that of the panel. Feature 1.11 does not require that **all** formworks comprising two parallel walls connected by plates as defined in features 1.5 to 1.8 fulfil the conditions defined in feature 1.11. Hence, arrangements **not** fulfilling the definition of feature 1.11 would simply not fall within the scope of claim 1.

Furthermore, even if the opponent's argument that the stiffness provided to the panel by any rib comprising voids (i.e. not a "full" rib) would necessarily be lower than that provided by a full rib is accepted, this only supports the understanding set out above that

the terms "substantially" and "equivalent" cannot be construed as requiring identical stiffness.

The invention is thus sufficiently disclosed (Article 83 EPC).

### 1.1.3 Admittance and consideration of A2 and A2a

Documents A2 and A2a were filed by the opponent in support of its argument on the impossibility for an edge rib comprising two parallel walls and connecting plates to provide the **same** (in a strictly numerical sense) stiffness to the panel as a full rib of equal width.

Since the interpretation of feature 1.11 as requiring the same stiffness for both edge ribs cannot be accepted, as outlined above, the content of A2 and A2a is not relevant for the outcome of the case.

Consequently, the admittance and consideration of A2 and A2a does not need to be discussed.

## 1.2 Added subject-matter - Article 123(2) EPC

### 1.2.1 Feature "cylindrical body", alleged omission of "circular cross-section"

The opponent argued that in view of the interpretation of the "cylindrical body" feature as a mathematical cylinder having whatever cross-sectional shape allegedly having been made by the patent proprietor in parallel infringement proceedings, the omission of the fact that the cylindrical body had a circular cross-section in amended claim 1 extended the subject-matter beyond the content of the application as filed.

This is not persuasive.

The term "cylindrical body" is explicitly disclosed as such in originally filed claim 9 (features 9.0a and 9.2c) and also in paragraph [0044] of the A2 publication. This literal disclosure encompasses any possible interpretation of the wording "cylindrical body". Any possible interpretation that the patent proprietor may bring forward of this wording in other proceedings cannot change the fact that the feature was originally disclosed **as such**. Whether such an interpretation is justified may play a role for novelty but has no bearing on the question of original disclosure.

Thus, the "cylindrical body" feature does not extend the subject-matter of claim 1 beyond the content of the application as filed.

#### 1.2.2 Omitted features 9.5 and 9.6

Features 9.5 ("said cylindrical body has diameter equal to the diameter of the holes of the edge ribs of the modular formwork, and length larger than the thickness of two edge ribs") and 9.6 ("radial relieves have preferably the shape of an annular segment in order to pass through the grooves of the holes of the edge ribs of the modular formwork") were omitted when the subject-matter of granted claim 9 was partially combined with granted claim 1. Granted claim 9 is based on originally filed claim 9, which defines a closing key comprising all the features of the closing key defined in granted claim 9.



The Board does not agree with the argument of the patent proprietor on the alleged implicit disclosure of the whole of features 9.5 and 9.6 in features 9.1, 9.2 and 1.10 and that a robust connection implied that the diameters of the cylindrical body and the holes in the edge rib were the same.

Feature 9.1 defines that the modular formwork can be closed with another similar formwork by the fastening means in the form of a closing key.

Feature 9.2 defines that the closing key is made of a cylindrical body.

Feature 1.10 defines that the fastening means (i.e. the closing key) are inserted into the aligned holes in the edge ribs of the two modular formworks and that the fastening means pass over the holes on the two walls of the two coupled edge ribs.

These features taken together define a closure between formworks achieved by a closing key made of a cylindrical body. They also imply that the cylindrical body has a length larger than the thickness of two edge ribs (part of feature 9.5).

However, even if it can be considered that a robust connection is an implicit feature of formworks intended to be connected to hold initially liquid concrete, it has not been shown that a robust connection can **only** be achieved when the cylindrical body of the closing key has a diameter equal to the diameter of the holes in the edge ribs. The wording "for the insertion of fastening means" in feature 1.10 merely means that the fastening means can be inserted through the holes on the walls of the edge ribs. From a technical point of

view, the formworks can also be solidly connected when the cylindrical body has a diameter considerably smaller than that of the holes since the compression carried out by the closed fastening means is not conditional on having equal diameters. Moreover, claim 1 does not exclude the presence of other elements on the formworks which could cooperate with each other to avoid relative movements between the formworks once they are closed by the closing keys.

The omission of the diameters of the cylindrical body and the holes being equal is linked to a different effect - the improved guidance of the cylindrical body when being inserted through the aligned holes in the edge ribs of the formworks. No reference to a guiding function of the cylindrical body, which could theoretically speak in favour of an implicit disclosure of the omitted features, is made in claim 1.

Furthermore, feature 1.10 **does not imply any shape** of the holes on the edge rib since it does not define any interaction between the holes and the radial relieves (which could even be foldable and completely retractable or which could cooperate with further fixing means after having passed through a hole without grooves which is big enough for it), apart from the fact that the fastening means must be suitable to be inserted through the holes.

Paragraph [0021] of the A2 publication discloses - in the general description of the invention - that "[o]n the edge ribs there are holes for the insertion and the closure of the closing keys". However, the only closing key comprising features 9.1 to 9.4 ("the modular formwork is closed with another similar formwork by the fastening means in form of a closing key, the closing

key being made of a cylindrical body with, at one end, a handgrip and at the opposite end two or more radial relieves") is disclosed in the embodiment and originally filed claim 9.

The only feature disclosed as optional in originally filed claim 9 is the "shape of an annular segment" for the radial relieves. The features "cylindrical body has diameter equal to the diameter of the holes of the edge ribs" (feature 9.5) and "grooves of the holes of the edge ribs" (feature 9.6) are not presented as optional and are **inextricably linked with the technical function** of the closing key. The relieves ensuring the closure of the formworks pass through the grooves. The fact that these omitted features - are disclosed in paragraph [0045] instead of paragraph [0044] of the A2 publication - where features 9.1 to 9.4 are disclosed - cannot be a basis for isolating features 9.1 to 9.4 from their functional context. The skilled person understands from both paragraphs and the figures that a single embodiment of a closing key is disclosed, and they would not consider any technically related feature defined in features 9.5 and 9.6 optional.

Thus, omitting the features "cylindrical body has diameter equal to the diameter of the holes of the edge ribs" (feature 9.5) and "grooves of the holes of the edge ribs" (feature 9.6) in amended claim 1 presents the skilled person with technical information which could not be derived from the application as filed.

Consequently, the subject-matter of claim 1 of the main request extends beyond the content of the application as filed (Article 123(2) EPC).

2. Auxiliary requests 1 to 5 - Article 123(2) EPC

In view of the amendments to claim 1 of the auxiliary requests 1 to 5 (see points IX. to XIII. above) and the reasoning in point 1.2.2 above, none of auxiliary requests 1 to 5 can overcome the objection of added subject-matter discussed above for claim 1 of the main request.

Claim 1 of auxiliary requests 3, 4 and 5 omits the feature "grooves of the holes of the edge ribs" (feature 9.6), and claim 1 of auxiliary requests 1 and 2 also omits the feature "said cylindrical body has diameter equal to the diameter of the holes of the edge ribs" (feature 9.5).

This was not contested by the patent proprietor.

Therefore, the subject-matter of claim 1 of each of the auxiliary requests 1 to 5 likewise extends beyond the content of the application as filed (Article 123(2) EPC).

3. Auxiliary request 6

3.1 Sufficiency of disclosure - Article 83 EPC

Since the only objection of sufficiency of disclosure is against feature 1.11, the same reasons as in point 1.1 above apply.

3.2 Clarity - Article 84 EPC

Amended claim 1 of auxiliary request 6 consists of the **combination of granted claims** 1 and 9.

The opponent argued that the skilled person understood from the feature "**the** grooves of the holes" in granted claim 9 that this claim depended on claim 7, which introduced the "grooves" feature. Since claim 9 had been combined with claim 1 without the features of granted claim 7, a lack of clarity arose from this amendment due to the fact that no preceding mention of "the grooves" was available anymore. Hence, the skilled person could no longer, upon reading the claims, correct this lack of clarity as they could in the granted claims. Consequently, the considerations of G 3/14 did not apply in this case since the lack of clarity arose from the amendment.

This is not persuasive.

Granted claim 9 is explicitly dependent on "any of the previous claims" and thus also directly on claim 1.

Hence, the lack of clarity due to a missing preceding mention of "the grooves" was present in this combination in the original claim set, which likewise did not include the additional features of granted claim 7.

Consequently, combining granted claims 1 and 9 cannot give rise to any new lack of clarity not present in the granted patent.

Since the claims of the patent may be examined for compliance with the requirements of Article 84 EPC only when, and then only to the extent that, the amendment introduces non-compliance with Article 84 EPC (G 3/14, headnote), it is not for the Board to examine the clarity of claim 1 on the grounds raised by the opponent.

3.3 Added subject-matter - Article 123(2) EPC

The opponent argued that claim 1 omitted the restriction that the grooves were "diametrically opposite" as defined in granted claim 7, this infringing the requirements of Article 123(2) EPC. This was because the reference to "the" grooves in granted claim 9 made reference to the preceding definition of the grooves in granted claim 7 and was thus only disclosed in combination with the features of granted claim 7.

This is not convincing.

Firstly, as explained in point 3.2 above, granted claim 9 is directly dependent on granted claim 1. Thus, granted claim 7 does not define a necessary limitation on the arrangement of the grooves of claim 9.

Secondly, Article 123(2) EPC prohibits an extension beyond the content of the application **as filed**.

Claim 1 of auxiliary request 6 is based on a combination of claims 1 and 9 as originally filed, i.e. on a combination of the formwork defined in claim 1 with the closing key defined in claim 9 of the originally filed application.

The closing key according to claim 9 as filed implies the presence of grooves in the holes of the edge ribs (feature 9.6), as set out in point 1.2.2 above, but it does not define in more detail how the grooves or the radial relieves (feature 9.4) are arranged. Thus, it is not limited to radial relieves and grooves arranged "diametrically opposite". It is also clear that

originally filed claim 9, as an **independent** claim, did not make reference to "the" grooves defined more specifically in originally filed claim 7.

Therefore, the omission of the restriction to "diametrically opposite" grooves in claim 1 of auxiliary request 6 does not infringe Article 123(2) EPC.

As to the alleged further extension of subject-matter by the "mathematical interpretation" of the term "cylindrical body", see point 1.2.1 above.

### 3.4 Inventive step - Article 56 EPC

#### 3.4.1 Prior use D1a as the closest prior art

##### (a) Uncontested findings of the opposition division

The opposition division acknowledged a prior use at the World of Concrete Fair, Las Vegas, in February 2003 ("prior use D1a"), based on - among others - document A3g and the hearing of Mr Hannawa as a witness.

Also in light of the witness hearing, the opposition division relied on A3g, and established which features were disclosed by prior use D1a.

The opposition division concluded that prior use D1a disclosed *"a modular formwork in plastic material, comprising a panel with a first and second side having, on the first side opposite to the second side in contact with the concrete, some edge ribs and main transversal ribs, said edge ribs being made of two walls parallel one to the other and perpendicular to*

*the panel between which of said two walls there is a plurality of plates connecting said two walls".*

The opposition division also concluded, based on the black items in the pictures of A3g and Annex ABC, Figure A, that the prior use disclosed fastening means that passed over holes in the edge ribs. These holes were aligned on the edge ribs for coupling various modular elements by aligning the holes and inserting the fastening means such that they passed over the holes.

This has not been contested by the patent proprietor in appeal. The patent proprietor actually explicitly accepted that the arrangement of formworks connected by spacers in Figure 12 of D1 (published after the priority date of the contested patent) reflected the disclosure of prior use D1a.

(b) Distinguishing features, technical effect and objective technical problem

It is common ground that features 9.1 to 9.6 (i.e. those related to the closing key) are not disclosed in prior use D1a. They read as follows: "said modular formwork is closed with another similar formwork by the fastening means in form of a closing key, wherein said closing key is made of a cylindrical body and has, at one end, a handgrip perpendicular to said body and at the opposite end two or more radial relieves, and wherein said cylindrical body has diameter equal to the diameter of the holes of the edge ribs of the modular formwork, and length larger than the thickness of two edge ribs, and wherein said radial relieves have preferably the shape of an annular segment in order to



pass through the grooves of the holes of the edge ribs of the modular formwork".

The technical effect of the distinguishing features is that the connection between formworks is carried out by a single element.

Consequently, the objective technical problem hinted at by the opponent - simplifying the connecting means of formworks - is correct. This was accepted by the patent proprietor.

(c) Admittance and consideration of A3i, A3j (pictures) and A3k (video)

A3i and A3j show spacers from a perspective perpendicular to that of A3g, thus enabling a more accurate observation. The information derived from this corresponds to the arrangement shown in Figure 12 of D1. The patent proprietor accepted that Figure 12 of D1 matches the use of spacers in prior use D1a. Consequently, it is not necessary to discuss the admittance and consideration of A3i and A3j in the appeal proceedings.

A3k is a video which does not show the formworks of the prior use. The video was instead filed by the opponent to clarify its arguments about the stability of closing keys in general when inserted into the holes of an edge rib. Three images of screenshots of A3k were inserted in pages 15 to 17 of the grounds of appeal for the same purpose. Consequently, as A3k and its screenshots are just an illustration of the arguments that the opponent brought forward and since these arguments have to be dealt with anyway, the question of the admittance and consideration of A3k can also be left open.

(d) Alleged obviousness of distinguishing features 9.1 to 9.6 in view of D10

The opponent argues that the skilled person would have found a solution for the posed technical problem in D10, which discloses the advantages of using a turn key for simplification of the connection between formworks (see D10, page 4, lines 24 to 35).

According to the opponent, using the turn keys disclosed in D10 with the formworks of prior use D1a did not pose any problem when assembling the formworks. Moreover, all holes involved - including those of the spacers used in D1a - could be adapted to the shape of the turn key of D10 without any drawback.

The Board is not convinced by this argument.

It is common ground that the formworks of prior use D1a are connected to each other by a system involving the use of spacers, i.e. elongated metallic plates extending from one formwork to the opposite one, to fix a distance between them and to withstand the pressure of poured concrete. These spacers comprise holes for receiving the bolts connecting adjacent formworks. It is not contested that the assembling of such a connecting system is - as argued by the patent proprietor - as follows.

- The bolts are inserted into the holes of the edge rib of a first formwork.
- Spacers are mounted onto the bolts.
- A second formwork is moved close so that the bolts protruding from the first formwork are inserted into the holes of the edge rib of the second

formwork and so that the spacers are located between the two adjacent formworks.

- The bolts are secured.

D10 discloses the use of a turn key only in a system not comprising spacers (see Figure 4 and 5). The skilled person would recognise this and realise that the use of any of the turn keys of D10 in prior use D1a would require an adaptation of the holes of the spacer and the formwork (i.e. an enlargement) to allow the passage of a turn key with the "broche transversale" (4). This would result in a weakening of the spacer due to the provision of grooves, according to the patent proprietor.

The opponent argued that the weakening created by providing the holes with grooves as in D10 would not be relevant for the skilled person for the following reasons. Firstly, the spacers used in prior use D1a already had weakening points along their length (see the indentations along the spacer in A3i or Figure 12 of D1), and the additional weakening by the grooves for the relieves would be marginal. Secondly, the contested patent left open the precise construction of the relieves and their size, and the skilled person knew how to provide relieves of the right dimensions to avoid the alleged weakening. Finally, Figure 4 of D10 suggested a horizontal arrangement of the grooves, which only led to a negligible weakening of the spacers, and the skilled person would anyway decide on the orientation of the grooves to be provided in the case of prior use D1a according to their needs.

This is not convincing.

According to the teaching of D1a, the tension to be supported by the spacers is directly supported by the contact region between the spacer and the bolt. In the case of D1a, this contact region is the minimum necessary circular opening in the spacer that allows the passage of the bolt. The circular design of the opening ensures a load distribution in which no weak points are created.

Following the teaching of D10 and providing any irregularity along the perimeter of the D1a openings (to allow the passing of the D10 turnkeys) translates into the appearance of weak points susceptible to deformation by the tension created under the load of the liquid concrete to be contained by the formworks. This is the case whatever the orientation of the grooves. If the grooves were oriented horizontally, the tension between the cylindrical body replacing the bolt and the spacer would be supported by a reduced section of the opening corresponding to the remaining material on the half of the opening oriented outwards. If the grooves were oriented vertically, they would tend to expand when tension rose between the cylindrical body and the outer half of the opening. Any intermediate orientation would also result in a non-uniform distribution of tensions in the spacer material.

Irregularities on the top and bottom sides of the spacers used in prior use D1a (see indentations on the top and bottom edges of the spacer in A3i and Figure 12 of D1) is irrelevant for this discussion since these regions are not subject to tension by direct contact with another element pushing against them (i.e. the bolt or turn key) - in contrast to the bolt openings.

The argument of the opponent about the contested patent having left open the precise construction of the relieves and their size is also not pertinent for the assessment of inventive step, which is about what the skilled person would or would not envisage doing in view of the prior art, not the patent. The Board is of the opinion that the modifications required to implement a turn key as disclosed in D10 would lead to a weakening of the spacers that is not negligible and would require further modifications. These modifications that the skilled person would have to provide to compensate for the weakening of the spacer go beyond what the skilled person would, in the Board's view, envisage in an obvious manner. No teaching on this can be seen in the prior art, and there is no evidence that this belonged to the common general knowledge of the skilled person.

In view of the above, the skilled person would not have combined prior use D1a with the teaching of D10 in an obvious manner.

(e) Alleged obviousness of distinguishing features 9.1 to 9.6 in view of D8 or D9

The opponent did not cite any passage of D8 or D9 in its submissions on the obviousness of using a turn key in combination with prior use D1a. No arguments based on the problem-solution approach were presented in connection with these documents. Thus, the mere assertions about the obviousness of the distinguishing features on the basis of D8 and D9 cannot be considered substantiated objections (Articles 12(2) and (4) RPBA 2007).

In any case, the arguments in preceding point (d) apply as well to the turn keys of D8 and D9 *mutatis mutandis*.

#### 3.4.2 Prior use D1b as the closest prior art

Since the disclosure of prior use D1b is comparable to that of prior use D1a for the use of spacers, the same arguments as in point 3.4.1(e) above against a combination of this prior art with D8, D9 or D10 apply.

#### 3.4.3 Prior use D2 as the closest prior art

D2 discloses "*enforcement [sic] supporting parts*" (122) connecting the walls of an edge rib (see Figure 5). The obvious role of such supporting parts (122) is to reinforce the edge rib. D2 also discloses a number of wedge holes (20a) extending through the supporting parts (122) of the edge ribs. The wedge holes receive flat wedge pins (200) used to connect the formworks.

The opponent argued that the wedge holes (20a) of D2 represented the aligned holes on the two walls of the edge ribs defined in feature 1.9 of claim 1 since the claim did not require any free space between the walls.

This is not persuasive in view of the interpretation of feature 1.9 by the skilled person.

Feature 1.9 requires a plurality of "aligned holes on the two walls of the edge rib".

The skilled person understands that the holes are defined as **aligned** because the walls are separated. If there were a continuous connection between the walls as in D2, the term "aligned" would not make technical sense, let alone when two separate walls and two

separate holes are not identifiable at the portion where the holes are provided, as in D2.

Thus, feature 1.9 is not disclosed in D2, and even in combination with D8, D9 or D10, as proposed by the opponent, this feature still established a difference over the subject-matter of amended claim 1.

#### 3.4.4 Prior use D3 as the closest prior art

The opponent argued that since the patent proprietor allegedly marketed products in which the turn keys were rotated by 30° only to achieve a connection between formworks, the skilled person would not see it as a problem that turn keys could not be rotated further if implemented in D3.

This is also not persuasive. What is relevant for the assessment of inventive step is what is disclosed in the documents showing the distinguishing features and not what other solutions are currently available on the market (or in the impugned patent). The skilled person understands from the solutions disclosed in the cited documents D8 to D10 - based on their technical knowledge - that the relieves on the body of the turn keys have to be arranged as far as possible from the grooves through which they enter to avoid an accidental release, thus requiring a 90° turn.

Consequently, a combination of the closing keys of any of D8, D9 or D10 with the formwork of D3 would not have been envisaged by the skilled person.

#### 3.4.5 D8 as the closest prior art

The opponent finally also argued that the skilled person would realise that the edge ribs of prior use D1a were lighter than the massive edge ribs of D8, and would, starting from D8, select this feature of prior use D1a to be combined with the formwork of D8.

This is not convincing, either.

Firstly, the opposition division and the patent proprietor are right in that the density of ribs in A3g (prior use D1a) is higher than that disclosed in Figure 1 of D8. This casts doubt on whether the skilled person would consider that the construction in prior use D1a is lighter than the one of D8.

Secondly, if the skilled person were to consider implementing the structure of double walls of the edge ribs of prior use D1a in the formwork of D8, they would do so by adopting the **whole** technical solution, i.e. including the connecting means disclosed in prior use D1a, which **interact with the double walls** of the edge ribs.

Consequently, the skilled person would not adopt in isolation, without hindsight, the features of prior use D1a which are necessary to arrive at the subject-matter of the invention.

#### 3.4.6 Final assessment

In view of the above, the subject-matter of amended claim 1 involves an inventive step.



4. Conclusions

In view of the considerations of the Board explained above, the decision under appeal is to be upheld.

**Order**

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

The appeals are dismissed.

The Registrar:

The Chair:



C. Spira

C. Herberhold

Decision electronically authenticated