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D E C I S I O N
of 23 June 1994

Case Number: T 1038/92 - 3.2.1

Application Number: 86201438.8

Publication Number: 0213674

IPC: F16L 9/06, F16L 9/16, F16L 11/11, F16L 55/16

Language of the proceedings: EN

Title of invention:
A plastic pipe comprising an outer corrugated pipe and a smooth inner wall, and a method of repairing or renovating a sewage pipe.

Patentee:
Wavin B. V.

Opponent:
Oltmanns Kunststoffwerk GmbH
Drossbach GmbH & Co KG

Headword:
-

Relevant legal norms:
EPC Art. 54, 56

Keyword:
"Novelty (yes)"
"Inventive step (no)"

Decisions cited:
-

Catchword:
-

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Case Number: T 1038/92 - 3.2.1

D E C I S I O N
of the Technical Board of Appeal 3.2.1
of 23 June 1994

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Decision under appeal: **Decision of the Opposition Division of the European Patent Office dated 17 September 1992, and issued in written form on 2 October 1992, rejecting the oppositions filed against European patent No. 0 213 674 pursuant to Article 102(2) EPC.**

Composition of the Board:

Chairman: F. A. Gumbel
Members: S. Crane
J.-C. Saisset

Summary of Facts and Submissions

I. European patent No. 0 213 674 was granted on 12 December 1990 on the basis of European patent application No. 86 201 438.6.

II. The patent was opposed by the first and second Appellants (Opponents 01 and 02) on the grounds that its subject-matter lacked novelty and/or inventive step with respect to the state of the art (Article 100(a) EPC). The following prior art documents, inter alia, were referred to in the opposition proceedings:

D1: DE-A-3 311 877
D3: FR-A-2 513 346
D4: GB-A-2 041 147
D5: US-A-4 261 671
D7: DE-B-2 413 878
D8: DE-A-2 637 995

III. By its decision taken at oral proceedings on 17 September 1992, and issued in written form on 2 October 1992, the Opposition Division rejected the oppositions.

IV. Appeals against this decision were filed by the first and second Appellants on 21 November 1992 and 4 December 1992 respectively, the corresponding appeal fees being paid on 23 November 1992 and 4 December 1992. Both Appellants requested that the contested decision be set aside and the patent revoked in its entirety.

The Statement of Grounds of Appeal of the first Appellants was received on 12 February 1993, reference being made therein to further prior art documents, including:

D13: Saechtling, Kunststoff Taschenbuch, 22. Ausgabe, Carl Hanser Verlag München Wien, 1983, page 293

D14: Winnacker - Küchler, Chemische Technologie, Band 6, Organische Technologie II, 4. Auflage, Carl Hanser Verlag, München Wien, 1982, pages 581, 582

D15: Elias/Vohwinkel, Neue polymere Werkstoffe für die industrielle Anwendung, 2. Folge, Carl Hanser Verlag München Wien, 1983, page 1117

D16: Polyurethane, Kunststoff Handbuch 7, herausgegeben von Dr Günter Oertel, Carl Hanser Verlag München Wien, 1983, pages 469 to 471.

In the Statement of Grounds of Appeal of the second Appellants, received on 27 January 1993, reference was also made to

D18: Römpps, Chemielexicon, 8. Auflage, 1979, page 1082.

V. With a letter received on 2 September 1993 the Respondents (Proprietors of the patent) submitted a new set of Claims 1 to 8, and a correspondingly amended passage of the description, on the basis of which maintenance of the patent in amended form was requested.

Claim 1 reads as follows:

"A plastic pipe (1) comprising an outer pipe (2) with rigid external corrugations (3) being at least covered on their inner side by sealing surfaces (4)

made of deformable material to form an essentially smooth inner wall, said sealing surfaces (4) being intimately attached to the wave valleys of the outer pipe (2), characterized in that the sealing surfaces (4) consist of a thermoplastic elastomer".

Dependent Claims 2 to 6 relate to preferred embodiments of the pipe according to Claim 1.

Independent Claim 7 has the following wording:

"Method of repairing or renovating a sewage pipe system by installing a plastic pipe in an existing sewage pipe, particularly from an essentially vertical access to a sewage pipe system, characterized in that a plastic pipe (1) comprising an outer pipe (2) with rigid external corrugations (3) being at least covered on their inner side by sealing surfaces (4) of a thermoplastic elastomer to form an essentially smooth inner wall said sealing surfaces (4) being intimately attached to the wave valleys of the outer pipe (2), is used".

Dependent Claim 8 relates to a preferred embodiment of the method according to Claim 7.

VI. Oral proceedings were held on 23 June 1994.

At the oral proceedings the Respondents supplementally to the main request specified in section V above submitted new sets of claims according to first and second auxiliary requests.

Claims 1 according to the first auxiliary request is worded as follows:

"A plastic pipe (1) comprising an outer pipe (2) with rigid external corrugations (3) being at least covered on their inner side by sealing surfaces (4) made of deformable material to form an essentially smooth inner wall, said sealing surfaces (4) being intimately attached to the wave valleys of the outer pipe (2), characterized in that the sealing surfaces (4) consist of a thermoplastic elastomer, and the pipe can be installed in an existing horizontal sewage pipe from an essentially vertical access".

Independent Claim 7 of the first auxiliary request corresponds to Claim 7 of the main request.

The claims according to the second auxiliary request comprise Claims 7 and 8 of the main request, renumbered as Claims 1 and 2.

VII. The arguments brought forward by the Appellants can be summarized as follows:

In the opinion of the second Appellants the subject-matter of Claim 1 according to the main request lacked novelty with respect to document D8. This document disclosed a plastics pipe comprising a corrugated outer pipe and smooth inner pipe arranged in the manner specified in the preamble of the claim. The characterising clause of the claim required that the inner pipe be of a thermoplastic elastomer. It was however proposed in document D8 to make the inner pipe of a polyolefin and as could be seen from document D18 it was well known that the general term "polyolefin" included within its ambit thermoplastic elastomers. It could thus be seen that the broad term "thermoplastic elastomer" as used in Claim 1 and the broad term

"polyolefin" as used in the state of the art overlapped. This was the type of situation dealt with in the decision T 124/87 (OJ EPO 1989, 491) where novelty was held not to be given.

As for inventive step both Appellants argued that it would be obvious, having regard to the known properties and uses of thermoplastic elastomers, as evidenced in particular by documents D13 to D16, to make the inner pipe of the well known composite pipe construction comprising corrugated outer pipe and smooth inner pipe of such a material, in order to provide an inner pipe with sufficient strength and abrasion resistance without impairing the overall flexibility of the composite pipe construction.

VIII. In reply the Respondents argued substantially as follows:

The basic problem with which the invention was concerned was to produce a plastics pipe which was suitable for use in an in situ method of repairing sewage pipelines wherein a long length of the plastics pipe was pulled into the sewage pipeline via a vertical access opening. The plastics pipe therefore had to have sufficient flexibility to enable it to be bent to a fairly small radius but at the same time be resistant to abrasion by the solids carried in the sewage flow.

The known composite plastics pipes comprising a corrugated outer pipe and smooth inner pipe did not meet these requirements since if the inner pipe were made thick enough to resist abrasion then the composite pipe lost overall flexibility and even if it could be bent sufficiently then the inner pipe would not recover its proper smooth shape thus encouraging accumulation of the solids.

The Appellants had surprisingly found that an inner pipe of thermoplastic elastomer gave the required properties without , as the skilled man would have expected, being subject under the weight of the sewage carried to sagging between the points of attachment to the outer pipe. The skilled man would have had a further technical prejudice against the use of a thermoplastic elastomer for the inner pipe since he would appreciate that it would be difficult to co-extrude this with the outer pipe.

None of the prior art documents suggested the use of a thermoplastic elastomer in a context similar to that claimed. In particular, the tubes disclosed in documents D13 to D16 were essentially small diameter reinforced hoses which had mechanical properties wholly different to those required for a pipe to be used in in situ sewage pipeline repair.

The finding in the contested decision that the skilled man would first have directed his attention to adjusting the thickness of the wall of the inner pipe and not have considered the choice of a different material for this pipe was correct. Furthermore, if he had made the further step of deciding to choose a different material there was for the above stated reasons nothing which could have led him to the choice of a thermoplastic elastomer.

Reasons for the Decision

1. The appeal complies with the requirements of Articles 106 to 108 and Rules 1(1) and 64 EPC; it is therefore admissible.

2. *State of the art*

2.1 Document D1 relates to a flexible hose comprising, in its simplest form, an inner layer of polyethylene, an intermediate layer of thermoplastic elastomer, and an outer layer of filamentary reinforcement material. The inner and intermediate layers are co-extruded with each other.

2.2 In document D3 there is disclosed a composite, double-walled plastics pipe comprising an outer pipe with rigid external corrugations and a smooth walled inner pipe which is attached to the outer pipe at the bottom of the corrugations. It is stated that the pipe has high flexibility and at the same time good resistance to crushing and that it can be produced with a large diameter suitable for use in drainage systems and the like. The inner and outer pipes can be of the same or different materials and these materials, and the thickness of the inner and outer pipes, are chosen so as to give the double-walled pipe the required mechanical properties.

2.3 Document D4 relates to the in situ renovation of sewage pipelines, in particular the connection of a lateral sewage pipe to a collector sewer into which there has been drawn a long length of flexible plastics lining pipe introduced through a manhole.

2.4 Document D5 relates to the laying of submarine pipelines and proposes replacing the conventional smooth walled steel pipe by a corrugated steel outer pipe having a smooth walled polyurethane liner.

2.5 In document D7 there is disclosed method and apparatus for producing double-walled plastics pipe by co-extrusion, air under pressure being introduced into

space between the helically formed corrugations of the outer pipe and the inner pipe so as to support the latter. This enables the use of thin walled inner pipes, down to a thickness of 0.05 mm, which have no appreciable effect on the overall flexibility of the double-walled pipe.

2.6 Document D8 relates in essence to the problems associated with adapting the method of document D7 to the situation where the corrugations in the outer pipe are purely circumferential and not helical. To this end passages are established between the inner spaces of the corrugations these passages being closed after the extruded double-walled pipe cools. It is stated that the inner and outer pipes may be of polyolefin, in particular polyethylene or polypropylene, or polyamide.

2.7 Documents D13 to D16 relate in general to the properties and uses of thermoplastic elastomeric polyurethanes. It is apparent from these documents that these materials were known to have a high modulus of elasticity, high elastic limit and good resistance to abrasion. Document D16 exemplifies the use of these materials as the inner layer of reinforced hoses, whereby the reinforcement may consist of woven fabric or helically extending reinforcement members, and indicates the suitability of such hoses for carrying abrasive products.

2.8 Document D18 is an extract form a reference work, the extract relating to the term "elastomers". Among the thermoplastic elastomers enumerated are "polyolefins" of unspecified type.

3. *Main request*

3.1 Novelty

The arguments presented by the second Appellants to the effect that the subject-matter of Claim 1 according to the main request lacked novelty with respect to document D8 centred on the fact that the claim merely requires the inner pipe to be of a "thermoplastic elastomer", which is a broad term defining the physical properties required of the plastics material involved but non-specific with respect to the chemical structure of the material, and which clearly embraces elastomeric polyolefins, whereas on the other hand document D8 gives a general teaching with respect to the chemical structure of the material of the inner pipe, which teaching also clearly embraces elastomeric polyolefins. That analysis is in itself correct. The Board cannot however accept the conclusion drawn from it that since there is an "area of overlap" between the two broad definitions contained in the claim and the state of the art, i.e. the aforesaid elastomeric polyolefins, then the claim necessarily lacks novelty.

In the opinion of the Board the proper approach to the question of novelty is to establish whether the disclosure of document D8 as a whole is such as to make available to the skilled man as a technical teaching the subject-matter of Claim 1. This basic principle is in fact clearly stated in decision T 124/89 on which the second Appellants rely, see point 3.2 of the Reasons.

In the present case document D8 states that the inner pipe may be made of a polyolefin, in particular polyethylene or polypropylene. There is nothing in the document which teaches the skilled man that from the large number of polyolefin materials available to him an

elastomeric polyolefin, which are specialised products, should be chosen. On the contrary, in view of the specialised nature of these elastomeric polyolefins, the skilled man would understand the reference in document to "polyolefins" as being directed to the normal thermoplastic extrusion grades of that material. The test for novelty exposed above must therefore in the present case be answered in the negative.

Decision T 124/89 related to the disclosure in the prior art of a process for the production of a class of compounds defined by values of particular parameters within numerical ranges and was concerned with the question whether all members of that class are made available to the public, so that it is clearly distinguished on the facts from the present case.

3.2 Inventive step

Of the various cited documents disclosing a plastics pipe in accordance with the preamble of Claim 1 the most relevant for the evaluation of inventive step is document D3 since this document clearly indicates the good combination of mechanical properties of the pipe (flexibility and resistance to crushing), the production of fairly large diameter pipes for use in land drainage, culverts and the like, and the fact that the materials for the inner and outer pipes may be different and chosen to give the desired combination of properties.

It is well known that a corrugated pipe has much greater flexibility than a smooth walled pipe. The degree to which the smooth walled inner pipe of the known double-walled pipe impairs the flexibility of that pipe will depend evidently on the thickness and mechanical properties of the material of the inner pipe. Furthermore, the level of stresses applied to the inner

pipe on flexing of the double-walled pipe will be dependent on its thickness. For the skilled man seeking to solve the problem of providing a double-walled pipe of the known configuration which in use is to be bent to a fairly small radius and thereafter straightened without the smoothness of the wall of the inner pipe being affected, even though the inner pipe is of substantial thickness, as would be required if the double-walled pipe were to be used in the method of in situ sewage pipeline renovation known from document D4, it is obvious that the thermoplastic material chosen for the inner pipe should have a high degree of elasticity. Since the material must also, given the intended field of use, have good resistance to abrasion, the skilled man would have every reason to choose a thermoplastic elastomer, such as are described for example in documents D13 to D16, and which were well known as exhibiting the required combination of properties. The subject-matter of Claim 1 cannot therefore be seen as involving an inventive step.

The counter arguments advanced against this conclusion by the Respondents are not convincing. None of the prior art documents in the proceedings support the contention of the Respondents that the skilled man would have had a technical prejudice against co-extruding a thermoplastic elastomeric material to form the inner pipe with a polyolefin material to form the outer pipe, co-extrusion, although not specified in Claim 1, being the method of choice for producing double-walled pipes of the type involved. In fact, document D1 clearly indicates that the co-extrusion of polyethylene and thermoplastic elastomeric layers gives good results. Furthermore, documents D7 and D8 teach how sagging of the inner pipe into the inner spaces of the corrugations can be avoided during co-extrusion of the pipes. Likewise, the skilled man would not have dismissed the

possibility of using an elastomer for the inner pipe because of the fear of sagging of the inner pipe during use of the double-walled pipe. This would only occur if the inner pipe were relatively thin and the chosen elastomer were to have a low modulus of elasticity. However, the whole point of using an elastomer is to allow the inner pipe to be relatively thick without being permanently deformed on bending, and as can be seen from documents D13 to D16 there is no suggestion that thermoplastic elastomers necessarily have a low modulus of elasticity.

With respect to independent method Claim 7 nothing inventive can be seen in the use of a double-walled pipe of which the inner pipe is formed of a thermoplastic elastomer, and which for the reasons stated above must be seen as being an obvious entity in itself, in the method of renovating a sewage pipe system know per se from document D4 in order during installation to take advantage of the increased flexibility of the double-walled pipe over the smooth walled pipe suggested in that document.

4. *Auxiliary requests*

Since both the sets of claims according to the first and second auxiliary requests contain the independent method claim (as Claim 7 in the first auxiliary request and as single main claim in the second auxiliary request) considered, for the reasons given above, as not involving an inventive step, it follows that both of these requests must be refused.

For completeness it is however noted that the amendment made to Claim 1 of the first auxiliary request specifying that the pipe "can be installed in an existing horizontal sewage pipe from an essentially

vertical access" imposes no real limitation on the pipe claimed since the relative diameters of the pipe, the sewage pipe, and the vertical access are not given so that is cannot be determined to what radius the pipe is to be capable of being bent.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

S. Fabiani F. Gumbel