

A		B		C	X
---	--	---	--	---	---

File Number: T 448/90 - 3.2.1

Application No.: 83 105 111.5

Publication No.: 0 094 694

Title of invention: Mains insertion

Classification: F16L 55/16

D E C I S I O N
of 12 January 1993

Proprietor of the patent: British Gas Corporation

Opponent: 01) Service National Gaz de France
02) Clearline Services Ltd.
03) Jörgensen & Søn

Headword:

EPC Articles 54 and 56

Keyword: "Prior use (not substantiated)" - "Novelty (main request, no;
auxiliary request, yes)" - "Inventive step (auxiliary request,
yes)"



Case Number : T 448/90 - 3.2.1

D E C I S I O N
of the Technical Board of Appeal 3.2.1
of 12 January 1993

Appellant :
(Proprietor of the patent) British Gas Corporation
Rivermill House
152 Grosvenor Road
London SW1V 3JL (GB)

Representative :
Morgan, David James
British Gas Corporation
Patents Department
326 High Holborn
London WC1V 7PT (GB)

Respondent :
(Opponent 01) Service National Gaz de France
23 Rue Philibert Delorme
F - 75017 Paris (FR)

Representative :
Thévenet, Jean-Bruno
Cabinet BEAU DE LOMENIE
55 Rue d'Amsterdam
F - 75008 (FR)

Respondent :
(Opponent 02) Clearline Services Limited
2 Alpha Business Park
Travellers Close
North Mymms
Hatfield, Herts AI9 7NT (GB)

Representative :
Holliday, Frank
Marks & Clerk
57-60 Lincoln's Inn Fields
London WC2A 3LS (GB)

Respondent :
(Opponent 03)

Hans Jørgenson & Søn
Entreprenør A/S
Sivmosevaenget 4
DK - 5260 Odense 5 (DK)

Representative :

Dipl.-Ing. J. Meinke
Meinke und Dabringhaus
Westenhellweg 67
W - 4600 Dortmund 1 (DE)

Decision under appeal :

Decision of the Opposition Division of the
European Patent Office dated 12 April 1990
revoking European patent No. 0 094 694 pursuant
to Article 102(1) EPC.

Composition of the Board :

Chairman : F. Gumbel
Members : S. Crane
W.M. Schar

Summary of Facts and Submissions

- I. European patent No. 0 094 694 was granted on 20 July 1988 on the basis of European patent application No. 83 105 11.5, which was a divisional application of parent European patent application No. 81 305 588.6 which led to European patent No. 0 053 480.
- II. The patent was opposed by the Respondents (Opponents 01 to 03) on the grounds that its subject-matter lacked novelty and/or inventive step (Article 100(a) EPC) and that it contained subject-matter extending beyond the content of the patent application (Article 100(c) EPC).

The following state of the art was relied upon by the Respondents:

(D1) US-A-3 181 302

Alleged public prior use of the apparatus of document D1 as described in two affidavits of Mr David A. Bowles and an affidavit of Mr Frank Versnick;

(D2) GB-A-1 406 769;

(D3) FR-A-2 279 009;

(D4) GB-A-1 503 689;

(D5) US-A-3 730 283;

(D6) DE-C-2 157 259; and

(D7) GB-A-1 261 952.

- III. By its decision dated 12 April 1990 the Opposition Division revoked the patent.

The reasons given for the decision were that the subject-matter of granted Claim 1 lacked novelty with respect to the teachings of document D1 and that the reference to "at least a portion" of the radially outward movement in the

characterising clause of granted Claim 1 implicitly included all of such movement, for which there was no basis in the original disclosure.

- IV. An appeal against this decision was filed by the Proprietors of the patent on 1 June 1990, the appeal fee having been paid two days earlier.

The Statement of Grounds of Appeal was filed on 3 July 1990.

- V. In the course of written proceedings before the Board the Appellants filed, with a letter dated 3 December 1992, an affidavit of Professor Frederick Burdekin, an expert on the fracture and structural behaviour of engineering materials.

- VI. Oral proceedings before the Board were held on 12 January 1993.

At the oral proceedings the Appellants presented as their main request that the decision under appeal be set aside and the patent maintained unamended.

The auxiliary request of the Appellants was for the maintenance of the patent in amended form on the basis of Claims 1 to 15, description and drawings submitted at the oral proceedings.

The Respondents requested that the appeal be dismissed.

- VII. Granted Claim 1 reads as follows:

"A method for replacing or preparing for replacement a buried existing main with a new main, the method comprising dividing the buried main in situ to form

discrete portions and moving the portions radially outwardly to widen the bore of the main to form a passage having a diameter at least as great as the external diameter of the new main or a liner for the existing main, maintaining sufficient clearance through the passage for movement therethrough of a new main or a liner for the existing main and moving the new main or liner endwise into the passage simultaneously with the widening of the bore of the buried existing main, the liner to serve as a protective sleeve for the new main when the new main is subsequently moved into the liner characterised in causing at least a portion of the radially outward movement of the divided portions to occur substantially simultaneously with the formation of the portions."

Granted Claims 2 to 17 relate to preferred features of the method of Claim 1.

Claim 1 according to the auxiliary request of the Appellants has the following wording:

"A method for replacing or preparing for replacement a buried existing main with a new main, the method comprising dividing the buried main in situ to form discrete portions and moving the portions radially outwardly to widen the bore of the main to form a passage having a diameter at least as great as the external diameter of the new main or a liner for the existing main, maintaining sufficient clearance through the passage for movement therethrough of a new main or a liner for the existing main and moving the new main or liner endwise into the passage simultaneously with the widening of the bore of the buried existing main, the liner to serve as a protective sleeve for the new main when the new main is subsequently moved into the liner, characterised in:

- (a) the division of the existing main being carried out so as to fracture the material thereof so that the discrete portions are in the form of debris of the kind which would fall unless prevented into the pathway formed for the new main or liner;
- (b) causing a portion of the radially outward movement of the discrete portions to occur substantially simultaneously with the formation of the portions;
and
- (c) the debris and earth being prevented from falling into the pathway for the new main or liner."

Dependent Claims 2 to 15 relate to preferred features of the method according to Claim 1.

VIII. The arguments put forward by the Appellants in support of their requests can be summarised as follows:

It could be seen that in the embodiment of Figures 1 to 3 all of the radially outward movement of the divided portions occurred substantially simultaneously with their formation so that the objection under Article 100(c) EPC was not well founded. In any case this objection could be readily overcome by deletion of the phrase "at least" from granted Claim 1, which would not affect the scope of the claim.

It was important to bear in mind that the radially outward movement referred to in the characterising clause of granted Claim 1 was part of the movement referred to in the preamble of the claim as being to widen the bore of the existing main to form a passage having a diameter at least as great as the external diameter of the new main or liner. Since the term bore in itself meant a passage of

circular cross-section, it was apparent that the movement referred to must be one which resulted in a passage of circular cross-section of diameter larger than the bore. Thus, even if it were accepted that the cutting wheels shown in document D1 separated the slit halves of the pipe laterally by a small amount this would not therefore constitute radially outward movement as envisaged in the characterising clause of the claim. The finding of lack of novelty with respect to this claim in the contested decision was therefore incorrect.

In the affidavits of Bowles and Versnick it was not possible to distinguish between what was the personal knowledge of these people and what had actually been made available to the public. The alleged prior use should not therefore be taken into account. However, even if it were accepted that the use of apparatus as shown in document D1 in a cast iron main was publicly demonstrated, then since the main was underground it would have been impossible to observe the behaviour of the fractured portions of the main. For the reasons given in the Burdekin affidavit, the movement of these portions on fracture would be wholly unpredictable. Furthermore, after fracture, the debris and earth could fall into the path of the spreader and obstruct it. The Appellants had, through the steps of causing outwardly radial movement of the fractured portions of the main substantially simultaneously with their formation and preventing this debris and earth from falling into the pathway of the new main or liner, as stated in features (b) and (c) of Claim 1 according to the auxiliary request, provided a method which had been successfully applied throughout the world. The apparatus according to document D1 had, on the other hand, never been introduced commercially.

Of the cited documents only document D1 related to the replacement of an existing main. It could not be seen how it would have been obvious for the skilled person to replace the cutting part of the apparatus of document D1 by burrowing apparatus such as disclosed in document D2, as had been argued by the Respondents.

IX. In reply the Respondents argued essentially as follows:

It was clear that in all of the embodiments shown only a portion of the radially outward movement of the divided portions of the main was caused substantially simultaneously with their formation. There was therefore no proper basis in the original disclosure for the reference in granted Claim 1 to "at least" a portion of such movement.

It was evident that the cutting wheels shown in document D1 would separate the two halves of the existing pipe as these were formed. This was in fact conceded in point 13 of the Burdekin affidavit. It was not understood why such separation did not constitute movement of the divided portions within the terms of granted Claim 1 since clearly the minimum diameter of the passageway formed thereby would be increased to some extent. The claim imposed no restriction on how large the portion of the radial movement caused substantially simultaneously with the formation of the divided portions had to be. The argument that any such movement could only be such which retained a circular cross-section of the bore did not hold good since this was not the case in the embodiments described in the patent specification. Granted Claim 1 therefore lacked novelty with respect to document D1.

It was clear from the Bowles affidavits that apparatus as shown in document D1 had been publicly demonstrated in the

context of replacing a cast iron main. It was not disputed by the Appellants that the prior art apparatus would actually cause fracture of such a main and the pressure of the cutting wheels on the inside main would inevitably result in radially outward movement of the fragments produced as the main fractured. The series of cutting wheels of increasing diameter proposed in document D1 was essentially equivalent to the tapered cutting blades proposed in the patent specification and would act in the same way. Point 15 of the Burdekin affidavit, which was relied upon by the Appellants to dispute this, did not take proper account of the support bars for the cutting wheels, which would prevent the type of deformation of the main as pictured in the affidavit. Furthermore, these support bars, and the short cable connecting the cutting section and the spreader of the apparatus of document D1, would effectively act to prevent debris and earth falling in front of the spreader and the new main which was attached thereto. Thus Claim 1, according to the auxiliary request of the Appellants, lacked novelty with respect to the public prior use of the apparatus of document D1. Even if this could not be accepted it would have been obvious for the skilled man to eliminate the short connecting cable if it were found that debris falling into the space in front of the spreader was causing problems. It would also have been obvious to replace the cutting section by some other type of apparatus suitable for fracturing a cast iron main, such as the pneumatic burrowing apparatus disclosed in document D2. This apparatus is stated to be suitable for enlarging an existing bore and is directly connected at its tail end to a pipeline to be laid. The form of the burrowing apparatus is such that the requirements in features (b) and (c) of the claim would be met.

Reasons for the Decision

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

2. Main request

2.1 Document D1 relates to a method and apparatus for replacing an existing underground pipe with a new pipe and comprises an elongated cutting section for splitting the existing pipe into two halves and a spreader for spreading apart the two halves sufficiently to enable the new pipe to be pulled through them. It is therefore apparent that all of the features of the preamble of granted Claim 1 are known from this prior art.

The cutting section of the prior art apparatus comprises two spaced elongate support bars between which are mounted a series of freely rotatable cutting wheels the diameter of which increases from the leading to the trailing end of the cutting section. It can be clearly seen from the figures that the diameter of the cutting wheels at the trailing end of the section is greater than the diameter of the existing pipe to be cut. As seen in cross-section (Figure 2) each of the cutting wheels tapers down from a cylindrical central portion to a knife-like cutting edge. Each of the support bars has a substantially semi-cylindrical cross-section with the curved outer surface arranged in close proximity to the inside of the pipe to be cut. The cutting section is attached by a short length of cable to a frusto-conical spreader 20, the trailing end of which is attached to the new pipe to be laid.

2.2 The Board is satisfied that as the cutting section of the apparatus described above is drawn through a pipe of

ductile material, for example mild steel, the cutting wheels will at first score and then progressively cut into the wall of the pipe until at some stage the pipe will be parted into two halves, this occurring where the diameter of the respective cutting wheel is marginally greater than the external diameter of the pipe. Thereafter, as the diameter of the cutting wheels increases further these will not perform any substantial cutting action but will instead progressively enter into and widen the gap between the two halves by virtue of their tapered knife-like cutting edges. Although Professor Burdekin in his affidavit filed by the Appellants states his belief that such a cutting action would only be possible with, in his opinion, an unrealistically thin-walled pipe, he nevertheless confirms that the sequence of events would be as portrayed above and that accordingly there would indeed by a slight movement apart of the two pipe halves.

- 2.3 The Appellants argue that the movement apart of the pipe halves by the cutting wheels is not in any case radially outward movement "to widen the bore of the main" within the terms of the preamble of granted Claim 1 and so accordingly cannot be "a portion of the radially outward movement" referred to in the characterising clause of the claim. They base this argument in particular on the dictionary definition of "bore" as being a passage of circular cross-section, so that widening of the bore is only achieved when the movement of the discrete portions of the divided main is such as to retain such a cross-section and this is not the case when the two pipe halves are laterally moved apart as disclosed in document D1.

The Board cannot accept this view. Firstly, it is to be noted that in all of the embodiments disclosed in the patent specification the cutting means which fracture the main are not such that could act on all fragments of the

main substantially simultaneously with their formation to move them radially outwardly and at that stage retain a substantially circular cross-section of the bore. The restricted interpretation of the terms of granted Claim 1 as advanced by the Appellants is therefore not supported by the totality of the disclosure. Secondly, it can be seen that after the lateral separation of the pipe halves caused by the cutting wheels of the apparatus of document D1 occurs, then the spreader enters into these separated halves to force them further apart and complete the widening of the bore sufficiently to allow passage of the new main. It follows therefore that the movement of the pipe halves caused by the cutting wheels must be seen as part of the overall bore widening process.

The Board has accordingly come to the conclusion that not only are the features of the preamble of granted Claim 1 explicitly disclosed in document D1 but that the feature of its characterising clause can be derived implicitly therefrom. The subject-matter of the claim therefore lacks novelty and the main request of the Appellants must be refused (Articles 52(1) and 54 EPC).

2.4 In the above circumstances it is not necessary to consider whether the use of the term "at least a portion" in granted Claim 1 is objectionable under Article 100(c) since the finding of lack of novelty would in no way be affected by the deletion of the qualification "at least".

3. Auxiliary request

3.1 Formal admissibility

Claim 1 according to the auxiliary request has been restricted with respect to granted Claim 1 by the introduction of a statement as to the nature of the

material of the main (feature (a)), the deletion of "at least" from "at least a portion", and the introduction of a statement that debris and earth are prevented from falling into the pathway for the new main or liner (feature (c)).

This Claim 1 and dependent Claims 2 to 15 all find a proper basis in the original disclosure of the parent application.

The amendments made to the description do not go beyond what is necessary to bring these into conformity with the terms of the claims and to take account of the closest state of the art.

Thus, there are no objections under Articles 123(2) and (3) to the documents corresponding to the auxiliary request.

3.2 Novelty and inventive step

3.2.1 According to his affidavit of 29 November 1988 Mr Bowles was involved, in the late 1950's and the 1960's, in the development of apparatus as shown in document D1.

In paragraph 6 of the affidavit he refers to unrestricted public demonstrations of the apparatus made to the Madisonville Sewer Authority and the Western Kentucky Gas Company but gives no further details. In paragraph 9 he states that the apparatus used in the demonstrations "resembled" the apparatus described in document D1 and cracked and fractured cast iron pipes. The real substance of the affidavit is contained in paragraph 8 where he describes the operation of the apparatus in a cast iron pipe and states that he observed this during above ground testing and as the result of excavating the area of the

fractured pipe after underground testing. The Board is of the opinion that the information contained in this paragraph 8 was Mr Bowles' personal knowledge accumulated as a result of a long association with the development of the apparatus involved and that it is not clearly established what information was made available to the public by virtue of the demonstrations he refers to in very general terms, or indeed what form these demonstrations took.

Mr Bowles' second affidavit of 18 December 1989 merely serves to clarify some aspects of paragraph 8 of his first affidavit and does not throw any further light on the alleged public demonstrations.

In his affidavit, Mr Versnick, the son of the employer of Mr Bowles at the relevant date, confirms that the operation of the apparatus of document D1 in a cast iron pipe was as described by Mr Bowles, he having observed tests within his father's plant. He does not however indicate that he was present at any public demonstrations.

Having regard to the above the Board has reached the conclusion that the crucial issues concerning the alleged prior use of what was done as a matter of fact, and what was made available to the public by the use have not been properly substantiated. Accordingly, no account is to be taken of the alleged prior use when assessing the patentability of the subject-matter of Claim 1 of the auxiliary request.

- 3.2.2 The closest state of the art with respect to the subject-matter of Claim 1 is therefore document D1.

No specific mention is made in document D1 of the material of the pipe involved but it is clear that this must be of a ductile material if the cutting means shown are to function as described. As Claim 1 is now limited to the fracturing of the main to form debris it is clear that its subject-matter is novel with respect to the prior art.

The technical problem in relation to the prior art known from document D1 is to develop the known method such that it can be put into reliable effect with a fracturable existing main and in particular to avoid problems that may be caused by the debris and earth formed on fracturing such a main, such as jamming or obstruction of the apparatus involved.

The general principle of in situ mains replacement is certainly disclosed in document D1. Furthermore, according to the Bowles and Versnick affidavits the apparatus of document D1 could in fact fracture a cast iron main rather than slice a ductile main as described in the document. However, it is not clear to the Board that this would have been evident to the skilled man on a reading of document D1 itself. Even on the assumption that the skilled man would be encouraged by the teachings of document D1 to consider in situ replacement of a fracturable main then there is nothing in the document, or in the rest of the cited prior art, that could lead him to the combination of causing a partial radially outward movement of the fractured mains portions as they are formed and then preventing this debris and earth from falling back into the pathway of the new main or liner for a new main, as stated in Claim 1.

In particular, the Board cannot accept that it would have been obvious for the person skilled in the art to replace the elongated cutting section disclosed in document D1 by

an earth boring device such as is shown in any one of the documents D2 to D6 since the technical considerations involved, especially the level of forces required, are significantly different between, on the one hand, fragmenting an existing main and, on the other hand, widening a pilot bore in the earth.

Document D7 relates to a method of lining an existing underground main in which the existing main is not fractured and replaced but is instead reamed out before receiving a thin flexible liner. Clearly, such a method is not comparable with that claimed in the present case.

The Board therefore comes to the conclusion that the subject-matter of Claim 1 according to the auxiliary request of the Appellants cannot be derived in an obvious manner from the cited prior art and accordingly involves an inventive step (Article 56 EPC). This claim, together with dependent Claims 2 to 15 and the amended description and drawings according to the auxiliary request of the Appellants therefore form a suitable basis for maintenance of the patent in amended form.

Order

For the above reasons, it is decided that:

1. The contested decision is set aside.
2. The main request of the Appellants is rejected.

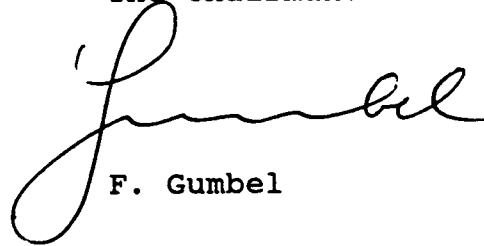
3. The case is remitted to the first instance with the order to maintain the patent on the basis of Claims 1 to 15, the description and drawings submitted at the oral proceedings (auxiliary request of the Appellants).

The Registrar:



N. Maslin

The Chairman:



F. Gumbel