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Bezeichnung der Erfindung: Base support for a tripod tower
Title of invention:
Titre de l'invention :

Klassifikation / Classification / Classement : E04H 12/34, E04H 12/22

ENTSCHEIDUNG / DECISION
vom / of / du 13 September 1988

Anmelder / Applicant / Demandeur :

Patentinhaber / Proprietor of the patent /
Titulaire du brevet : Jaquith Industries, Inc.

Einsprechender / Opponent / Opposant : n.v. ADB s.a.

Stichwort / Headword / Référence :

EPÜ / EPC / CBE Article 56

Schlagwort / Keyword / Mot clé : "public prior use - not to be decided"
"inventive step - yes"

Leitsatz / Headnote / Sommaire

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Case Number : T 306/87 - 3.2.2

D E C I S I O N
of the Technical Board of Appeal 3.2.2
of 13 September 1988

Appellant : (Opponent)
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Decision under appeal :
Decision of the Opposition Division of the European Patent Office dated 2 June 1987 rejecting the opposition filed against European patent No. 0 042 738 pursuant to Article 102(2) EPC.

Composition of the Board :

Chairman : K. Stamm
Members : C. Andries
W. Moser

Summary of Facts and Submissions

I. On 7 March 1984, European patent No. 42 738, incorporating nine claims, was granted on the basis of European patent application No. 81 302 767.9, filed on 19 June 1981.

II. On 30 November 1984, the Appellant filed a notice of opposition requesting the revocation of the European patent under Article 100(a) EPC. The opposition was based on the documents D1 to D12, in particular on:

D1: Publication "ADB-Air Equipment S.A., Information, Rigid steel masts" Der. 110A. 670 e-f-es;

D4 to D6: Full drawings of a safety approach mast-SMA/2 dated 16-12-1974 (D6) and details of these full drawings (D4 and D5) as evidence for an alleged prior use;

D10a and 10b: Drawings No. 020041190 F and No. 020041200 F; as evidence for another alleged prior use; and

D12: Affidavit of Peter L. Van der Welle, dated 22 January 1986, as evidence for a further alleged prior use at the Medinah International Airport.

III. By its decision dated 2 June 1987, the Opposition Division rejected the opposition.

IV. The Appellant lodged an appeal against this decision on 27 July 1987 with payment of the prescribed fee. He requested that the decision under appeal should be set aside and the patent in suit should be revoked.

In his statement of grounds, filed on 14 September 1987, the Appellant cited a plurality of new documents (D13 to D21), among others:

D13: US-A-4 084 328 cited in the description of EP-B-42 738; and

D19: FR-A-1 102 647;

and argued that the subject-matter of Claim 1 did not involve an inventive step with respect to documents D13, D1, D6, D10b and D15 to D20.

Subsequently, the Appellant filed additional documents and affidavits in order to prove the accessibility to the public of document D1 before the priority date claimed for the patent in suit and furthermore introduced document

D22 "Safety approach mast, Type SM/A; der. 104.A.268e"

whose Figure 5 consists of a photo which, compared to the second photo starting from the left-hand side on the last page of document D1, is of a better quality.

V. The Respondent contested the above arguments and requested that the appeal be rejected and that the witness, who signed the affidavits related to document D1, should be heard.

VI. During oral proceedings held on 13 September 1988, the Respondent filed an amended Claim 1 in response to a remark of the Board that Claim 1 as published would not satisfy the requirements according to Article 123(2) EPC. The Respondent requested the maintenance of the patent based on this amended Claim 1 and the accordingly adapted

description. In addition, he questioned again the relevance of document D1.

The Appellant for his part maintained his request for revocation of the patent in suit. Moreover, he pointed out that the main purpose of the Affidavit according to document D12 consisted of demonstrating the use of a unitary member and a slab. On the other hand, the Appellant endorsed the view expressed by the Board that there existed an obvious lack of clarity as regards the subject-matter of document D12.

Finally, by means of a drawing executed on the blackboard, the Appellant exemplified the system of balancing forces that would occur during the actuation of a tower. Thus, according to the conditions of static equilibrium, a tower having a length of 12m would require a horizontal force of 50kg to be applied near the end of a lever arm of 2m.

VII. Claim 1 reads now as follows:

"A base support for a tripod tower, the support comprising a slab (28) having an essentially planar, horizontal upper surface; a pair of anchor means (30, 32) fixed to the slab and having portions (36, 38) extending upwardly from the upper surface thereof to provide a horizontal pivotal axis which, in use, is parallel to a line passing through two legs (12, 14) of the tower to enable the tower to be pivoted between an erect vertical position and a lowered substantially horizontal position; and fixing means (34) fixed to the slab to the side of the horizontal axis remote from that to which the tower extends, in use, in its lowered position, for releasably fixing the tower, in use, in its erect position; characterized by a rigid, unitary member (40) pivotally attached to the anchor means

portions for pivotal movement about the horizontal axis and having complementary fixing means (76) for cooperation with the fixing means (34) to releasably secure the unitary member resting on the upper slab surface, the unitary member having a housing (80) by means of which there can be coupled to the unitary member a lever arm or bar (78) for use in applying to the unitary member a reaction for pivoting the unitary member about the horizontal axis; and three mounting brackets (58, 60, 62) fixed to the unitary member at equally spaced positions for respective connection to the three legs of the tripod tower, two of the brackets (58, 60) being positioned on a second line parallel to the horizontal axis with the third of the brackets (62) displaced from the second line in the same direction as that in which the complementary fixing means is displaced from the horizontal axis; whereby a tower connected by its legs to the brackets may be moved between its erect and lowered positions by a reaction applied directly to the housing (80) of the unitary member with the tower substantially undistorted other than as a result of compression in two of its legs (12, 14) and tension in its third leg (16)."

Reasons for the Decision

1. The appeal complies with Articles 106 to 108 and Rules 1(1) and 64 EPC. It is therefore admissible.

2. There are no formal objections under Article 123 EPC to the present text of the patent in suit since the proposed amendments in Claim 1 and the corresponding amendments in the description are supported by the application as originally filed and do not extend the protection conferred.

Because of the introduction into Claim 1 of the constructional feature "housing", which forms a part of the unitary member and consequently has to be constructed in such a manner that the coupling of a lever arm or bar to that unitary member is possible, the general functional feature at the end of Claim 1 has been limited to the function of the specific features ("housing, lever arm or bar"), which were not only described in the application as originally filed, but also in the published patent.

3. Documents D14 to D18, D20 and D21, filed by the Appellant only together with his Statement of Grounds for Appeal, were not submitted in due time within the meaning of Article 114(2) EPC. Indeed, due to the fact that the Opposition Division maintained the patent in suit unamended, these documents should actually have been filed within the time limit of nine months according to Article 99(1) EPC. Furthermore, with respect to the examination of patentability of the patent in suit, the degree of relevance of these documents is too low to be taken into account. In accordance with Article 114(2) EPC, these documents can thus be disregarded.

4. As regards the extent of the state of the art to be considered in the present case, the Board's observations are as follows:

4.1 In the case on hand, the question whether documents D1, D4 to D6, D10a, D10b and D11 rightly form a part of the state of the art within the meaning of Article 54(2) EPC can be left undecided because, in view of the assessment of novelty and inventive step of the subject-matter according to the patent in suit, they are to be considered irrelevant (cf. points 5 and 6 below).

4.2 As a result, all documents and affidavits, which were submitted by the Appellant in order to prove respectively the accessibility to the public of document D1 (cf. point IV above) and the prior use of the subject-matter disclosed in documents D4 to D6, D10a, D10b and D11, and which neither describe nor depict a base support for a tripod tower, may be completely disregarded. Likewise, in the Board's view, it is not necessary (within the meaning of Article 117(3) EPC) for the witness, who signed the affidavits which are supposed to prove the accessibility to the public of document D1, to give evidence orally, as requested by the Respondent.

4.3 The content of document D12 (affidavit of P.L. Van der Welle) has to be qualified as ambiguous. Even the Appellant agreed to this opinion during the oral proceedings.

Moreover, the content of this document is not consistent with any of the other documents presented by the Appellant. Indeed, the combination of the subject-matter contained in the third paragraph of document D12, according to which the third bracket is displaced in a certain direction (same direction), and the subject-matter contained in the fifth paragraph of document D12, according to which, during tilting of the mast as a unit, two legs are placed in compression with the third leg being placed in tension, never has been shown or described in the available documents which gave a survey of the Appellant's products.

Therefore, document D12 may also be disregarded.

5. Novelty.

5.1 Documents D1 and D22 describe and show tripod towers and their base supports. These base supports (fixed or pivotally mounted to the ground) do not comprise a housing as defined in Claim 1.

5.2 Documents D4 to D6, D10a, D10b and D11 each describe a tower, comprising at least two tripod masts fixed to one unitary member.

The unitary member is not provided with a housing by means of which there can be coupled to the unitary member a lever arm or a bar for use in applying to the unitary member a reaction for pivoting the unitary member on a horizontal axis. The Board does not share the Appellant's view that the left side of the base plate (D6: 37; D10b: 51), as shown in documents D6 and D10b, is provided with means allowing a reaction force to be applied directly to that base plate.

5.3 Document D13 describes a tripod tower without a rigid unitary member being pivotally attached to the anchor means.

5.4 Document D19 describes a method of mounting a four-legged mast. The base support for this four-legged mast would not be suitable for a tripod tower.

5.5 The subject-matter of Claim 1 is therefore novel within the meaning of Article 54 EPC.

6. Inventive step.

6.1 The patent relates to a base support for a tripod tower according to the pre-characterising portion of Claim 1.

Such a base support and the corresponding tripod tower are known from document D13.

The tripod tower in such an installation is composed of lightweight, frangible aluminium tubing so that, in the event of a tower being struck by an approaching aircraft, the tower will be sheared off before causing serious structural damage to the aircraft. To minimise or to avoid such an aircraft damage it is of the utmost importance to have components of the tower with minimum weight and maximum frangibility. On the other hand, such a tower should be strong enough to carry at its top a comparatively heavy cross member and lights.

The tripod tower according to document D13 may be tilted because two of the three legs of the tripod tower are mounted for pivotal movement, and the third leg may be temporarily detached from its mounting, so that the tower can pivot on the pivotal mounting of the two legs. However, as soon as the third leg is released from the base plate, considerable looseness occurs in the remaining structure which leads to twisting and excessive wear of the pivots, resulting in structural damage or misalignment problems. As a consequence of this, the legs of the tripod tower and the cross braces have to be of greater weight and strength than would otherwise be necessary.

6.2 The problem to be solved consists therefore in providing a base support for a tripod tower which allows the components of the tower to be of minimum weight and of maximum frangibility, and which, at the same time, is instrumental in increasing the rigidity of the tower during the tilting operation.

The so defined problem differs from that mentioned in the description of the patent in suit in that it summarises

what is objectively to be solved by the features according to Claim 1 and that it does not contain pointers to the solution (cf. T 229/85, OJ EPO 1987, 237).

6.3 The Board accepts that this problem is solved by the features mentioned in Claim 1.

By equally distributing the compressive forces on two legs and the tension forces on one leg, and - as a result of the rigidified base cross-section of the tower - by avoiding peak stresses in the legs due to fluctuations in the smoothness of the raising and lowering of the mast, it is possible to use tower components of lesser weight and higher frangibility than according to the solution in D13.

As a consequence of the presence of a rigid unitary member comprising three specifically located (equally spaced) mounting brackets and of the specific pivoting of that unitary member, two legs connected to the respective brackets equally share the compressive forces when the mast is tilted.

Due to the presence of a housing on the unitary member and its use to pivot the tripod tower, it becomes possible to obtain a controlled smooth raising or lowering of the tower with two of the legs only in compression and the third leg only in tension. A continually changing flexing and stressing of the mast, particularly a whipping upwards and downwards of its free end, which would give rise to continual changes as regards the compression and tension occurring in the legs and to an increase of the peak stresses in the different legs due to these stress-fluctuations, may thereby be avoided.

6.3.1 The Board cannot follow the argument raised by the Appellant that it would be essential to indicate in Claim 1 the correct position of the housing on the unitary member with respect to the three legs of the tripod tower. Indeed, such a specific interrelation is irrelevant for the distribution in the legs of forces due to the pivotal movement. It is important that, by means of the lever arm or bar and the housing, the entity "unitary member and tripod tower" is pivoted around an horizontal axis, and that the legs are not directly contacted by the lever arm or bar or by the housing, so that stress-fluctuations in these legs may be avoided and only one kind of stress (compression or tension) occurs in each leg. This stress situation is present during the whole lowering or raising of the mast and is independent of the place where the reaction is applied to the unitary member.

6.3.2 The fact, that at the end of the lowering movement the mast is also supported at its free end, does not deprive the tower from the advantages existing in the cantilever-position during tilting as claimed. A better controlled application of the balancing force during tilting, when combined with an appropriate disposition of the legs under compression, results in weight reduction. It is true that a harsh bouncing on the support at the end of the lowering movement may or presumably will spoil this advantage, but since the subject-matter of the present Claim 1 offers the possibility to move the tower smoothly during its lowering stage, it is clear for a person skilled in the art that such a bouncing should be avoided.

6.3.3 The argument presented by the Appellant that a mast with a length of up to twelve meters according to document D1 is already extremely light and that, therefore, sharing the compression forces in two legs is unimportant, cannot be accepted as relevant by the Board, since each reduction in

weight and the thereby increased frangibility is of the utmost importance when a mast is struck by an airplane.

6.3.4 The argument of the Appellant, namely that the problem cannot be solved since the forces created in the legs during the pivoting movement of the tower are smaller than the forces generated by the passing aircrafts or by stormy winds, is not sufficiently substantiated. But even if this assertion were correct, the assumed cantilever-situation of Claim 1 could not simply be compared with the final situation of the tower in its vertical position.

6.3.5 The static situation as exemplified by the Applicant during oral proceedings (cf. point VI above) is accepted by the Board. However, an appropriate limitation of the scope of Claim 1 appears not necessary since dimensional restrictions with regard to applicable forces are self-evident conditions in design practice.

6.4 A person skilled in the art, starting from a base support for a tripod tower according to document D13, who would try to obtain a mast with components of minimum weight and maximum frangibility, could not find, however, an indication in the cited documents to use a specific actuatable unitary member provided with mounting brackets and a housing according to Claim 1.

6.4.1 Documents D1, D22, D4 to D6, D10a, D10b and D11 describe and/or show tripod towers of three different types.

The first type of said tripod towers comprises a unitary member (base plate) always fixed to the ground, and remaining on the ground during lowering or raising of the tower. The tower is raised or lowered by disconnecting one of the legs from the tripods base plate, so that the tower can pivot around the other two tripod's leg ends (text of

documents D1 and D22; and the first photo from the left hand side on the last page of document D1).

This type of tower and its base support are equal to the tower and the base support of the prior art according to document D13, and this type of tower gives no hint how to solve the problem of decreasing weight and increasing frangibility.

The second type of said tripod towers comprises a unitary member which is always fixed to the three tripod's leg ends, which has a pivoting connection with a concrete slab and which has fixing means to releasably fix the tower in its erect position to the slab. The fixing means is located on the unitary member to that side of the pivot axis which is remote from the side to which the tower extends in its lowered position (first direction). The three leg ends are so connected to the unitary member that two of the leg ends form a line parallel to that pivot axis, and the third leg end is so located on the unitary member that it is displaced from that line through these two leg ends in a direction which is opposite to the previous mentioned first direction (second photo from the left hand side on the last page of document D1; Figure 5 of document D22; documents D4, D5 and D6: tripod tower in the middle; configuration R-R-R; document D10b: tripod tower in the middle).

This second type of said tripod towers and its corresponding base support suggest to the person skilled in the art to use, in a base support according to document D13, a unitary member connected to the tripod leg ends and pivoting together with these legs in order to obtain thereby a more solid construction during raising and lowering. Although such a base support does of course influence the weight of the legs used, there is no hint

given in these documents to use features which permit to pivot the tower by a reaction applied to that unitary member in view to obtain thereby a controlled smooth movement and to avoid continual changes in the compression and tension in the legs. In particular, the method to raise or to lower this type of tower, which is mentioned in the text and shown in the indicated photos of the documents D1 and D22 (hand over hand action as a person walks along the mast), causes continual changes in the compression and tension in the legs.

The third type of said tripod towers comprises a unitary member which is always fixed to the three tripod's leg ends and to the upper end of a tube. The tower is raised or lowered by pivoting that unit (legs-unitary member-tube) around a horizontal axis (document D10a: tripod tower in the middle; document D11: details). If the tower is pivoted on an axis near to the ground, one of the legs of the tripod tower in the middle is put in compression whereas the two other legs are put in tension. Here, too, no hint is given by such a type of tripod tower on how to decrease the weight of the legs and on how to increase thereby their frangibility by pivoting a unitary member connected to the tower (legs) with the help of a housing on that unitary member and in such a manner that compression only occurs in two legs and tension only in the third leg.

Therefore, these documents merely show what is self-evident for a person skilled in the art, namely that such a tripod tower can be made more solid during pivoting by the use of a member connecting the three free ends of the legs.

These documents, however, do not indicate or suggest the presence of means (specific attachment to the anchor means

and to the legs; housing) on such a unitary member that would allow the tripod tower to be made of material of lighter weight and higher frangibility.

6.4.2 Document D19 describes a method of mounting a four-legged mast. Since the problem of frangibility as well as the idea of dividing the compression and the tension forces among the different legs are neither mentioned nor suggested and, furthermore, even not relevant in this document, and since the reaction force to pivot the first part of the mast up to a vertical position is not applied to the member strengthening the leg ends, but rather to a cross member linking two neighbouring legs (Figure 6), a person skilled in the art does not find in this document any hint to modify the base-support of a tripod tower according to document D13, or even according to documents D1, D22, D4 to 6, D10a, D10b and D11, in such a manner that the above defined problem is solved with the features present in Claim 1.

6.4.3 Even though a person skilled in the art considers the above mentioned second or third type of said tripod towers and its corresponding base support as the closest prior art, he does not find in the available documents any indication that, in view of solving the stated problem, the tripod tower ought to be turned around about 180° and a housing be used on the unitary member.

Turning around about 180° a tripod tower, appertaining to one of these types, cannot be considered as a simple design feature as it is stated by the Appellant. Such a measure would appear in the view of the skilled man to be in conflict with the normal static principle of choosing structures with lowest possible bending moments. It is trivial knowledge that the maximum bending moment of a cantilever under equally distributed loading is four times

higher than that of a beam having the same length, when the latter is supported as "simple beam" on both ends. Therefore, the skilled man had no reasons for providing a cantilever-support and, as a consequence thereof, for turning around a known tripod tower about 180°.

The opinion expressed by the Appellant, according to which, also in case of the second type of said tripod towers, two of the legs are in compression and the third leg in tension during raising and lowering (hand over hand method) of the tower at least respectively at the beginning or at the end of these actuations, is only considered to be accurate by the Board with respect to the situation in which the tower, in its starting position, is supported at both of its ends.

Indeed, due to the "hand over hand" raising (or lowering), the stress situation in the legs is rapidly changing. Starting from the situation (wherein two of the legs are in compression, one in tension), and by moving the hands from the end point of the tower towards its pivoting point, the situation of the tower changes from a beam situation supported on both ends to a situation wherein the tower has one part acting as a simple beam and one part acting as a cantilever, whereby the length respectively of the beam and cantilever part is changing continuously during the whole raising procedure. The stress situation in the different legs is therefore rapidly changing and switching over from compression to tension and vice-versa. Therefore, the Board takes the view that such a stress situation cannot be compared with the definition given in Claim 1 where it is clearly stated that during the whole pivoting movement the tower is substantially undistorted other than as a result of compression in two of its legs and tension in its third leg.

6.4.4 To sum up it can be said that none of the cited documents, even in combination with each other, suggests to a skilled person the solution outlined by the features of Claim 1.

6.5 Therefore, the subject-matter of Claim 1 involves an inventive step within the meaning of Article 56 EPC.

7. Based upon the valid Claim 1 and dependent Claims 2 to 9, which concern preferred embodiments of the base support according to Claim 1, and the modified description, the patent may be maintained.

8. Since, in the present case, the effect on the scope of the protection conferred by the patent brought about by the amendments in the description and in Claim 1, made during the oral proceedings, was easy to perceive and since, on the other hand, the parties gave no indication during the oral proceedings that they needed more time in order to examine these amendments, the Board was able to dispense with informing the parties in accordance with Rule 58(4) EPC (cf. T 219/83; OJ EPO 1986, 211).

Order

For these reasons, it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the Opposition Division with the order to maintain the patent with the following documents:

Claim 1: filed during Oral Proceedings;
Claims 2 to 9: as published;

Description: as published with the following modifications:

- column 2, line 5: insertion after the word "surface" of the sentence added in lines 18 to 23 of amended Claim 1;
- column 2, line 16: insertion of the words "housing of the" between the words "the" and "unitary";

Drawings: as published.

The Registrar: The Chairman:

S.Fabiani K.Stamm