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Application No.: 82 302 019.3

Publication No.: 0 078 093

Title of invention: Device for imparting continuous passive motion to human joints

Classification: A61H 1/02

DECISION
of 17 October 1991

Applicant: TORONTO MEDICAL CORP.

Opponent: COMPAGNIE GENERALE DE MATERIEL ORTHOPEDIQUE

Headword:

EPC Article 56

Keyword: "Inventive step (no)" - "selection of equivalent alternative means"

Headnote



Case Number : T 71/90 - 3.2.2

D E C I S I O N
of the Technical Board of Appeal 3.2.2
of 17 October 1991

Appellant :
(Proprietor of the patent)

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(Opponent)

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Decision under appeal :

Decision of Opposition Division of the European
Patent Office dated 21 November 1989 revoking
European patent No. 0 078 093 pursuant to
Article 102(1) EPC.

Composition of the Board :

Chairman : G.S.A. Szabo
Members : M.G. Noel
J.H. van Moer

Summary of Facts and Submissions

I. European patent No. 0 078 093 was revoked by decision of the Opposition Division dated 21 November 1989 on opposition by the Respondent (Opponent), on the ground that its subject-matter did not involve an inventive step having regard to the documents:

- (1) FR-A-2 407 710
- (4) US-A-2 773 499.

II. The Appellant (Proprietor of the patent) lodged an appeal against this decision on 12 January 1990, paying the fee for appeal and submitting a Statement of Grounds in good time.

In reply to a summons notice to oral proceedings issued by the Board, the Appellant submitted on 17 September 1991 new requests including a set of eleven claims according to a main submission and two sets of ten claims according to a first and a second auxiliary submission, respectively. Claims 1 according to respective submissions read as follows:

1. (Main submission) A continuous passive motion apparatus for mobilizing a human joint comprising:
 - flexing means comprising an elongate support (A) and traveller means (25) provided on the support for reciprocating linear movement relative thereto;
 - connecting means (C) for connecting the flexing means to operatively engage a limb of the body connection to the joint to be mobilized; and
 - electric motor means (31) for driving the flexing means to move back and forth through a reciprocating linear stroke in a slow rhythmic cycle of up to two cycles per minute, whereby the limb is moved to mobilize said

joint throughout the rhythmic cycle; characterized in that the motor means comprises a motor (31) having means responsive to a predetermined load to reverse the motor direction to thereby reverse the direction of travel of the traveller means at any point in its back and forth path of travel of said reciprocating linear stroke, in said support.

1. (First auxiliary submission) Claim 1 according to the main submission supplemented by the following additional features: the motor means is fixedly mounted on said elongate support between the motor and traveller, supporting means (B) is provided at one end of the elongate support (A) for supporting the elongate support from the human body and said connecting means (C) operatively engages said limb so that the at least one joint to be mobilised forms a linkage intervening the supporting means (B) and connecting means (C).

1. (Second auxiliary submission) Claim 1 according to the main submission supplemented by the following additional features: the elongate support (A) extends between a support end and an opposite end; the apparatus further including

supporting means for supporting the supported end from a further support while leaving said opposite end for retention remote from said supported end;

said connecting means connecting the traveller means to an extremity of a limb wherein a plurality of joints of the limb form a linkage intervening the supporting means and the extremity;

and said motor means (31) being fixedly carried by the elongate support, and the transmission means (33) being carried by the elongate support between said motor means and said travelling means so that the apparatus is portable.

III. Oral proceedings took place on 17 October 1991.

- (i) In his written submissions and in the oral proceedings the Appellant argued substantially as follows:

With regard to the closest prior art document (1) the problem to be solved, underlying the present patent was to avoid excessive load to the motor. The means for the solution, i.e. which was responsive to a predetermined load to reverse the motor direction might be of trivial nature, as long as it was understood that the invention resided essentially in the non-obvious recognition of the problem and in the particular application of known means.

The person skilled in the art had no reason to refer to the teaching of the document (4) which dealt with a traction or stretching apparatus, as opposed to the continuous passive mobilisation apparatus (CPM) developed in the present patent and based on a significantly different principle. Therefore, the combination of two documents (1) and (4) was clearly based on an ex post facto analysis.

As to the auxiliary submissions, the invention resided in the whole combination of the characterising features of Claim 1 with those of the preamble, that is in the simultaneous application of all features.

- (ii) These arguments were contested by the Respondent, who essentially stressed that the principle of reversing the direction of a reciprocating traveller means at any point of its linear stroke, in accordance with

increased load caused for instance by the patient's resistance, was known from document (4). This citation related to the same technical field. Since the patent itself only made a general reference to suitable d.c. motors on the market which provided such reversal, no specific contribution to inventivity could be seen in the use of such appropriate and known means for their purpose.

As to the auxiliary claims, the Respondent submitted that the additional features introduced in Claims 1 did not serve the problem originally set and resulted in a mere collocation of independent features, without interaction between each other. Furthermore, these additional features were known from document (1).

- IV. The Appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of the claims submitted on 17 September 1991, according to the main submission or to either of the auxiliary submissions.

The Respondent requested that the appeal be dismissed.

Reasons for the Decision

1. The appeal is admissible.

2. Formal aspects

2.1 Main submission

Claim 1 is based on Claims 1 and 7 of the granted patent and is fairly supported by the original application. In particular, a motor having means responsive to a

predetermined load to reverse the motor direction is disclosed in the application as filed, page 6, first paragraph. The last feature of Claim 1 "to thereby reverse ...", is disclosed on page 4, lines 17 to 23 of the original application. The amendments brought to Claim 1 therefore do not extend beyond the content of the application as filed and are not such as to extend the protection conferred.

Claims 2 to 11 are, in turn, based on the respective Claims 2 to 12 (less Claim 7) of the patent as granted.

The Board is thus satisfied that the claims according to the main request meet the requirements of Article 123(2), and of (3) EPC, in view of additional limitations.

2.2 First and second auxiliary submissions

Claim 1 according to either of the first or the second auxiliary submission is formed by incorporating in Claim 1 of the main submission, also the subject-matter of Claim 2, either in extenso (second auxiliary submission) or after slight amendments in the sense of simplified wordings (first auxiliary submission).

Claims 2 to 10 correspond to Claims 3 to 11 of the main submission.

Therefore, the same conclusions as above regarding Article 123 EPC applies to the claims of the auxiliary submissions.

3. Closest prior art

Document (1) represents unquestionably the closest prior art. It describes a continuous passive motion apparatus for mobilizing a human joint having most of its features contained in the precharacterising portion of Claim 1 (main or auxiliary submissions). These are in particular flexing means comprising an elongate support 1 and traveller means 12 provided on the support for reciprocating linear movement relative thereto, connecting means 2 to 4 for connecting the flexing means to the joint of the limb to be mobilized and electric motor means 13 to 18 for driving the flexing means to move back and forth through a reciprocating linear stroke in a slow rhythmic cycle.

Document (1) describes further that the motor means comprises a motor 17 and means 18 (end stops) responsive to reverse the motor direction to reverse thereby the direction of travel of the traveller means 12 in its reciprocating linear stroke (cf. page 3, lines 26 to 29).

This known apparatus suffers from the disadvantage that the flexing means will continue to reciprocate along the full stroke length determined by the distance between the reversing end stops regardless of any resistance offered by the patient or occurring for any other reason.

4. Problem and solution

The technical problem to be solved when starting from document (1) is therefore, as admitted by the Appellant, to avoid application of excessive load to the motor for any reason, for example, where there is some unplanned obstruction in the mechanism or where the patient offers undue resistance (cf. patent specification, column 3, lines 24 to 31).

This object is achieved mainly by the characterising feature of Claim 1 (main or auxiliary submissions) according to which the motor means for reversing the motor direction is responsive to a predetermined load, so as to reverse immediately the direction of travel of the traveller means at any point of its stroke. A safety function is thus performed when the need arises in addition to the prime actuating i.e. reciprocating function, as before.

5. Novelty

The subject-matter of Claim 1 (main submission) contains the following features which are not disclosed in document (1):

- (a) the reciprocating cycle is up to two cycles per minute;
- (b) the reversal of the motor direction is achieved by means responsible to a predetermined load; and
- (c) reversal of the traveller means may occur at any point of its stroke.

Since no other document than document (1) comes closer to the subject-matter of Claim 1 (main submission) it must be regarded as novel. The same applies to Claim 1 according to both auxiliary submissions which contain further additional features (cf. point 2.2 above).

6. Inventive step

6.1 Main submission

6.1.1 Feature (a) is of little importance and contributes in no way to the problem to be solved. Although the rate of the reciprocating cycle is not specified in document (1), it

must be noted, however, that the apparatus described therein is used for flexing a knee joint, as it is also the case with the embodiments according to Figures 4 and 5 of the present patent. The applications being similar, it can thus be reasonably assumed that in both cases slow rhythmic cycles are performed, having periods in the same period range.

Feature (c) is confined to the result to be achieved ("thereby") by the means set out in feature (b). In fact, feature (b) represents the sole essential feature of the solution, since the exact reversal position of the traveller at any point of its stroke is clearly dependent of the occurrence of an obstacle along the travel path. Consequently, features (b) and (c), are to be considered in unity as a whole.

6.1.2 In order to solve the problem of avoiding excessive load to the electric motor, any obstacle must be detected in order to reverse immediately the direction of the motor and, hence, of the traveller. According to the patent specification (cf. col. 3, lines 25-28) this may be achieved, "for example, where the actuator or traveller reaches the end of its stroke and is halted by the stop 37 or 39, (Figure 3), as the case may be". This corresponds exactly to what is shown in document (1) where a pair of end stops 18 are setting two predetermined limit positions at which a reversal of the motor direction is obtained (cf. page 3, lines 26 to 29).

Alternatively, the patent now also provides for a reversal "where there is some unplanned obstruction" (cf. col. 3, line 29). Expressions such as "for example", "or", clearly introduce equivalent means, since the same effect and the same result are expected. The next paragraph gives examples of marketed motors which are suitable in the

circumstances. The Board observed that the Appellant deemed it not necessary to provide the patent description with additional and superfluous details in this critical respect, as suitable conventional motors and associated controlling circuits are well known to any person skilled in the field of electrotechnical engineering, for the same purpose. These means are apparently on the market and are part of common general knowledge.

As a matter of fact, if this were not the case, the Board would be led to the conclusion that the reversible motor and its control were insufficiently disclosed and hence the claimed subject-matter was not patentable on this ground, cf. Article 83 EPC.

In the present case, the Board considers it as forming part of the normal activities of the man skilled in the art to select from the means which are known to him as suitable for a certain purpose the most appropriate one.

- 6.1.3 If the skilled person decided to start from document (1), he would not have had any difficulty to replace the reversible motor and the end stops described therein by a known motor having means responsive to preset limits as well as to a predetermined load, as suggested in the patent, to arrive directly at the subject-matter of Claim 1. The Board regards this merely as an analogous substitution by an improved functional equivalent also already available in the art, the incorporation of which being obvious in view of its predictable beneficial effect (cf. the decision T 192/82, OJ EPO 1984, 415).

Summing up, the Board is satisfied that the solution given in Claim 1 is obvious, having regard to the teaching of document (1) and the general technical knowledge of a skilled person and cannot therefore be considered as

involving an inventive step under Article 56 EPC. Problems relating to real and potential hazards in the medical field are part of the general consciousness of all working in the field, and so are standard means to eliminate them. The subject-matter only added a fail-safe feature to the known system.

6.1.4 It results from the foregoing conclusion that, in the Board's view, it is not even necessary to refer to document (4) to establish obviousness of Claim 1. However, if need be, the skilled person still could find in this document, which relates to a neighbouring technical field and particularly describes a stretching and flexing apparatus having a reciprocating piston rod 55 driven by a non-reversible electric motor 92 and a hydraulic actuator control mechanism for producing and applying through the reciprocating rod, rhythmic movements to a patient, a clear indication suggesting him to use means responsible to a predetermined load to limit the stroke of the flexing means in cases of emergency. To this end, reference is made to column 7, lines 8 to 13 of document (4) where it is specified that "the length of the strokes of the rod 55 will be automatically limited at the points reached when the pressures for which the switches 116, 117 are set have been attained either because of the patient's resistance or any other reasons". This illustrates the same hazards encountered and the fail-safe system to be employed.

6.1.5 The Board also cannot accept the Appellant's argument according to which his basic contribution was to recognise that there can be an unsuspected problem with respect to the disadvantages presented by the apparatus of document(1) ("problem invention", cf. T 2/83, OJ EPO 1984, 265) and that this, in conjunction with the solution set out in the characterising part of Claim 1, represents an inventive contribution to the art.

Since the overcoming of recognised drawbacks and aiming at improvements must be considered as the normal task of the skilled person, no contribution to the inventive step of the solution can possibly be seen in the perception of the problem as indicated above. Problems which are perceptible, i.e. which necessarily come to light during use, can be construed as being part of the state of the art (cf. T 109/82, OJ 1984, 473, in particular point 5.1). It is irrelevant in this respect that the phenomenon was only reported in a journal after the priority date, or that there could be other equally obvious answers (e.g. guards) to the problem.

6.2 Auxiliary submissions

- 6.2.1 As stated above (cf. Point 2.2), the subject-matter of Claim 1 according to the first and second auxiliary submissions is formed by incorporating the subject-matter of Claim 2 in the claim with different wordings. Therefore, both Claims 1 according to the auxiliary submissions are nearly identical in scope.

The features added refer to the special relationship between the elongate support A, the supporting means B and the connecting means C, in conformity with the embodiment as shown on Figure 1 of the patent. They do not contribute in any way to solving the problem as set above and consequently must be considered as non-essential for the solution. As it is, the Board is faced with a mere collocation of features which do not support each other in terms of effect but achieve a mere aggregative result and must therefore be considered separately. The characterising features thus operate in a normal way without any mutual interaction: the means for reversal of

the motor direction have no influence on the supporting structure arrangement ABC, and vice-versa.

6.2.2 Furthermore, the features added to Claim 1 are broadly drafted, so as to cover the various embodiments according to Figures 1 to 8 of the patent. Since they are not committed to any particular embodiment, the same level of generalisation is also applicable to interpret the teaching of the closest prior art document (1), in which a motor means is fixedly mounted on an elongate support 1 and includes a transmission means 14 on the support between the motor 17 and traveller 12; a supporting means 3, 4 is provided at one end 21 of the elongate support; and a connecting means 4a, 4b operatively engages the limb so that the joint (knee) to be mobilised forms a linkage between the supporting means and connecting means. The arrangements suggested in the claims for supporting means are no more than variants of commonly encountered means for the purpose of attaching objects to the human body.

It results that in the Board's view, the provision of additional known features to the subject-matter of Claim 1 of the main submission do not add anything which would imply an inventive step. For these reasons, the subject-matter of both Claims 1 according to the first and second auxiliary submissions also lack an inventive step as required by Article 56 EPC.

Order

For these reasons, it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



S. Fabiani



G. Szabo

R. Waf.
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