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D E C I S I O N
of 21 January 2003

Case Number: T 0656/01 - 3.2.7

Application Number: 96910178.1

Publication Number: 0824490

IPC: B65G 47/51

Language of the proceedings: EN

Title of invention:
Storage unit for the accumulation of semimanufactured products, with means of regulation of the speed of advance

Patentee:
FABIO PERINI S.p.A.

Opponent:
Paper Converting Machine Company

Headword:
-

Relevant legal provisions:
EPC Art. 54, 56, 100(b)

Keyword:
"Novelty (yes)"
"Sufficiency of disclosure (yes)"
"Inventive step (main request - no; auxiliary request - yes)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0656/01 - 3.2.7

D E C I S I O N
of the Technical Board of Appeal 3.2.7
of 21 January 2003

Appellant: (Opponent)
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Respondent: (Proprietor of the patent)
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Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted 9 April 2001 rejecting the opposition filed against European patent No. 0 824 490 pursuant to Article 102(2) EPC.**

Composition of the Board:

Chairman: A. Burkhart
Members: P. A. O'Reilly
E. Lachacinski

Summary of Facts and Submissions

I. The appellant (opponent) filed an appeal against the decision of the Opposition Division to reject the opposition against the European Patent No. 0 824 490.

II. Opposition was filed against the patent as a whole and based on Article 100(a) EPC (lack of novelty and lack of an inventive step) and Article 100(b) EPC (insufficiency of disclosure).

The Opposition Division held that the subject-matter of claim 1 of the main request (maintenance unamended) was novel and involved an inventive step and the teaching of claim 3 could be carried out by the person skilled in the art.

The most relevant prior art documents for the present decision are:

D1: GB-A-1 531 622

D2: GB-A-1 437 381

D3: DE-A-2 553 132

D4: US-A-5 339 942

D5: US-A-4 142 626

D7: US-A-4 168 776

D12: "Tissue Issues - Tissue Converting in the 1990's" Richard A. Seibert, Niagara Lockport

D14: JP-A-536195 and English translation thereof

III. The appellant requested that the decision of the Opposition Division be set aside and the patent be revoked.

The respondent (proprietor) requested that the appeal be dismissed (main request). Alternatively, the respondent requested that the patent should be maintained in accordance with the first auxiliary request filed during oral proceedings before the Board on 21 January 2003, or the third or fourth auxiliary requests filed with letter of 13 December 2002.

IV. The independent claim of the main request reads as follows:

"1. A storage unit for the temporary storage of rolls (L) of rolled up band-shaped material, arranged between a first section (I) and a second section (T) of a production line and comprising:

- an endless flexible member (3) defining a closed path within said storage unit and bearing a plurality of seats (19) for said rolls, said seats being subdivided into two groups, a first group of empty seats and a second group of full seats respectively,
- input means (25, 63) for distributing, in said seats (19) of said first group, rolls (L) arriving from said first section (I),
- output means (29) for the controlled discharge of rolls from the seats (19) of said second group towards said second section (T),
- a first motor unit (23) for the advance of the

seats of the first group towards the input means,

- a second motor unit (27) for the advance of the seats of the second group towards the output means,

characterized in that

- said first and said second motor unit (23, 27) move the flexible member (3) with a continuous motion,
- and the speed of advance of the two motor units is determined respectively by the rate with which the rolls come from said first section (I) and the rate with which they are requested by said second section (T)."

The independent claims 1 and 2 of the first auxiliary request read as follows:

"1. A storage unit for the temporary storage of rolls (L) of rolled up band-shaped material, arranged between a first section (**R,** I) **including a re-reeling machine (R)** and a second section (T) of a production line and comprising:

- an endless flexible member (3) defining a closed path within said storage unit and bearing a plurality of seats (19) for said rolls, said seats being subdivided into two groups, a first group of empty seats and a second group of full seats respectively,
- input means (25, 63) for distributing, in said seats (19) of said first group, rolls (L) arriving from said first section (I),
- output means (29) for the controlled discharge of rolls from the seats (19) of said second group towards said second section (T),
- a first motor unit (23) for the advance of the

seats of the first group towards the input means,

- a second motor unit (27) for the advance of the seats of the second group towards the output means, **wherein**
- said first and said second motor unit (23, 27) move the flexible member (3) with a continuous motion,
- and the speed of advance of the two motor units is determined respectively by the rate with which the rolls come from said first section (I) and the rate with which they are requested by said second section (T) **and is determined according to the rate of production obtained from the production data coming from the re-reeling machine in said first section (I) and according to the rate of production of the second section (T) respectively**."

"2. A storage unit for the temporary storage of rolls (L) of rolled up band-shaped material, arranged between a first section (I) and a second section (T) of a production line and comprising:

- an endless flexible member (3) defining a closed path within said storage unit and bearing a plurality of seats (19) for said rolls, said seats being subdivided into two groups, a first group of empty seats and a second group of full seats respectively,
- input means (25, 63) for distributing, in said seats (19) of said first group, rolls (L) arriving from said first section (I),
- output means (29) for the controlled discharge of rolls from the seats (19) of said second group towards said second section (T),
- a first motor unit (23) for the advance of the

seats of the first group towards the input means,

- and a second motor unit (27) for the advance of the seats of the second group towards the output means, **wherein**
- said first and said second motor unit (23, 27) move the flexible member (3) with a continuous motion,
- **an input distributor (25) and a distributor (22) downstream of the output means (29) are provided, which transfer a roll individually from said first section to said storage unit and from said storage unit to the second section respectively,**
- **associated with said input distributor (25) and said distributor (22) downstream of the output means respective sensor means (61, 24) which determine the number of rolls waiting upstream of the respective distributors (25; 22);**
- the speed of advance of the two motor units is determined respectively by the rate with which the rolls come from said first section (I) and the rate with which they are requested by said second section (T), **the speed of advance of said two motor units (23, 27) being modified according to the number of waiting rolls detected by said sensor means**."

V. The appellant argued in written and oral submissions essentially as follows:

(i) The specification is not sufficient to enable the person skilled in the art to construct an arrangement falling within the scope of claim 4.

(ii) The subject-matter of claim 1 of the main request

is not novel over the disclosure of document D2. In the first embodiment disclosed in the document there is a storage unit which is suitable for the temporary storage of rolls since it is stated to be suitable for inflated tubes which have a similar shape to rolls. The storage unit includes an endless member defining a closed path within the unit since on page 2, lines 93 to 94 it is stated that "the storage chain can be limited to the present device". There are a plurality of seats in the form of studs which are divided into a group of empty seats and a group of full seats as indicated on page 1, lines 26 to 28. Input means 24 are disclosed. Output means, although not explicitly mentioned, must be present. There are first and second motor units in the form of the driving wheels 26, 27 respectively, which respectively advance the first and second groups of seats. The driving wheels must be considered as motor units as they are driven. The storage chain moves continuously as stated on page 2, line 17, as well as page 1, lines 33 to 34 which mentions that it "runs smoothly". The driving wheels are respectively advanced at the rate of production of the first and second sections, as indicated on page 2, lines 88 to 92.

(iii) The subject-matter of claim 1 of the main request does not involve an inventive step over document D2 in combination with document D12. The problem to be solved by the feature that there are first and second motor units in the storage device is to provide a modular production line which would allow the storage device to be removed from the production line without disconnecting links to

other parts of the production line. Also, document D2 leaves open the type of drive for the input and output driving wheels. The skilled person implementing the teaching of document D2 would have to choose some type of drive. Document D12 explains that various parts of machines for tissue converting may be replaced by servo-motor drives. Storage devices are mentioned in the document and are visible in the figures. The skilled person would apply this teaching to the device of document D2 in order to implement its teaching and to solve the problem posed. The skilled person would also consider combining document D2 with document D7.

(iv) The subject-matter of claim 1 of the first auxiliary request does not involve an inventive step. It is already known from document D2 to use the production data to determine the speed of the input and output driving wheels. The skilled person would further consider the re-reeling machine as a suitable source of production data to determine the speed of the input driving wheel.

Also, the subject-matter of claim 2 of the first auxiliary request does not involve an inventive step. From document D5 the skilled person knows to use the queue on the input distributor to control the input motor unit. Document D14 teaches to increase the speed of the machine when the number of waiting articles increases.

VI. The respondent argued in written and oral submissions essentially as follows:

(i) Claim 1 of the main request is novel over document D2. The document does not disclose motor units since the connection of the driving wheels 26, 27 to the processing station and finishing machine respectively could be a mechanical linkage which does not form a motor unit. The movement of the chain in the prior art device is not continuous. It is only the chain which is described as continuous and not its movement. The fact that the prior art device is stated to run smoothly does not mean that the chain runs continuously since the term smoothly has other meanings. Since the device of document D2 has no motor units, the speed of advance of the two motor units cannot be said to be determined by the rate with which the rolls come from said first section and the rate with which they are requested by said second section as required by claim 1.

(ii) The subject-matter of claim 1 of the main request involves an inventive step. Document D2 is not the nearest prior art document and hence not the correct starting point. Document D7 represents the nearest prior art document since this document is concerned with the storage of rolls of rolled up band-shaped material as set out in claim 1. The preamble of claim 1 is based on document D7. The problem to be solved with respect to document D7 is to reduce the mechanical stresses on the structure of the storage unit. The skilled person would not consider document D12. The only servo-motors disclosed in this document are disclosed in connection with a rewinding device. There is

nothing to suggest the use of servo-motors in a log storage device. If the skilled person considered document D2 he would not find in the document the solution to the problem of filling the seats whilst avoiding a stop and go functioning. Moreover, if he took over any of the teaching of document D2 into the storage device disclosed in document D7 he would take it over completely. He would thus replace the drive units in the storage unit of document D7 with driving wheels directly connected to the gluing station and sawing station respectively. Document D5 is not relevant because it also only provides a single speed motor at the input and a direct connection at the output.

(iii) The subject-matter of claims 1 and 2 of the first auxiliary request involves an inventive step.

With respect to claim 1 the skilled person, if combining documents D7 and D2, would take the teaching of document D2 that the production data should be taken from the machine which is upstream from the storage device. This is the gluing machine in the case of document D7. The skilled person would have no reason to consider taking the production data of the re-reeling machine. Taking the production data from the re-reeling machine has the advantage that changes in the rate at which rolls will arrive at the storage device are communicated earlier to the input motor unit of the storage device. This means that stoppage of this motor unit due to lack of waiting rolls can more easily be avoided.

With respect to claim 2 the skilled person has no indication from the cited prior art to use the number of rolls waiting to modify the motor unit speed. The only document which describes sensing if rolls are waiting is document D5. Document D5 however only discloses sensing if a roll is waiting and not the number of rolls that are waiting. Moreover, this information in document D5 is used in connection with a single speed motor and not to modify the speed of the motor.

Reasons for the Decision

Main request

Sufficiency of disclosure

1. The appellant has stated that the specification does not allow the skilled person to carry out the teaching of claim 4. The appellant has given no arguments to support this contention. Moreover, there does not appear to be any reason why the skilled person could not carry out the teaching of the claim. In the view of the Board therefore the patent discloses the invention sufficiently to be carried out by the person skilled in the art, and that therefore the ground of opposition according to Article 100(b) EPC is not justified.

Novelty

2. Document D2 discloses with respect to figures 1 and 2 a storage unit suitable for the temporary storage of rolls of rolled up band-shaped material (inflated tubes are disclosed, page 2, lines 31 to 32), arranged

between a first section (a processing section, page 2, line 76) and a second section (a finishing machine, page 2, line 92) of a production line and comprising:

- an endless flexible member (a continuous chain 7, page 1, line 23) defining a closed path within said storage unit (page 2, lines 94, 95) and bearing a plurality of seats (studs, page 2, lines 29 to 35) for said rolls, said seats being subdivided into two groups, a first group of empty seats (return section 8) and a second group of full seats (advancing section 9) respectively,

- input means (24, page 2, lines 75 to 82) for distributing, in said seats of said first group, rolls arriving from said first section,

- output means for the controlled discharge of rolls from the seats of said second group towards said second section (since the tubes have to be discharged this feature is implicitly present),

- a first unit (driving wheel 26) for the advance of the seats of the first group towards the input means,

- a second unit (driving wheel 27) for the advance of the seats of the second group towards the output means,

- the first and second units moving the flexible member (7) with a continuous motion (page 2, line 17),

- and the speed of advance of the two units being

determined respectively by the rate with which the rolls come from said first section (page 2, lines 86 to 90) and the rate with which they are requested by said second section (page 2, lines 90 to 93).

The Board considers that the chain conveyor 7 disclosed in document D2 moves continuously. On page 2, lines 16 to 18 reference is made to "A continuously moving chain conveyor or storage chain 7 is provided". "Continuously" (underlining added) is an adverb which can only qualify "moving". It cannot qualify "chain conveyor" or "storage chain" as then it would have to be the adjective "continuous". This interpretation is also consistent with the fact that the driving wheels 26 and 27 are driven at the rate of the processing station and finishing machine respectively. The arguments of the respondent in this respect cannot therefore be followed by the Board.

Document D2 does not however disclose first and second motor units for moving the flexible member. In document D2 the first driving wheel 26 is described as being driven "synchronously or in accordance with the working speed of the delivering processing station" and the second driving wheel 27 is described as "controlled at the speed of a finishing machine". This disclosure does not imply that motor units are present in the device. The driving wheels 26, 27 could, for instance, be mechanically linked to the processing station and finishing machine respectively. In the opinion of the Board such a mechanical linkage does not constitute a motor unit as part of the storage unit. The appellant has sought to convince the Board that the term motor must be considered broadly as encompassing the

possibility of providing motion to driving wheels 26 and 27. The Board cannot however follow the arguments of the appellant in this respect. The skilled person would understand "motor unit" in the context to be a means producing mechanical motion from some other energy source. In this respect the use of the term 'unit' clearly implies that this energy transformation will have to take place in the motor unit which itself is in the storage unit. This would not be the case if there was a mechanical linkage to the processing station or finishing machine. The Board therefore concludes that document D2 does not disclose either explicitly or implicitly first and second motor units.

The subject-matter of claim 1 is therefore novel in the sense of Article 54 EPC.

Inventive step

3.1 Closest prior art

In the opinion of the Board the closest prior art is represented by document D7. This document lies in the same technical area as that specified in claim 1. This document (cf. Figures 1 to 3) discloses:

A storage unit for the temporary storage of rolls of rolled up band-shaped material, arranged between a first section and a second section of a production line and comprising:

- an endless flexible member 12 defining a closed path within said storage unit and bearing a plurality of seats (cradle members 58) for said rolls, said seats being subdivided into two

groups, a first group of empty seats (between sprockets 15 and 28) and a second group of full seats (between sprockets 14 and 26) respectively,

- input means 82 for distributing, in said seats of said first group, rolls arriving from said first section,

- output means 90 for the controlled discharge of rolls from the seats of said second group towards said second section,

- a first motor unit 18 for the advance of the seats of the first group towards the input means,

- a second motor unit 20 for the advance of the seats of the second group towards the output means.

The above features formed the preamble of the patent as granted and it was not disputed by the respondent that these features are known from document D7. In the opinion of the Board document D7 further discloses the feature of claim 1 whereby

- the first and said second motor units 18, 20 move the flexible member with a continuous motion.

The respondent has argued that the device disclosed in document D7 requires that the infeed drive unit 18 is switched on and off with the arrival of logs to ensure that all the cradle members are filled. This however appears to be just one possible way of operating the device, which is not in fact mentioned in the document. The operation of the storage device can be continuous.

In column 6, lines 7 to 12 it is stated that when both the infeed and outfeed drive units 18 and 20 are energized logs are simultaneously accepted at the input and discharged at the output. This constitutes a continuous operation. The fact that this mode of operation may lead to some cradles being empty is irrelevant to the question of whether or not the operation is continuous.

3.2 Problem to be solved

The objective problem to be solved by the features of claim 1 is to provide a storage device in which all the seats of the device in the first group may be filled without introducing mechanical stresses.

3.3 Solution to the problem

The solution to the problem is that the speed of advance of the first and second motor units is determined respectively by the rate with which the rolls come from said first section and the rate with which they are requested by said second section.

By varying the motor speeds according to the input and output requirements the speeds can be adjusted to allow all the seats to be filled without however stopping and starting the motor units. In the device of document D7 it was possible for the operator to stop the infeed drive unit 18 when no logs were waiting to be loaded and to start it again when logs were waiting. Whilst this would ensure that all the seats in the first group were full it would require constant stopping and starting of the infeed drive unit which would produce mechanical stresses.

3.4 The solution to the problem is obvious for the following reasons:

Document D2 is a document directed to storage devices in general. Its field of application is not limited. Moreover, in the one application mentioned the stored components are inflated tubes which have the same form as the elongated rolls of paper mentioned in document D7. The skilled person would therefore have no prejudice against considering the teaching of document D2. In document D2 it is explained that the input driving wheel 26 may be driven in accordance with the working speed of the delivering processing station and the output driving wheel may be controlled at the speed of the finishing machine (column 2, lines 86 to 93). The skilled person would understand this to mean that the input driving wheel will have its speed altered according to the rate the delivering processing station delivers components and the output driving wheel will have its speed altered according to the rate required by the finishing machine. The skilled person would recognise that if the speed of the input driving wheel is linked to the working speed of the delivering processing station then the result will be that all the seats are filled without stopping and starting the input driving wheel. The same would apply at the output side. Thus, the skilled person will recognise the solution to the objective problem in document D2. When considering how to apply this teaching to the device disclosed in document D7 the skilled person would want to use the type of drive means already used therein so as not to lose any advantages. Thus, he would merely exchange the existing single speed motor drive units for motor units with variable speed so to be able to vary the input drive speed in accordance with the

working speed of the delivering gluing station and the output drive speed in accordance with the working speed of the receiving sawing station. As already explained above with respect to novelty, document D2 does not disclose any particular type of drive so that the skilled person would have no prejudice against using the type of drive unit already provided in the device of document D7, i.e. a motor drive unit. Indeed, the absence of a teaching in document D2 in this respect would encourage the skilled person to use the type of drive unit already present in the device of document D7. The skilled person would merely make the necessary change to a variable speed drive unit which is as such known to him and ready at his disposal. The skilled person would, in solving the objective problem, therefore arrive at the subject-matter of claim 1 in an obvious manner.

3.5 Therefore, the subject-matter of claim 1 of the main request does not involve an inventive step in the sense of Article 56 EPC.

First auxiliary request

Amendments

4. Claim 1 has been amended in this request to specify that the speeds of advance of the motor units are respectively based on the rate of production of the first and second sections and that for the first section the rate of production is obtained from a re-reeling machine in the first section. A basis for these amendments can be found in the description of the patent in suit in column 6, lines 33 to 38 and column 6, line 56 to column 7, line 3 and in the

description as originally filed on page 9, lines 27 to 32, and on page 10, lines 12 to 18.

Claim 2 in this request is a combination of claims 1, 2 and 3 as granted.

The dependent claims have been correspondingly renumbered and their dependencies correspondingly changed.

The amendments therefore comply with Articles 123(2) and 123(3) EPC.

Insufficiency of disclosure

5. This ground fails against the auxiliary request for the same reasons as already set out with respect to the main request.

Inventive step

6.1 Compared to claim 1 of the main request claim 1 of the first auxiliary request specifies how the rate at which the rolls come from the first section and are requested by the second section is to be determined. For the rate at which the rolls come from the first section the production data of a re-reeling machine in the first section is used. In the device disclosed in document D7 there is in the first section a re-reeling machine and a gluing machine (column 1, lines 10 to 13) with the gluing machine being next upstream to the storage device. In the storage device of document D2 the speed of the input driving wheel 26 is in accordance with the speed of the delivering processing station, i.e. the station next upstream to the storage device. The

skilled person when applying the teaching of document D2 to the device of document D7 would take the equivalent station of the device disclosed in document D7, i.e. the next station upstream. This next station in document D7 is the gluing machine. Claim 1 of the first auxiliary request however does not specify taking the production data from this gluing station but rather from the re-reeling machine which is further upstream. The choice of taking the production data of the re-reeling machine has the advantage that the first motor unit can start to react early to potential changes in the rate of arrival of rolls and thus avoid a situation where there are no rolls waiting to be loaded onto the storage device. None of the cited documents suggest using the data from the re-reeling machine for this purpose. Moreover, this choice goes against the teaching of document D2 which, when applied to the device of document D7, is to take the production data of the gluing machine. The subject-matter of claim 1 of the first auxiliary request is therefore not obvious to the person skilled in the art.

6.2 Compared to claim 1 of the main request independent claim 2 of the first auxiliary request additionally contains features directed towards further modifying the speeds of advance of the first and second motor units by providing the necessary features to detect the number of rolls waiting upstream of the respective input and output distributors. This means that the speeds of advance of the motor units are each subject to control of their speeds of advance by two parameters. None of the cited prior art documents suggests control by two parameters. Also, none of the cited prior art documents suggest the use of the number of rolls waiting upstream of the respective input and

output distributors as a parameter.

The appellant argued that a combination of documents, D7, D2, D5 and D14 would lead the skilled person to the subject-matter of claim 2. Document D5 does disclose a set of sensors which indicate when there is a roll waiting at the input distributor. However, the sensors do not detect the number of rolls and the information is used only to switch a single speed motor on or off. There is no indication of controlling a motor speed based on the information. Document D14 is a partial translation of a Japanese patent which concerns a wrapping machine for bread. The machine may have its rate of wrapping controlled by the number of items waiting for wrapping. Since there is no storage unit with input and output distributers and with seats to be filled the skilled person would not find any reason to consider the teaching of this document. This is even more so the case since document D14 does not deal with the same type of product as that dealt with in document D7.The subject-matter of claim 2 of the first auxiliary request is therefore not obvious to the person skilled in the art.

6.3 Therefore, the subject-matter of each of claims 1 and 2 of the first auxiliary request involves an inventive step in the sense of Article 56 EPC.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the first instance with the order to maintain the patent in amended form with the following documents:

Claims: 1 to 7 according to the first auxiliary request filed on 21 January 2003,

Description: column 1 filed on 21 January 2003; column 2 filed with letter of 13 December 2002 as description for the first and second auxiliary request; columns 3 to 7 as granted,

Figures: 1 to 3 as granted.

The Registrar: The Chairman:

D. Spigarelli A. Burkhart