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File Number: T 427/88 - 3.2.4

Application No.: 82 200 302.6

Publication No.: 0 060 009

Title of invention: A conveyor system

Classification: B65G 19/16, A01K 39/00

D E C I S I O N
of 27 November 1991

Proprietor of the patent: CHORE-TIME N.V.

Opponent: TECNICAS E INNOVACIONES GANADERAS S.A.
(TIGSA)

Headword:

EPC Article 56

Keyword: "inventive step (yes, after amendment)"

Headnote



Case Number : T 427/88 - 3.2.4

D E C I S I O N
of the Technical Board of Appeal 3.2.4
of 27 November 1991

Appellant :
(Opponent)

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Decision under appeal :

Interlocutory decision posted on 15 June 1988
concerning maintenance of European patent
No. 0 060 009 in amended form.

Composition of the Board :

Chairman : C. Andries
Members : M. Ceyte
J.P. Seitz

Summary of Facts and Submissions

- I. The Respondent is the Proprietor of the European patent No. 0 060 009 (patent application No. 82 200 302.6) which was granted on 4 December 1985.
- II. The patent was opposed by the Appellant on the grounds that its subject-matter does not involve an inventive step. In support of his request, he submitted inter alia the following prior art documents:
- E1: "Zootechnica International", March 1981, No. 3, pages 10 and 11,
- E2: Prospectus of the firm Big Dutchman, a Division of U.S. Industries Inc., Zeeland, Michigan, USA, 1/70 No. 10036,
- E3: Prospectus of the firm IBO Tecnica Alemana para Ganaderia, 1976, T.2.296,
- E4: Prospectus of the firm Chore-Time Equipment, Inc., Milford, Indiana 46542, 1972, No. 2TFS-1-72,
- E5: US-A-2 232 606
- E9: GB-A-762 411
- E10: US-A-3 003 464
- E11: US-A-3 191 581
- III. By its interlocutory decision posted on 15 June 1988, the Opposition Division maintained the patent in amended form on the basis of the documents specified in a communication pursuant to Rule 58(4) EPC dated 18 March 1988.

IV. The Appellant filed an appeal against this decision on 10 August 1988 and paid the appeal fee the same day. Statement of Grounds of appeal was filed on 9 September 1988.

V. In the oral proceedings held on 27 November 1991 the parties defended their cases, whereby documents E3, E4, E5, E9-E11 were dealt with in detail.

The Respondent requested that the patent be maintained on the basis of Claims 1 and 2 and description as filed during the oral proceedings and drawings as granted.

VI. The Appellant's arguments set forth in his written and oral statements can be summarised as follows:

Prior art document E9 acknowledged and evaluated in the introductory part of the patent in suit discloses a feed conveyor of the type specified in the prior art portion of Claim 1.

As stated in column 1, lines 40-42, the object of the patent is to simplify a conveyor system of this kind.

This object appears to be achieved by the solution stated in the characterising part of Claim 1, i.e. the following features:

- (a) the conveying element is an open helical spring having a rectangular cross-section;
- (b) the small sides of the rectangular cross-section are positioned at the radial outside and inner side of the helical spring;

(c) the teeth of the sprocket wheel are provided with bevelled faces;

(d) the teeth penetrate a straight horizontal section of the track in a zone opposite to the bottom of said section.

Documents E1 to E4 show undeniably that conveying elements in the form of an open helical spring having a rectangular cross-section were known before the priority date for use in feed conveyor systems. In the decision under appeal, the Opposition Division took the view that the helical conveying element shown in documents E1 to E4 is intended to rotate so as to urge by rotary motion the material feed through the ducts of the conveyor system. However, the helical conveyor element according to document E5 translates through the ducts of the conveyor system and has a cross-section which may be rectangular (page 2, right-hand column, line 33). The conveying element of document E10 is likewise a helical spring which is translated by means of pulleys.

A skilled person would recognise from the teachings of these documents that it would be obvious to replace the conveyor element of document E9 by a translating helical conveyor element having a rectangular cross-section and to modify accordingly the sprocket wheel drive, so that the features (a), (b) and (c) cannot be regarded as non-obvious.

As regards the additional feature (d), the nearest prior art document E9 shows that the teeth of the sprocket wheel penetrate a straight section of the continuous track of the conveyor system. Only the horizontal arrangement of the sprocket wheel is novel, but not clearly derived from the schematic perspective views of Figures 2 and 3 as filed.

Thus, one part of the additional feature (d) is known and the other part constitutes added subject-matter which contravenes Article 123(2) EPC, so that such a feature cannot impart non-obviousness to the subject-matter of Claim 1.

The Appellant requested revocation of the patent in its entirety.

VII. The Respondent contested the arguments brought forward by the Appellant. He pointed out in particular that there is no suggestion in the cited prior art documents of so arranging a sprocket or gear wheel that its teeth penetrate a straight horizontal section in a zone opposite to the bottom of said section, so as to avoid damage of the feed and contamination of the driving element. Fig. 3 of document E11 shows a sprocket wheel whose teeth come into contact with the bottom, so that the feed can be damaged and contamination is not excluded.

VIII. Claim 1 reads as follows:

" A feed conveyor system comprising a continuous track in the form of feed display or dispensing channels interconnected by ducts of circular cross-section or tubes having arcuate shape sections, an endless conveying element running through the channels and the ducts or tubes and adapted to follow the arcuate shape sections, said endless conveying element defining scraping elements and being movable through the continuous track by a driving wheel situated in a straight section of said track and radially engaging the conveying element in longitudinal direction, the pitch of the teeth of the driving wheel being adapted to the pitch of the scraping elements of the conveying element, a duct section being connected to

a feed supply, characterized in that the scraping elements are formed by a rectangular wire bent to form an open helical spring (9) forming the conveying element and having the small sides of the rectangular cross-section (12) of the wire positioned at the radial outside and innerside of the helical spring, in that the driving wheel consists of a gear wheel and in that the teeth of that gear wheel (13) are provided with bevelled faces, said teeth penetrating a straight horizontal section of the track in a zone opposite to the bottom of said section so as to contact the long sides of the rectangular cross-section of the wire between windings of the helical spring."

Reasons for the Decision

1. The appeal complies with Articles 106 to 108 and Rule 64 EPC and is admissible.
2. With respect to the formal aspects of the claims, the following is to be observed:
 - 2.1 The Appellant has challenged under Article 123(2) EPC the insertion into Claim 1 of the word "horizontal" (the straight horizontal section where the drive system is located). Figures 1 to 7 and particularly Figures 2 and 3 of the drawings as originally filed cannot reasonably be interpreted by a skilled reader to illustrate the location of the drive system in other than an horizontal section of the track. The drawings are all consistent with one another in this respect and none permits any sensible interpretation suggesting that the location may be in a non-horizontal section. A vertical section is anyway excluded because of the aperture formed in the wall of the

duct to enable the teeth of the gear wheel to contact the helical conveying element. It is true that Figures 1-3 which show the horizontal arrangement of the drive system are schematic perspective views; however, Figure 1 clearly shows a vertical feed hopper in the form of a truncated cone mounted on supporting legs as well as the building with its roof and vertical walls in which the feed conveyor is lodged. Compared with the vertical walls of the depicted building or the vertical feed hopper, it is readily apparent that the drive system is located in a horizontal straight section of the track.

Furthermore, the original patent application (page 6, lines 1 to 7) indicates that the embodiment according to Figure 6 has a closed circuit channel system on each floor. Such an indication implies a horizontal positioning of the channel system.

The feature "gear wheel" inserted into the characterising portion of Claim 1 and the statement of invention, is indisputably disclosed in the original patent application documents (see e.g. Claim 1 as filed).

The other features added to Claim 1 are clearly described in the original description and shown in the drawings, whilst Claim 2 finds support on page 5, lines 1-5 and Figure 4 as filed.

The claims thus meet the requirements of Article 123(2) EPC.

- 2.2 The wording "sprocket wheel" used in the amended Claim 1 on which the decision under appeal is based as well as in Claim 1 as granted has been amended to read "gear wheel" for the sake of clarity and consistency. A sprocket wheel

normally designates a wheel fitted with sprockets on its outer rim, which can be used generally in a chain drive. In the present case, the driving wheel is used for translating the helical conveyor element and not for a chain. In the original patent application documents as well as in the granted patent, in particular in the description of the illustrated embodiment the expression "gear wheel" is used consistently (original patent application: pages 2 to 6). Pursuant to Article 69(1) EPC the description and the drawings shall be used to interpret the claim for the purpose of resolving an ambiguity and determining the extent of protection. The wording "gear wheel" can be found in the description as filed so that in this case, the protection cannot be extended by the introduction of this feature into Claim 1. Therefore, this clarification does not contravene Article 123(3) EPC.

Amended Claim 1 contains all the other features of the granted Claim 1, so that the requirements of Article 123(3) EPC are also met in this respect.

3. None of the available documents discloses a feed conveyor system having all of the features specified in Claim 1. Novelty was never disputed by the Appellant, the Opposition Division or the Board, so that no further discussion appears to be necessary in this respect.
4. It still remains to be examined whether the requirement of inventive step is met by the subject-matter of Claim 1.
 - 4.1 Prior art document E9 is acknowledged and evaluated in the introductory part of the patent-in-suit and the object to be achieved or the problem to be solved which is mentioned in column 1, lines 40-42 is formulated vis-à-vis this

prior art document.

In a communication pursuant to Article 110(2) EPC, dated 28 December 1990, the Board expressed the provisional view that document E10 appeared to be more relevant than document E9. However, as discussed during the oral proceedings, document E10 does not disclose a feed conveyor of the type stated in the prior art portion of Claim 1, since the helical conveyor element does not come into contact with the duct wall and thus does not define, as claimed, a scraping element which rubs against the duct wall. The helical conveyor element according to this citation is also not adapted to follow the arcuate shape section as claimed, since the disclosed conveyor system needs quite complicated cornering devices. The Board thus comes to the conclusion that document E9 more closely resembles the subject-matter of Claim 1 and thus represents the closest prior art.

- 4.2 In the known conveyor according to document E9, the endless conveyor element is an assembly of a plurality of flights or scrapers each rigidly connected to a connecting rod. In order that the conveyor element may pass the arcuate shape sections of the ducts, the connecting rods are pivotably linked together. For this purpose, the connecting rods are provided with spherical or hemispherical enlargements which are fitted in a cup-shaped head belonging to a next connecting rod. Further, the teeth of the driving wheel are U-shaped so that arms of the teeth may pass on either side of a connecting rod to contact the driving face of the associated flight or scraper and no tendency of tilting the scraper occurs (cf. column 1, lines 19-35 of the patent in suit).

In this known conveyor, the driving wheel is not situated in the active part of the duct where the material is

conveyed, but on the return part disposed between the discharge opening and the hopper, which return part thus contains none of such material. The driving wheel used for translating the conveyor element therefore does not come into contact with the conveyed material, so that damage of the conveyed material and a contamination of the driving wheel are avoided.

One disadvantage of this conveyor is the very complicated design of the conveyor element, special measures being necessary to avoid penetration of material to be conveyed into the joints between the connecting rods.

- 4.3 An objective assessment of what is actually achieved over the closest prior art document E9 allows the problem to be formulated as the provision of a conveyor system with a simplified design having however a good conveying efficiency while minimizing the damage of the conveyed feed or the contamination of the driving wheel.

This problem is in essence solved by the following features stated in the characterising portion of Claim 1:

- (i) the scraping elements are formed by a helical conveyor element of rectangular cross-section;
- (ii) the driving wheel is a gear wheel whose teeth penetrate a straight horizontal section of the track in a zone opposite the bottom.

By the long sides of the rectangular cross-section of the helical conveyor element (feature (i) above) an improved conveyance of the feed of the material through the ducts is achieved.

Furthermore, by positioning the driving wheel as stated in the characterising feature (ii) the damage of the conveyed material and the contamination of the driving wheel are minimized.

- 4.4 Documents E1-E4 show clearly helical conveyor elements having a rectangular cross-section. However, as pointed out in the decision under appeal, the conveying element according to Claim 1 is not only a helical spring of rectangular cross-section, but has also to be an endless one, to define scraping elements and to be movable in longitudinal direction through the continuous track. In documents E1 to E4 the helical conveying elements are of finite length (no continuous track) and are rotated by motors so as to urge by rotary motion the material through the duct of the conveyor system.

It is true that document E3 seems to disclose on its back page the use of conveying elements in a continuous track-system ("Equipo de transporte con cadena"). However, it is clear that this system is limited to the shown corresponding conveying elements e.g. "cadena de transporte, redonda" and "cadena de transporte, en canal". Indeed, no link exists in document E3 between the use of helical conveying elements ("espiral") of finite length driven by a rotating motor on the one hand and the use of the non-helical conveying elements ("cadena de transporte") on the other hand. A person skilled in the art therefore does not find in document E3 a lead to use a helical conveying element in a continuous track system.

- 4.5 The helical conveyor element according to document E5 translates through the ducts of the conveyor system. It "may be of any desired cross-sectional shape, for example round, square, rectangular, triangular, etc." However, there is no disclosure or suggestion in this citation that

the choice of a rectangular cross-section from the numerous other possibilities would provide the advantageous technical effect discussed above, that is to say would improve the conveying efficiency of the helical conveyor element. Contrary to the Appellant's view, the provision of a rectangular cross-section cannot be considered as suggested solely on the grounds that such a feature was disclosed by publications in the same special technical field. It is also necessary to examine whether this prior art gave the skilled person an indication for applying this measure in the present case. Such an indication does not have to be given expressis verbis. It can reside in the fact that the purpose of the disclosed feature is the same as in the case to be decided. (cf. Decision T 39/82, EPO OJ, 1982, 419, point 7.3 of the reasons).

In the present case, there is no disclosure in the prior art documents E1-E5 that a rectangular cross-section would improve the conveying efficiency when compared with the usual circular cross-sectional shape. Furthermore, in the Board's view, this technical effect does not become apparent to the skilled person when reading the prior art documents E1-E4 or E5.

- 4.6 Further, even if the skilled person had thought to incorporate a helical conveyor element of rectangular cross-section (feature (i)) into a conveyor system of the type disclosed in document E9, he would not have arrived at the teaching of Claim 1, since the prior art documents do not give any hint that the damage of the conveyed feed by the driving wheel or its clogging may be minimized by positioning the driving wheel in a straight horizontal section of the track in a zone opposite the bottom (the afore-mentioned feature (ii)).

Indeed, the conveyor systems according to documents E9 and E5 avoid the problem of contamination of the driving wheel by situating the driving wheel in that part of the conveying track where no conveyed material is present (document E9: page 2, lines 68 to 77; document E5: Figs. 1 and 2). No hint is given to situate the driving wheel in a part of the conveying track where conveyed material is present, let alone to take measures that in such a case contact between driving means and conveyed material must be avoided as much as possible.

Document E11 concerns a poultry feeding system having a feed channel system in which is mounted an endless conveyor chain driven by sprocket wheels. As best seen in Figures 2 and 3, the sprocket wheels are disposed in a straight portion of the feed channel above its bottom. However, the teeth of the sprocket wheels engage the "horizontally disposed links of the conveyor chains" (column 3, line 29), and according to Figures 2 and 3, the teeth of the sprocket wheels appear to touch the bottom of the channel, so that the feed may be pressed and ground by the sprocket wheels. Thus the disclosed arrangement does not have the task of minimizing damage of the conveyed feed by the driving wheels. It follows that also the prior art document E11 could not suggest the characterising feature (ii).

4.7 Prior art document E10 does not concern a feed conveyor of the type specified in the prior art part of Claim 1 (see above section 4.1). Further, there is also no disclosure or suggestion in this citation of adopting a rectangular cross-section for improving the conveying efficiency of the helical conveyor element and of positioning the driving wheel as defined in the characterising part of Claim 1. On the contrary, it becomes clear from Figs. 8 and 14 that no measures have been taken to avoid contact

between the driving means on the one hand and conveyed material on the other. In the absence of any disclosure or suggestion in these respects, document E10 would be of no assistance to the skilled person seeking to solve the problem at hand.

- 4.8 In the remaining documents, there is likewise no disclosure or suggestion of the features (i) and (ii) stated in the characterising part of Claim 1.
- 4.9 Therefore, in the Board's judgement, the subject-matter of Claim 1 involves an inventive step (Article 56 EPC) and the patent is to be maintained on the basis of this independent claim.
- 5 Dependent Claim 2 concerning a particular embodiment of the invention in accordance with Rule 29(3) EPC is likewise acceptable.
6. The present description and drawings take account of the requirements of the EPC.

The opposition and appeal grounds thus do not prejudice the maintenance of the patent in the present amended form.

A communication under Rule 58(4) EPC is unnecessary in the present case (see T 219/83, OJ EPO 1986, 211) since the oral proceedings gave both parties adequate opportunity to comment therein on the current set of amended patent documents i.e. on the proposal to maintain the European patent in amended form.

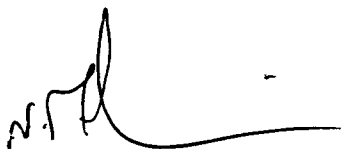
Order

For these reasons, it is decided that:

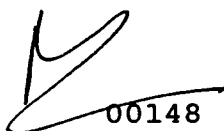
1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to maintain the patent with the following documents:
 - claims 1 and 2 as filed during the oral proceedings;
 - description as filed during the oral proceedings;
 - Figures 1 to 7 as granted.

The Registrar

The Chairman



N. Maslin


C. Andries
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I.P.S.