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D E C I S I O N
of 3 February 1995

Case Number: T 0237/94 - 3.2.4

Application Number: 88201201.6

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IPC: A01F 15/00

Language of the proceedings: EN

Title of invention:
Round baler with rollers and belts

Applicant:
NEW HOLLAND BELGIUM N.V.

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step (yes)"

Decisions cited:
-

Catchword:

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Case Number: T 0237/94 - 3.2.4

D E C I S I O N
of the Technical Board of Appeal 3.2.4
of 3 February 1995

Appellant: NEW HOLLAND BELGIUM N.V.
Leon Claeysstraat 3a
B-8210 Zedelgem (BE)

Representative: Altenburg, Udo, Dipl.-Phys.
Patent- und Rechtsanwälte
Bardehle, Pagenberg, Dost, Altenburg,
Frohwitter, Geissler & Partner
Galileiplatz 1
D-81679 München (DE)

Decision under appeal: **Decision of the Examining Division of the European Patent Office dispatched on 3 August 1993 refusing European patent application No. 88 201 201.6 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: C. A. J. Andries
Members: F. Widhalm
M. Lewenton

Summary of Facts and Submissions

I. On 12 October 1993 the Appellant (Applicant) lodged an appeal against the decision of the Examining Division dispatched on 3 August 1993 to refuse European patent application No. 88 201 201.6. The appeal fee was paid on 12 October 1993 and the Statement of Grounds of Appeal received on 13 December 1993.

The Examining Division held that the application did not meet the requirements of Article 56 EPC in view of the prior art disclosed in EP-A-120545 (D1) and EP-A-130 858 (D2) or EP-A-125 719 (D3).

II. The Appellant requested that the decision under appeal be set aside and a patent be granted on the basis of the following documents:

Description: pages 1 to 5 as filed with the letter of 25 November 1994.
Claims 1 to 5 as filed with the letter of 25 November 1994.
Figures 1 and 2 on sheet 1/1 as originally filed.

III. The wording of the present Claim 1 reads as follows:

"A round baler comprising:
- a main frame (12);
- an auxiliary frame (18) pivotally connected to the main frame (12) for movement between a closed, bale-forming position and an open, bale-discharge position;
- an expandable bale chamber defined by a front wall formed by a series of rollers (30,32,34,36), a rear wall formed by a run (38a) of endless flexible

conveyor means, a floor roller (28) and a bale chamber inlet (39);
said pivotal mounting (20) of the auxiliary frame (18) on the main frame (12) being located generally at or adjacent the bale chamber upper end;
said series of rollers (30,32,34,36) being rotatably mounted in the main frame (12) in an arcuate arrangement extending above the bale chamber inlet (39) and between said bale chamber inlet (39) and the pivotal mounting (20) of the auxiliary frame (18) on the main frame (12);
said flexible conveyor means comprising a plurality of side-by-side extending endless belts (38) movably supported on a drive roll (48) rotatably mounted generally at or adjacent the bale chamber upper end and guide rolls (40,42,44,46) rotatably mounted in the auxiliary frame (18);
said run (38a) extending between said drive roll (48) and one of said guide rolls (46) disposed, when seen with the auxiliary frame (18) in the closed position, generally at or adjacent the bale chamber lower end and, said floor roller (28) being rotatably mounted in the main frame (12) at a distance from said series of rollers (30,32,34,36) to determine said bale chamber inlet (39) therebetween and, again when seen with the auxiliary frame (18) in a closed position, adjacent said one guide roll (46);

- a pick-up roll (22) mounted on the main frame (12) adjacent the floor roller (28) and the bale chamber inlet (39);
- pivotally mounted take-up and tensioning arms (50) for the conveyor means (38) and disposed, on the one hand, to urge said run (38a) of the conveyor means (38), in the empty condition of the baler, into a rectilinear path extending between said one guide roll (46) and said drive roll (48) and defining,

together with the series of front wall rollers (30,32,34,36), the floor roller (28) and the bale chamber inlet (39), a generally D-shaped bale starting chamber (37) and, on the other hand, to permit during bale formation, expansion of said run (38a) in a direction away from that series of front wall rollers (30,32,34,36) and outwardly between said one guide roll (46) and said drive roll (48) to extend along a curved path therebetween and delimiting, together with said series of front wall rollers (30,32,34,36), said floor roller (28) and said bale chamber inlet (39), a generally cylindrically shaped, full size bale chamber when a bale being formed therein, reaches its maximum size, and characterised in that

- said drive roll (48) is rotatably mounted in the main frame (12) and provided between said series of front wall rollers (30,32,34,36) and said pivotal mounting (20) of the auxiliary frame (18) on the main frame (12) and
- again when seen with the auxiliary frame (18) in the closed position, said drive roll (48) is located forwardly of said one guide roll (46) whereby said run (38a) of the conveyor means (38) is inclined upwardly and forwardly from said one guide roll (46) in the empty condition of the baler (10)."

Reasons for the Decision

1. The appeal is admissible.

2. *Formal admissibility of the amended application documents*

The requirements of Article 123(2) EPC are met because the amendments find support in the original application documents.

2.1 In particular for Claim 1 a basis can be found in the originally filed Claims 1, 3 and 4; Figs. 1 and 2; and pages 3 and 4 of the description.

2.2 The dependent claims as well as the amended introductory part of the description are supported by the originally filed application documents.

3. The novelty of the subject-matter of Claim 1 is not disputed.

4. *Inventive step*

4.1 Closest prior art

The Board agrees with the Examining Division which considered the embodiment disclosed in Fig. 17 of document D1 to represent the closest prior art. This embodiment is a round baler of the same type as the claimed one, namely a round baler with endless conveyor means forming the rear wall of the bale chamber in the tailgate part and with a series of rollers forming the front wall of the bale chamber.

4.2 Differences between the closest prior art and the claimed baler

The claimed baler comprises additionally the following features:

(i) the drive roll (48) is rotatably mounted in the main frame (12);

(ii) the drive roll (48) is provided between said series of front wall rollers (30, 32, 34, 36) and said pivotal mounting (20) of the auxiliary frame (18) on the main frame (12);

(iii) when seen with the auxiliary frame (18) in the closed position, said drive roll (48) is located forwardly of said one guide roll (46) whereby said run (38a) of the conveyor means (38) is inclined upwardly and forwardly from said one guide roll (46) in the empty condition of the baler (10).

4.3 Effects of the differences on the device according to D1

The inclination of the belt will certainly improve the starting of the bale formation, because the incoming crop or hay is bound to fall again on the incoming stream of crop. In the device of D1 having the belt running vertically this phenomenon might be delayed, all the more so because the crop has to fall against the direction of movement of the baler.

4.4 Objective problem

The objective problem can be seen to be to prevent bale starting problems. Indeed, differing features (i) to (iii) cooperate together to prevent starting problems

due to the forward inclination of the belt, which itself is due to the specific location of the drive roll (48), while keeping the housing structure of the baler according to Fig. 17 of document D1 generally unmodified.

4.5.1 The device for forming crop into round bales according to D3 discloses a drive roll which not only supports the belts but which is as well rotatably mounted in the main frame of the device. It does not seem to involve an inventive step to use the differing feature (i) in the baler according to Fig. 17 of document D1. Indeed it seems logical to try to mount all the drive rolls in the main frame since the drive power comes from the tractor via the main frame so that there are no problems with the driving mechanism when opening the tailgate for delivering the bale since the main frame remains fixed.

4.5.2 The fact that the drive roll is provided between said series of front wall rollers and said pivotal mounting of the auxiliary frame on the main frame (differing feature (ii)) is not shown in any document. In particular the fact that the roller is separated from the pivotal mounting does not seem to be known. In a number of prior art devices the axis of rotation of the drive roll is the same as the axis about which the tailgate is pivoted when delivering the bale. Therefore, it seems to go against normal practice to provide the drive roll in that specifically claimed position.

4.5.3 The following differing feature (iii) is that, when seen with the auxiliary frame (18) in the closed position, the drive roll (48) is located forwardly of said one guide roll (46) whereby said run (38a) of the conveyor means (38) is inclined upwardly and forwardly from said one guide roll (46) in the empty condition of the baler (10).

This feature means in fact that the run of the conveyor means (belts 38) is inclined upwardly and forwardly when the baler is empty and that the means for achieving it is the location of the drive roll (48) forwardly and upwardly with respect to the guide roll (46).

Documents D2 and D3 clearly show inclined belts in their Figures, but none of them mentions in the description the function of this inclination so that it is not clear whether this inclination is done on purpose or not and whether the skilled man would recognise an intended function of that inclination.

Even if the skilled man were to recognise that such an inclination enhances the initial formation of the bale, both prior art documents teach to use, in addition to the belts, specific means to reduce the initial volume of the bale forming chamber, so that the skilled man wishing to prevent bale starting problems in D1 would be guided by D2 and D3 to adopt not only the inclination of the belt but also the additional chamber volume reducing means, which in both cases are constituted by arm means comprising two rollers which pull the belts together in their lower position ensuring thereby that already at the beginning of the bale formation, the bale is guided and maintained in the proper shape. Indeed nothing in those documents teaches a departure from that combination.

However, the embodiment according to Fig. 17 of document D1 disclosing a large, generally D-shaped bale starting chamber, does not seem to be compatible with the embodiments according to documents D2 and D3 which disclose a completely different (in volume and form) starting chamber, so that the person skilled in the art would not be guided by the presence of the small inclined part of the rearward belt forming part of the

bale starting chamber in documents D2 and D3 to use a large inclined surface for the rearward belt of the bale starting chamber in the embodiment according to Fig. 17 of document D1.

4.5.4 It seems precisely to be part of the invention to have recognised that in the specific round baler configuration according to Fig. 17 of document D1, only the inclination of the belt run - without anything else - is sufficient to prevent bale starting problems.

Indeed, by displacing the upper drive roll (48) in the forward direction relative to the lowest guide roll (46) the inclination of the belt run is obtained in a very simple constructional manner which is not suggested by any of the cited prior art documents.

4.5.5 The other prior art documents to be considered (D5: GB-A-2 128 542, D6: EP-A-115 608) do not disclose balers of the kind having an expandable chamber. In this kind of device the bale forming chambers in the empty condition are of a very different shape so that the skilled person wishing to prevent starting problems in the device according to Fig. 17 of D1 would not find any hint in D5 or D6 towards the use of an inclined expandable rear belt to solve them.

4.6 The invention claimed in Claim 1 therfore has to be considered as involving an inventive step since, having regard to the state of the art, the invention is not obvious to a person skilled in the art.

5. The subject-matter of Claim 1 is thus patentable under Article 52 EPC. A patent may therefore be granted on the basis of the claim and the documents defined in Section II above.

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 grant a patent in the version set out in Section II above.

The Registrar: The Chairman:

N. Maslin C. Andries

03.02.1995