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Bezeichnung der Erfindung:
Title of invention:
Titre de l'invention : Grain separating apparatus

ENTSCHEIDUNG / DECISION
vom / of / du 2 October 1984

Anmelder/Patentinhaber:
Applicant/Proprietor of the patent:
Demandeur/Titulaire du brevet : Massey-Ferguson Service N.V.; Massey-Ferguson S.A.

Stichwort / Headword / Référence : -

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Art. 52(1), 56 EPC

Leitsatz / [illegible]note / Sommaire

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Case Number: T 35 / 84

DECISION

of the Technical Board of Appeal 3.2.1

of 2 October 1984

Appellant: Massey-Ferguson Services N.V.
Abraham de Veerstraat 7A
Cuaracao (AN)
and
Massey-Ferguson S.A.
Boursidiere, RN 186
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Representative: Jones David Bryn
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Decision under appeal: Decision of Examining Division 125 of the European Patent Office dated 29 September 1983 refusing European patent application No 81 900 070.4 pursuant to Article 97(1) EPC

Composition of the Board:

Chairman: G. Andersson
Member: M. Huttner
Member: P. Ford

SUMMARY OF FACTS AND SUBMISSIONS

I. The European Patent application No. 81 900 070.4 filed on 19 December 1980 as international application PCT/GB 80/00222 claiming priority from two national British applications of 8 January 1980, and 30 July 1980 and published under the International Publication No. WO 81/01939 was refused by a decision of Examining Division 125 of the European Patent Office dated 29 September 1983. The decision was based on the original Claims 1 and 2 and the amended Claims 3-13 filed on 22 June 1983.

The reason given for the refusal was that in view of the prior art disclosed by GB-A-1 101 431 and GB-A-1 184 542 the subject-matter of Claim 1 did not involve an inventive step within the meaning of Article 56 EPC and the claim was thus not allowable under Article 52(1) EPC.

II. On 4 November 1983 the appellants lodged an appeal against the decision. The appeal fee was duly paid and the statement of grounds was received together with an alternative Claim 13.

The appellants argued that a person skilled in the art could not deduce the subject-matter of the invention from anything disclosed in the state of the art.

III. As a result of objection raised by the Board of Appeal during the procedure before the Board, the appellants submitted on 17 August 1984 a new set of Claims 1-12 together with a slightly revised description and a new alternative Claim 13, requesting that the impugned decision be set aside and a European patent be granted on the basis of the new claims and amended description.

The new Claim 1 reads as follows:

Apparatus for recovering grain from a mixture of grain and straw in a combine harvester comprising a conveyor capable of conveying a mixture of grain and straw in a generally horizontal direction to a discharge end; a chute arranged so that said mixture discharged from the conveyor falls onto the chute, the chute having a floor that is imperforate to the passage of grain through it and is downwardly inclined and projects beyond said discharge end in the feeding direction of the conveyor; a trough covered by a grille provided at or adjacent to the lower end of the chute and adapted so that when the mixture of grain and straw passes down the chute grain is collected by the trough and straw passes over it; and a rotor provided above and adjacent to the rear end of the chute and driven so as to assist the discharge of material from the apparatus, characterised in that the rotor (7) is mounted so that it is adjustable towards and away from the chute (4) and grille (6) to vary the space therebetween for different types of crop crop conditions.

The alternative Claim 13 reads as follows:

Apparatus for recovering grain from a mixture of grain and straw in a combine harvester comprising a conveyor capable of conveying a mixture of grain and straw in a generally horizontal direction to a discharge end; a chute arranged so that said mixture discharged from the conveyor falls onto the chute, the chute having a floor that is imperforate to the passage of grain through it and is downwardly inclined and projects beyond said discharge end in the feeding direction of the conveyor; a

trough covered by a grille provided at or adjacent to the lower end of the chute and adapted so that when the mixture of grain and straw passes down the chute grain is collected by the trough and straw passes over it; and a rotor provided above and adjacent to the rear end of the chute and driven so as to assist the discharge of material from the apparatus, characterised in that the rotor (7) is carried between the lower ends of a pair of downwardly extending arms (10) that are pivotally supported at their upper ends (14) so as to allow the rotor (7) to be swung backwards and forwards between the number of different settings relative to the chute (4) and grille (6) so as to vary the space therebetween for different types of crop and crop conditions, the rotor (7) being driven by a drive mechanism comprising an upper drive pulley or wheel (30) that is rotatable about said upper pivot axis (14) and a lower drive pulley or wheel (33) that is co-axial with the axis of the rotor (7), the two drive pulleys or wheels (300,33) being coupled so that an input drive (44) to the upper pulley (30) serves to drive the lower pulley (33), and a drive coupling (38) being provided between the lower pulley (33) and the rotor (7).

IV. For the original claims, description and drawings reference should be made to publication No. WO 81/01939.

Reasons for the Decision

1. The appeal complies with Articles 106 to 108 EPC, and it is considered to comply also with Rule 64 EPC, since it follows from the statement of appeal and from the fact to continue the prosecution of this case on the basis of

amended documents (new alternative Claim 13) that the appellants request the decision to be set aside in its entirety and the grant of a patent with these documents. The appeal is, therefore, admissible.

2. Compared with the wording of Claim 1 on which the decision is based, the effective Claim 1 comprises the added feature of the adjustability of the rotor not only towards the chute but also towards the grille. This feature can, however, be derived from the statement of the original Claim 1 according to which the grille is provided at the lower end of the chute. This implicates that a change of position of the rotor with respect to the chute inevitably entails a change of position with respect to the grille. Therefore, the subject-matter of Claim 1 and similarly of alternative Claim 13 does not extend beyond the content of the application as filed (Article 123(2) EPC).

In the preamble of Claims 1 and 13, the appellants have recited all those features of the apparatus which are in combination disclosed in GB-A-1 101 431 representing the closest prior art compared with the devices disclosed in the other publications cited in the search report. These claims thus likewise meet in this respect the formal requirements of the Convention (Rule 29(1) EPC).

3. The examination as to whether an apparatus according to Claims 1 or 13 is disclosed in any of the documents uncovered by the search report leads to the conclusion that the subject-matter of each of these claims is novel having regard to this state of the art, due to the fact that they all fail to disclose a rotor which is adjustable towards and away from a chute and a grille.

4. In the apparatus of the same kind known from GB-A-1 101 431 there is a downwardly inclined chute imperforate to the passage of grain provided with a pluraity of fins to prevent the straw from reaching the floor of the chute. Both, the chute and the fins are adjustable in the direction of the length of the fins relative to a trough to suit varying crop conditions. In the embodiment shown in Figure 1, the trough is covered by a stationary grille provided at the lower end of the chute for guiding the straw coming off the fins for passing the rotor arranged above and adjacent to the rear end of the chute and driven to assist the discharge of the material.

According to the appellants, this apparatus is not efficient when harvesting bulky crops tending to accumulate in the form of an entangled mass above the rotor. These accumulations can block the combine separating mechanism. The appellants consider this as disadvantageous.

5. Therefore, the technical problem to be solved by the present invention is to overcome this disadvantage and to modify the known apparatus so that it can handle bulky crops thereby increasing grain separation efficiency and crop flexibility of the combine to which it is fitted.

6. The solution of this problem is based on the idea of adjusting the width of the space between the chute and the rotor to suit the varying crop conditions and different types of crop. As proposed in the application this is achieved by mounting the rotor so that it is adjustable towards and away from the chute and the grille.

7. It remains to be examined whether the subject-matter of Claim 1 involves an inventive step and the question now arises whether the publications cited would give the skilled person any indication how the space between the rotor and the chute should be made adjustable by an adjustable rotor.

7.1 As can be readily gathered from GB-A-1 101 431, there is one embodiment disclosed having a chute with fins wherein no grille is provided below the chute and an alternative embodiment having such a grille interposed between the rotor and the trough accomodating an auger. In the former case, the chute and the fins, are, as already mentioned, adjustable in the direction of the length of the fins relative to the trough. However, according to the appellants, the width of the gap existing between the rotor and the chute is not or insignificantly affected by such adjustment, due to the limits of the longitudinal adjustment of the fins depicted in Figure 4. This is persuasive and it must be accepted that variation of the gap between the chute and the rotor is not taught by GB-A-1 101 431. Nevertheless, the teaching that adjustments should be made in the beating area to suit varying crop conditions can be extracted by the skilled person from this document.

7.2 The other piece of pertinent prior art relied on by the Examining Division, namely GB-A-1 184 542 discloses a rotatable grain recovery drum with angularly adjustable tines that can be set at different trailing orientations to suit the condition of the straw (cf. page 2, line 102-105). Provided the rotor axis is in fixed relation to the frame of the combine -there is no reason to

assume that this would not be so- such adjustment inevitably leads to a variation of the effective rotor diameter and thus to the gap between the end of the tines and the adjacent grid, while no change of the position or inclination of the grid defining the path of the crop occurs. Even if the gap change so produced is only slight, it nevertheless teaches the skilled person of the possibility of gap width variation without moving the adjacent grid to suit the condition of crop.

The one specific purpose of adjusting the inclinations of the tines of the rotor so as to avoid wrapping of long straw, indicated by way of example in lines 105 to 110 of page 2, does not prevent the skilled person from recognising that thereby the passageway for the crop is widened and thus more crop would be expected to pass through the gap, and also that such an arrangement would provide a solution to crop accumulation occuring above the rotor.

6.3 Therefore, if these teachings are applied to those of GB-A-1 101 431, which, incidently, is consistent because both device end to accomodate crop riations, the rotor tines would be made angularly adjustable with the inevitable consequence of gap variation to suit different types of crops. The argument put forward by the appellants that this variation would remain very slight, is irrelevant in view of lack of any lower limit of the space variation of the claimed apparatus.

6.4 For the skilled person who wishes to vary the gap between the rotor and the chute that is without adjusting the tines in a structurally more suitable or more convenient way, there are only two reasonable alternatives available, namely making either the chute or the

rotor position adjustable with respect of the other. Consequently, it is simply a matter of choice to give preference either to the solution commonly known in thresher cylinder/concave arrangements wherein the concave is mobile relative to the cylinder leaving the rotor fixed or, as appellants have chosen to do, to make the rotor itself adjustable relative the stationary chute. Such choice however, must be considered as obvious.

6.5 The fact that none of these citations specifically refer to avoiding the problem of crop blockage cannot be considered as decisive, because the problem, although it may be new, cannot possibly contribute to the inventive merit of the solution as its formulation stems from the accumulation of crop observed in existing prior art machines and the desire to remove it. The problem is thus by no means unusual to the skilled person.

6.6 The appellants further argue that for proper grain collection and avoiding accumulation, compaction and blocking of the crop, the chute must be inclined at an optimum angle. Such requirement, however, inevitably leads the skilled person to look for a solution in which the position of the crop guiding member cooperating with the rotor must not be varied, as already suggested by GB-A-1 184 542. In this device, the gap between the rotor and the grid is varied without the necessity of varying the position of the grid.

If this teaching is applied logically to GB-A-1 101 431, this leads to a stationary chute with a maintained inclination and a gap adjustable by rotor position variation. An appreciation of the alleged importance of

fact that there is an optimum angle of inclination to be maintained, can therefore not induce the Board to adopt a different view on the issue of obviousness.

7. For the forgoing reasons the subject-matter of Claim 1 lacks an inventive step as required by Article 56 EPC. Therefore it cannot be allowed having regard to Article 52(1) EPC.

8. With respect to the alternative request for the grant of alternative Claim 13 essentially incorporating all the features of the original Claims 1, 2 and 3, the Board sees no reason to deviate from the findings in paragraph 12 of the Decision under Appeal as to both the novelty (Article 54 EPC) and the inventive step (Article 56 EPC) of the subject matter, after the appellants have now chosen to adopt the previous proposal of the Examining Division. Thus the Board holds this Claim to be both novel and based on an inventive step. Claim 13 is therefore, allowable.

9. Since the statement of invention is not in conformity with the content of the alter.. ive Claim 13 and the acknowledgement of the pertinent prior art is not completed so as also to include GB-A-1 184 542 disclosing a variable gap for the crop passage, although this was requested in a communication, the Board, in order not to deprive the appellants of an opportunity to amend the application to comply with Rules 27(1)(c) and (d), deems it appropriate to remit the application to the Examining Division for further prosecution.

ORDER

It is decided that:

1. The Decision of the Examining Division of the European Patent Office dated 29 September 1983 is set aide.

2. The application is remitted to the Examining Division for further prosecution on the basis of the alternative Claim 13 and the new pages 2, 3, 6 and 8 of the description, both submitted on 17 August 1984.

The Registrar: The Chairman: