BESCHWERDEKAMMERN DES EUROPÄISCHEN PATENTAMTS

BOARDS OF APPEAL OF THE EUROPEAN PATENT OFFICE

CHAMBRES DE RECOURS DE L'OFFICE EUROPEEN DES BREVETS

A		B		C	X

File No.: T 0826/90 - 3.2.4

Application No.: 84 101 291.7

Publication No.: 0 116 895

Classification: B65H 3/52

Title of invention: Automatic sheet feeding device

D E C I S I O N
of 16 June 1993

Applicant:

Proprietor of the patent: HITACHI, LTD.

Opponent: BSG Technische Beratungs-Gesellschaft mbH

Headword: Sheet feeding/HITACHI

EPC: Art. 54, 56 and 123(2)

Keyword: "Novelty (yes)" - "Inventive step (yes)"

Headnote
Catchwords

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0826/90 - 3.2.4

D E C I S I O N
of the Technical Board of Appeal 3.2.4
of 16 June 1993

Appellant: (Opponent)
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Decision under appeal: **Interlocutory decision of the Opposition Division of the European Patent Office dispatched on 20 August 1990 concerning maintenance of European patent No. 0 116 895 in amended form.**

Composition of the Board:

Chairman: C.A.J. Andries
Members: P. Petti
J.P.B. Seitz

Summary of Facts and Submissions

I. European patent No. 0 116 895 concerning an "Automatic sheet feeding device" and comprising five claims was granted on 4 May 1988 in respect of European patent application No. 84 101 291.7 filed on 8 February 1984.

II. An opposition was filed against the patent requesting it be revoked. The opposition was based on Article 100(a) EPC.

III. The patent was maintained in amended form by decision of the Opposition Division dispatched on 20 August 1990.

IV. On 18 October 1990 the Appellant (Opponent) lodged an appeal against the decision and paid the appeal fee. The statement setting out the grounds of appeal was received on 12 December 1990.

V. Oral proceedings took place before the Board on 16 June 1993.

(i) The Respondent filed a new Claim 1 and a revised description of the patent (columns 3 and 4).

The independent Claim 1 reads as follows:

"An automatic sheet feeding device for successively feeding thin sheets (10) with carbon backing, that have a high coefficient of friction, from a stack of sheets (10) by separating the sheets, the device comprising:

feeding means (1) for feeding the sheets (10) from said stack of sheets (10);
separating means (17) cooperating with said feeding means (1) for separating the sheets (10), the carbon backing side of which being in contact with said separating means (17), so as to allow the sheets (10) to be fed one by one by said feeding means (1), the coefficient of friction of the separating means (17) with respect to the sheets (10) being lower than the coefficient of friction of the feeding means (1) with respect to the sheets (10) and higher than the coefficient of friction of one sheet (10) with respect to another sheet (10), such that the coefficient of friction of the separating means (17) with respect to the sheets (10) is kept at a level higher than that of the sheets with carbon backing at all times;
torque regulating means (14, 15) for regulating a torque applied to said separating means (17);
rotating means (12) for rotating the separating means (17) through said torque regulating means (14, 15); and
wherein the separating means (17) are maintained in direct frictional engagement with the rotating means (12) and, when no sheets are present between the separating means (17) and the feeding means (1), with the feeding means (1), whereby the coefficient of friction between the separating means (17) and the feeding means (1) and the torque applied by the rotating means (12) to the separating means (17) are set such that, when no sheets (10) are held between the separating means (17) and the feeding means (1), the separating means (17) rotates in the feeding direction, and when the

sheets (10) are held therebetween, the separating means (17) rotates in the opposite direction."

(ii) The Appellant pointed out that, according to the description and drawings of the patent under appeal (column 6, lines 42 to 61; Figure 8), when a sheet feeding device provided with separating and feeding rollers both made of chloroprene rubber is operated for feeding sheets with carbon backing, the carbon backing side being in contact with the separating roller, the coefficient of friction of the separating roller with respect to the sheets suddenly decreases such that during a certain period of time it becomes lower than the coefficient of friction of the feeding roller with respect to the sheets and is still higher than that of one sheet with respect to another sheet (see Figure 8: line C between lines A and B). He argued that such a phenomenon would also occur when a device according to the prior art reflected by document US-A-4 368 881 is operated to feed sheets with carbon backing. In these conditions, such a device would deprive the subject-matter of Claim 1 of novelty.

(iii) The Appellant also argued that it would be obvious for a skilled person to arrange in the device known from document US-A-4 368 881 a separating roller having a friction coefficient lower than that of the feeding roller and that therefore the subject-matter of Claim 1 would not involve an inventive step.

(iv) The Respondent presented the following counterarguments:

The phenomenon concerning the reduction in friction coefficient of a separating roller made of chloroprene rubber as set out in the description of the patent may not be considered as forming part of the prior art according to Article 54 EPC. Moreover, such a phenomenon only occurs when the roller concerned is stained with carbon ink.

There is no suggestion in the state of the art of how in sheet feeding devices provided with torque regulating means to arrange a separating roller having a friction coefficient with respect to the sheets lower than the coefficient of friction of the feeding roller with respect to the sheets but higher than that of one sheet with respect to another sheet, such that the friction coefficient of the separating roller is kept at a level higher than that of the sheets with carbon backing at all times.

VI. The Appellant requested the decision under appeal be set aside and the patent be revoked.

The Respondent requested that the decision under appeal be set aside and the patent maintained on the following basis:

Claims: 1 as filed during the oral proceedings; and
2 to 5 as granted.

Description: columns 1, 2 and 5 to 8 (line 44) as granted; and

columns 3 and 4 as filed during the oral proceedings.

Drawings: Figures 1 to 8 as granted.

Reasons for the Decision

1. The appeal is admissible.

2. *Allowability of the amendments*

2.1 Claim 1 has been amended by the addition of features with respect to the granted claim.

2.1.1 The feature that "the carbon backing side of sheets is in contact with the separating means" can be derived from a passage in the description as granted (column 6, lines 23 to 27) corresponding to the description as filed (page 12, lines 4 to 10).

2.1.2 The result according to which "the coefficient of friction of the separating means is kept at a level higher than that of the sheets with carbon backing at all times" can be derived from a passage in the description as granted (column 6, lines 29 to 37) corresponding to the description as filed (page 12, lines 11 to 19).

2.1.2.1 The Appellant argued that this result - according to original disclosure (page 12, lines 11 to 19) - would only be achieved when the separating roller is formed of foamed urethane rubber. The present Claim 1 would therefore introduce new matter in so far as this result is related to the difference between the friction coefficients of the separating and feeding

means and not to the specific material of the separating means.

The Board cannot accept this argument for the following reason:

The relationship between the friction coefficients of the separating means, the feeding means and the sheets with respect to sheets was described as being an essential feature of the invention in the "Summary of the invention" of the original description (page 4, lines 5 to 12). It is therefore clear that this relationship must result in the particular desired technical effect. The fact that the reduction in the friction coefficient of the separating roller during operation of the sheet feeding device can be obviated by selecting for the separating roller a material of lower friction coefficient than the feeding roller is also described in a passage of the original description (page 10, line 16 to page 11, line 4) which refers to foamed urethane rubber only by way of example ("such as foamed urethane rubber": page 11, lines 3 and 4).

It is therefore clear for the reader of the original disclosure that the result according to which the coefficient of friction of the separating means is kept at a level higher than that of the sheets with carbon backing has to be attributed to the relationship between the different friction coefficients as defined in Claim 1 and that this relationship is maintained during operation of the sheet feeding device.

2.1.2.2 The introduction of the above mentioned result into the claim after the feature defining the relationship

between the different friction coefficients represents not only a clarification but also a limitation of this feature in so far as it teaches that the relationship between the different friction coefficients has to be selected such that the coefficient of friction of the separating means is kept at a level higher than that of the sheets with carbon backing at all times.

Thus the indication of the above mentioned result represents a clear technical teaching. The description indicates - as an example - that the result can be obtained by employing a separating roller made of foamed urethane rubber. A more precise formulation of this feature in terms of structural limitations, such as the introduction of the specific material into the claim would excessively limit the scope of the claim. Such a functional definition is therefore permissible (cf. T 68/85, EPO OJ 1987, 228).

2.1.3 The feature that "the separating means are maintained in **direct frictional** engagement with the rotating means and, when no sheets are present between the separating means and the feeding means, with the feeding means" can be unambiguously derived from the drawings as filed (Figures 1 to 7). This feature represents the clarification of the expression "maintained in engagement" in the granted claim.

2.1.4 The feature that "the coefficient of friction between the separating means and the feeding means and the torque applied by the rotating means to the separating means are set such that, when no sheets are held between the separating means and the feeding means, the separating means rotates in the feeding direction, and when the sheets are held therebetween, the separating means rotates in the opposite direction"

can be derived from a passage in the description as granted (column 5, lines 4 to 22) corresponding to the description as filed (page 9, line 17 to page 10, line 5).

2.1.4.1 The Appellant argued that this feature was only disclosed with respect to a first embodiment of the invention (see the first part of the detailed description of the application as filed, page 5, line 5 to page 10, line 13). Since Claim 1 contains features which are not described in this first part of the detailed description but in a second part (see description as filed, page 10, line 14 to page 15, line 23), the combination of features of Claim 1 would be new with respect to the original disclosure. The Board cannot accept this argument either, because the two above-mentioned parts of the detailed description are not independent of each other. The sentence "A modification of the embodiment shown and described hereinabove will be described" (see original description, page 10, lines 14 and 15) which precedes the second part constitutes a link between the two parts of the description. It is therefore clear that the modifications described in the second part relate to the embodiment already described in the first part.

2.2 The amendments of the passage in the description in column 4 , lines 4 to 10 remove an inconsistency between that passage and the drawings.

2.3 The amendments therefore do not infringe the provisions of Article 123 EPC.

3. *Novelty*

3.1 The part of the description of document US-A-4 368 881 which relates to the background of the invention describes two different types of paper feeders.

3.1.1 The feeders of the first type (see column 1, lines 11 to 36) are based on the differential friction principle. In these feeders the retarding or separating roller is always driven in a direction opposite to the feeding direction, the relationship between the friction coefficients being the same as defined in present Claim 1. Since the feeder according to Claim 1 has a separating roller which may be driven in two directions, the description of feeders of the first type does not deprive Claim 1 of novelty.

3.1.2 The feeders of the second type (see column 1, line 37 to column 2, line 11) comprise a separating roller which can be driven in both directions, namely in the feeding direction, when only one sheet is fed or no sheets are fed between the feeding and the separating roller, and in the opposite direction, when two or more sheets are fed. In the feeders of this type the separating roller and the feeding roller must have a friction coefficient with respect to the sheets which is greater than the coefficient between two sheets.

According to the statement on column 2, lines 3 to 6, the friction coefficient of the separating roller "can be as high as practical and need not to be less than the friction of the feed roller". The information that the coefficient is lower than that of the feed roller cannot unambiguously be derived from this statement, so that the description of feeders of the second type does not deprive Claim 1 of novelty.

3.2 The embodiments described in the detailed description of document US-A-4 368 881 (column 4, line 34 to column 10, line 55) concern a feeder comprising a feed roller 98 having a friction surface 100 (see particularly column 5, lines 16 and 17) and a retarding roller 112, 164 having a high-friction working surface (see particularly column 5, lines 41 to 43; column 6, lines 62 to 65). Therefore the information that the friction coefficient of the retarding roller is lower than that of the feed roller cannot be derived from the description of the preferred embodiments of document US-A-4 368 881.

3.3 In any case, the feature in Claim 1 that "the separating means are maintained in **direct frictional** engagement with the rotating means" and the result that "the coefficient of friction of the separating means is kept at a level higher than that of the sheets with carbon backing at all times" can be attributed neither to the preferred embodiments disclosed in document US-A-4 368 881 nor to the feeders described in document US-A-4 368 881 as representing the background art.

3.4 The Board cannot accept the argument put forward by the Appellant during the oral proceedings (see section V(ii) above) for the following reasons:

The phenomenon concerning the reduction in the coefficient of friction of a separating roller of chloroprene rubber is neither disclosed in the specification of the patent under appeal nor in its originally filed European application in the part of the description concerning the acknowledgement of the background art. The phenomenon is described only in order to present a comparative test between separating

rollers respectively made of chloroprene rubber and foamed urethane rubber. Therefore this phenomenon cannot be considered as prior art according to Article 54(2) EPC. Furthermore, it is clear that the coefficient of friction of the chloroprene rubber separating roller at the start of the device (see the common point of lines A and C in Figure 8) is not lower than that of the feeding roller, but equal to it, and that the coefficient of friction of the separating roller is not higher than that of the sheets with carbon backing at all times (see the part of line C below the upper line of range D in Figure 8).

Document US-A-4 368 881 neither discloses the use of a feeder for feeding sheets with carbon backing nor a retarding (separating) roller made of chloroprene rubber. It is therefore already impermissible to combine the information concerning the above-mentioned phenomenon contained in the patent under appeal (or in the corresponding patent application) with the feeder disclosed in document US-A-4 368 881.

3.5 The subject-matter of Claim 1 is therefore novel within the meaning of Article 54 EPC.

4. *Closest state of the art, problem and solution*

4.1 The Board and the parties consider document US-A-4 368 881 to represent the closest state of the art.

4.2 The subject-matter of Claim 1 substantially differs from the closest state of the art in that the coefficient of friction of the separating means with respect to the sheets is lower than the coefficient of

friction of the feeding means with respect to the sheets and higher than the coefficient of friction of one sheet with respect to another sheet such that the coefficient of friction of the separating means with respect to the sheets is kept at a level higher than that of the sheets with carbon backing at all times.

The effect produced on account of this distinguishing feature is that the risk of the surface of the separating means being stained by carbon ink when the device is used for feeding thin sheets with carbon backing is minimised. This feature therefore not only represents a technical teaching which extends beyond the definition of a range of values for the friction coefficient of the separating means but also implies a selection of materials for the separating and feeding means of the feeding device which permits the friction coefficient of the separating means to be kept **at all times** at a level higher than that of the sheets with carbon backing.

Moreover, a further difference between the subject-matter of Claim 1 and the closest state of the art can be seen in the direct frictional engagement between separating, rotating and feeding means.

4.3 The technical problem to be solved can therefore be seen as to provide an automatic sheet feeding device of high reliability in performance, capable of separating and feeding thin sheets with carbon backing with high reliability.

5. *Inventive step*

5.1 According to document US-A-4 368 881 (column 2, lines 3 to 6), the friction coefficient of the

separating roller "can be as high as practical and need not to be less than the friction of the feed roller". This statement represents rather a suggestion to arrange in a feeding device provided with torque regulating means a separating roller having a friction coefficient equal to or greater than that of the feed roller. This suggestion is reflected by the statements in column 1, lines 37 to 40 ("... rollers both having high coefficient of friction are used") and in column 5, lines 16-17 and 41-43 ("... a feed roller having a friction surface"; "...a retarding roller having a high-friction working surface").

The closest state of the art indicates therefore a way in the opposite direction to that of the invention.

5.2 In any case, the feature that the "coefficient of friction of the separating means with respect to the sheets is lower than the coefficient of friction of the feeding means with respect to the sheets and higher than the coefficient of friction of one sheet with respect to another sheet such that the coefficient of friction of the separating means with respect to the sheets is kept at a level higher than that of the sheets with carbon backing at all times" is not suggested by the available prior art.

5.3 The Appellant argued that the skilled person is free to select any value of the coefficient of friction for the separating roller of the feeding device according to document US-A-4 368 881. The skilled person - after having observed the phenomenon of carbon ink adhering to the surface of the separating roller of a feeding device used for feeding sheets with carbon backing - could easily realise that this phenomenon is caused by the high difference in friction coefficients between

the surface of the roller with respect to the sheets and one sheet with respect to another sheet. He would therefore substitute the separating roller of the device according to document US-A-4 368 881 by another roller having a lower friction coefficient without modifying the feeding roller. Since this friction coefficient of the separating roller must be higher than that between two sheets of paper (see document US-A-4 368 881, column 2, lines 6 to 10), the skilled person would arrive at a feeding device in which the friction coefficient of the separating roller with respect to the sheets is lower than the friction coefficient of the feeding roller with respect to the sheets and higher than the friction coefficient of one sheet with respect to another sheet.

Apart from the fact that, as already pointed out in section 5.1 above, document US-A-4 368 881 does not suggest such an approach, which therefore has to be considered as the result of an *ex post facto* analysis, the Board is not convinced by this allegation of the Appellant. Without any proof from the Appellant the Board is unable to accept that allegation that the sole modification of the coefficient of friction of the separating means in the feeder according to US-A-4 368 881, without taking into consideration its relation to that of the feeding means, would result in a coefficient of friction which could remain higher than that of the sheets with carbon backing at all times (cf. second paragraph of above section 4.2).

Furthermore, the problem to be solved relates to the carbon ink adhering to the surface of the separating roller of a feeding device used for feeding sheets with carbon backing. This problem is not mentioned in the available prior art so that no direct link can be

made between the particular relationship between the different friction coefficients set out in Claim 1 and a more reliable operation of the device when used to feed sheets with carbon backing.

Moreover, the prior art concerning the feeders operating on the differential friction principle (see section 3.1 above), by which there is the same relationship between the friction coefficients of the rollers as in the present Claim 1, is described in document US-A-4 368 881 as suffering from the drawback of unreliable operation due to the paper fibres adhering to the rollers and thus reducing their friction coefficient (see column 1, lines 24 to 36). This would dissuade the skilled person who wants to achieve a more reliable operation of the device from applying the differential friction principle to a device according to the closest state of the art.

5.4 Therefore, the subject-matter of Claim 1 involves an inventive step within the meaning of Article 56 EPC.

6. In view of the above, the patent can be maintained on the basis of independent Claim 1 and dependent Claims 2 to 5 which concern particular embodiments of the device according to Claim 1.

7. At the end of the oral proceedings the Appellant had an opportunity to state his observations on the amendments submitted by the Respondent. Therefore it is not necessary to issue a communication according to Rule 58(4) EPC (cf. T 219/83, EPO OJ 1986, 211).

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 that the further procedure, i.e. the maintenance of the patent, be based on the following text of the patent:

Claims: 1 as filed during the oral proceedings; and
2 to 5 as granted.

Description: columns 1, 2 and 5 to 8 (line 44) as granted; and
columns 3 and 4 as filed during the oral proceedings.

Drawings: Figures 1 to 8 as granted.

The Registrar: The Chairman:

N. Maslin C. Andries