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**Datasheet for the decision  
of 30 June 2021**

**Case Number:** T 0087/17 - 3.4.03

**Application Number:** 04015344.7

**Publication Number:** 1536297

**IPC:** G03G21/18, G03G15/00

**Language of the proceedings:** EN

**Title of invention:**

Process cartridge, mounting method of electrophotographic photosensitive drum and replacing method of the photosensitive drum

**Patent Proprietor:**

CANON KABUSHIKI KAISHA

**Opponent:**

ETIRA European Toner & Inkjet Remanufacturers  
Association a.i.s.b.l.

**Headword:**

**Relevant legal provisions:**

EPC 1973 Art. 56  
EPC Art. 123(2)  
EPC R. 80, 101(1)  
RPBA Art. 12(4)  
RPBA 2020 Art. 13(2)

**Keyword:**

Admissibility of appeal - (yes)  
Inventive step - problem and solution approach - common  
general knowledge - obvious modification - main request (no) -  
auxiliary requests 3, 4, and 6 (no)  
Amendments - auxiliary requests 1 and 2 - added subject-matter  
(yes)  
Amendment after summons - exercise of discretion - exceptional  
circumstances (yes) - suitability to resolve the issues raised  
(no)

**Decisions cited:**

T 1129/09, T 0767/14, T 0846/01, T 0950/99

**Catchword:**



**Beschwerdekammern**  
**Boards of Appeal**  
**Chambres de recours**

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Case Number: T 0087/17 - 3.4.03

**D E C I S I O N**  
**of Technical Board of Appeal 3.4.03**  
**of 30 June 2021**

**Appellant:** ETIRA European Toner & Inkjet Remanufacturers  
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**Decision under appeal:** **Decision of the Opposition Division of the  
European Patent Office posted on 3 November 2016  
rejecting the opposition filed against European  
patent No. 1536297 pursuant to Article 101(2)  
EPC.**

**Composition of the Board:**

**Chairman** T. Häusser  
**Members:** A. Böhm-Pélissier  
A. Bacchin

## **Summary of Facts and Submissions**

- I. The appeal is against the decision of the opposition division rejecting the opposition against European patent No. EP 1 536 297, which concerns a process cartridge, a mounting method of an electrophotographic photosensitive drum and a replacing method of the photosensitive drum.
- II. The opposition was based on the grounds of opposition under Article 100 (a) and (c) EPC 1973, in particular lack of novelty, lack of inventive step, and added subject-matter.
- III. At the end of the oral proceedings held before the Board, the appellant (opponent) requested that the decision under appeal be set aside and that the patent be revoked.
- IV. The respondent (proprietor) requested that the appeal be dismissed and the patent be maintained as granted, or, as an auxiliary measure, that the patent be maintained on the basis of any of auxiliary requests 1 to 6, filed with the reply to the statement of grounds of appeal, or on the basis of auxiliary request 7 filed during the oral proceedings before the board of appeal. The respondent further requested to consider the appeal inadmissible and not to admit documents X5 and X6/X6a into the proceedings.
- V. References cited:
  - (a) Documents introduced in the first instance proceedings:

D6 = JP H06-2365 (U)

X4 = JP S64-24363 (U)

(b) Documents introduced with the statement of grounds of appeal:

X5 = Niemann, Gustav, *Maschinenelemente Band I Konstruktion und Berechnung von Verbindungen, Lagern, Wellen*, Springer-Verlag, 1981, second edition, pages 3, 4, 10, 222 - 224

X6 = JP H02-168291

X4a = machine translation of X4

X6a = machine translation of X6

VI. Highlighting (additions/emphasis, **bold** and ~~deletions~~) in cited passages and labeling of the features was added by the board.

VII. The relevant claims of the various requests read as indicated below.

Claim 1 of the **main request** (as granted and maintained):

(A) A **process cartridge** (20) detachably mountable to a main assembly (B) of an electrophotographic image forming apparatus (A), comprising:

(B) an electrophotographic photosensitive drum (21),

(C) process means (22, 24, 25) actable on said electrophotographic photosensitive drum (21),

(D) a drum frame (26) rotatably supporting said electrophotographic photosensitive drum (21),

(E) a first drum frame opening (93) provided at a first longitudinal end of said drum frame (26),

(F) a second drum frame opening (94) provided at a second longitudinal end of said drum frame (26),

(G) a first end regulating portion (95) provided at the first longitudinal end of said drum frame (26),  
(H) a second end regulating portion (96),  
(I) a drum shaft (89) which is penetrated through said electrophotographic photosensitive drum (21) to be engaged with said first drum frame opening (93) and said second drum frame opening (94),  
(J) a first end flange (82) provided at a first end of said electrophotographic photosensitive drum (21),  
(K) a first end flange opening (82a), provided to said first end flange (82), for penetrating said drum shaft (89) therethrough,  
(L) wherein said first end regulating portion (95) and said second end regulating portion (96) regulate a position of said electrophotographic photosensitive drum (21) in its longitudinal direction, characterized in that  
(M) the drum shaft (89) is provided with a through hole (92) extending in a direction perpendicular to said drum shaft (89),  
(N) a first opening (81a) and a second opening (81b) are provided opposite from each other at a periphery of said first end flange opening (82a) in a direction perpendicular to a longitudinal direction of said electrophotographic photosensitive drum (21),  
(O) a connecting member (84) is provided, which is penetrated through said first opening (81a) and said through hole (92) and engaged with said second opening (81b) to connect said electrophotographic photosensitive drum (21) with said drum shaft (89),  
(P) said connecting member (84) connects said drum shaft (89) with said electrophotographic photosensitive drum (21)  
(Q) so that said electrophotographic photosensitive drum (21) is supported rotatably to said drum frame (26) with said drum shaft (89), and

(R) said first end regulating portion (95) comprises a projection (95) provided to an inner surface of said drum frame (26) at a position inside the longitudinal end of said drum frame (26)

(S) and regulates a position of an end surface of said first end flange (82), and

(T) said second end regulating portion (96) is an inner surface (96) of said drum frame (26) located at the second longitudinal end of said drum frame (26) and

(U) regulates a position of an end surface of a second end flange (83) provided at a second end of said electrophotographic photosensitive drum (21) by the inner surface (96).

Claim 1 of **auxiliary request 1:**

[Features (A)-(Q)],

(R1) said first end regulating portion (95) comprises a projection (95) provided to projected, at a position inside the longitudinal end of said drum frame (26), from an inner surface of said drum frame (26) which faces an outer peripheral surface of the electrophotographic photosensitive drum (21) at a position inside the longitudinal end of said drum frame

(S1) and to regulates a position of an end surface of said first end flange (82), and

[Features (T)-(U)].

Claim 1 of **auxiliary request 2:**

[Features (A)-(Q)],

(R2) said first end regulating portion (95) ~~comprises~~ is a projection (95) of said drum frame (26) provided to an inner surface of said drum frame (26) at a position inside the longitudinal end of said drum frame (26)

[Feature (S)-(U)].

Claim 1 of **auxiliary request 3**:

[auxiliary request 2],

(V3) wherein said first end flange (82) has a projection portion (82b) projected on a side opposite from a connecting portion with said electrophotographic photosensitive drum (21);

(W3) said first end flange opening (82a) is penetrated through the projection portion (82b); and said first and second openings (81a, 81b) are provided so as to be penetrated from an outer surface of the projection portion (82b) toward said first end flange opening (82a).

Claim 1 of **auxiliary request 4**:

[auxiliary request 2],

(V4) wherein said first end flange (82) has a projection portion (82b) projected from said end surface of said first end flange (82) toward ~~on~~ a side opposite from a connecting portion with said electrophotographic photosensitive drum (21);

[Feature (W3)].

Claim 1 of **auxiliary request 5** is identical to claim 1 of the **main request**. Claim 6 of **auxiliary request 5** contains the following formal corrections with respect to claim 6 as granted:

A **drum replacing method** of replacing an electrophotographic photosensitive drum (21) provided in a process cartridge (20) which is detachably mountable to a main assembly (B) of an electrophotographic image forming apparatus (A), comprising:

...

a drum shaft pulling step of pulling out the drum shaft (89) which is penetrated through a ~~second~~ first end opening provided in the drum frame (26) from the



outside of ~~the~~ a first longitudinal end of the drum frame (26) to the first longitudinal end of the drum frame (26), the electrophotographic photosensitive drum (21), and a second end opening provided at a second longitudinal end of the drum frame (26), ...  
a drum supporting step of supporting the new electrophotographic photosensitive drum (21) on the drum frame (26) by penetrating the drum shaft (89) from the outside of the first longitudinal end of the drum frame (26) through the first end opening ~~(81a)~~, the new electrophotographic photosensitive drum (21), and the second end opening ~~(81b)~~, ...

Claim 1 of **auxiliary request 6:**

(AM) A mounting method of mounting an electrophotographic photosensitive drum (21) to a drum frame (26) of a process cartridge (20) which is detachably mountable to a main assembly (B) of an electrophotographic image forming apparatus (A), comprising:

(BM) a drum positioning step of effecting positioning of said electrophotographic photosensitive drum (21) in its longitudinal direction on said drum frame (26) by regulating a first end of said electrophotographic photosensitive drum (21) with a first end regulating portion (95) and regulating a second end of said electrophotographic photosensitive drum (21) with a second end regulating portion (96),

(CM) a drum supporting step of supporting said electrophotographic photosensitive drum (21) on said drum frame (26) by penetrating said drum frame (26) from the outside of one longitudinal end of said drum frame (26) through a first end opening provided at a first longitudinal end of said drum frame (26), said electrophotographic photosensitive drum (21), and a

second end opening provided at a second longitudinal end of said drum frame (26), and

(DM) a drum shaft mounting step of mounting a drum shaft (89) in said electrophotographic photosensitive drum (21) by penetrating a connecting member (84) through a through hole (92) provided in said drum shaft (89) in a direction perpendicular to a longitudinal direction of said drum shaft (89), and a first opening (81a) and a second opening (81b) which are provided opposite from each other in a periphery of a first end flange opening (82a), which is provided in a first end flange (82) at a first end of said electrophotographic photosensitive drum (21), for permitting penetration of said drum shaft (89) therethrough,

(EM) wherein in said drum positioning step, the positioning of said electrophotographic photosensitive drum (21) in its longitudinal direction on said drum frame (26) by regulating a position of an end surface of said first end flange with a projection (95), as said first end regulating portion (95), of said drum frame (26),

(FM) provided to an inner surface of said drum frame (26) at a position inside the first longitudinal end of said drum frame (26)

(GM) and regulating a position of an end surface of said second end flange (83), provided at the second end of said electrophotographic photosensitive drum (21), with an inner surface (96) of said drum frame (26) located at the second longitudinal end of said drum frame (26),

(HM) wherein said first end flange (82) has a projection portion (82b) projected from said end surface of said first end flange (82) toward a side opposite from a connecting portion with said electrophotographic photosensitive drum (21);

*(IM) said first end flange opening (82a) is penetrated through the projection portion (82b); (JM) and said first and second openings (81a, 81b) are provided so as to be penetrated from an outer surface of the projection portion (82b) toward said first end flange opening (82a).*

Claim 1 of **auxiliary request 7**:

[Features (AM) - (EM)],

*(FM7) provided to an inner surface of said drum frame (26) at a position ~~inside~~ at the first longitudinal end of said drum frame (26)*

[Features (GM) - (JM)].

VIII. The **parties argued** essentially as follows:

(a) The appellant/opponent was of the opinion that the appeal was admissible since at least the issues of added subject-matter and lack of inventive step were sufficiently substantiated in the statement of grounds of appeal.

Documents X5 and X6/X6a were filed as evidence that pin or bolt connections could be used for attaching a shaft to a hub and should be admitted into the proceedings.

Auxiliary requests 2 to 4 made no attempt to overcome the added subject-matter and inventive step objections. Auxiliary request 5 was based on formal amendments in claim 6 which were not based on a ground for opposition. Finally, auxiliary request 7 was filed late and no exceptional circumstances could be identified justifying why it should be admitted into the proceedings. These

requests should therefore not be admitted into the proceedings.

The claimed subject-matter of features (R), (S), (R1), (S1) and (R2) extended beyond the application as filed, in particular in relation to the feature "position inside the longitudinal end". Furthermore, the claimed invention was not inventive over X4/X4a in combination with common general knowledge as documented in X5 or with document D6, because a pin connection for fixing a shaft to a photosensitive drum was part of the common general knowledge (X5) and known in the specific technical field (D6).

- (b) The respondent/proprietor considered that the appellant/opponent did not file any submissions that could be regarded as a sufficient statement of grounds of appeal and that the appeal was therefore not admissible.

The further prior art documents X5 and X6/X6a should not be admitted into the proceedings since they were filed late and were not more relevant than the documents on file with regard to the assessment of inventive step.

Requests similar to auxiliary requests 1 to 6 had already been filed in the first instance proceedings. Moreover, auxiliary request 7 was filed during the oral proceedings before the board as a reaction to developments occurred therein. The auxiliary requests should therefore be admitted into the proceedings.

The claimed subject-matter, in particular features (R), (S), (R1), (S1) and (R2), did not extend beyond the application as filed. Furthermore, features (R) and (S) were not disclosed in X4/X4a and the claimed invention was inventive, because the skilled person had no incentive to change the press-fit connection in X4/X4a to a pin connection.

## **Reasons for the Decision**

### **1. Procedural matters**

#### **1.1 Admissibility of the appeal**

1.1.1 The respondent/proprietor considers that the appellant/opponent did not file any submissions that could be regarded as a sufficient statement of grounds of appeal within the meaning of Article 108 EPC. In the statement of grounds of appeal, the appellant/opponent only generally dealt with the issues regarding added subject-matter and inventive step, whereas the issues regarding prior use and novelty had not been addressed at all. Therefore, only part of the grounds on which the opposition division's decision was based had been addressed. However, for an admissible appeal, it was insufficient to address only part of the grounds on which the opposition division's decision is based. As basis for this reasoning T 1129/09 was cited.

Furthermore, the inventive step objection made by the appellant/opponent was not sufficiently substantiated, because it partly referred to submissions during the first instance proceedings. It was important that the statement setting out the grounds of appeal be such that the Board of Appeal and the other parties could

understand without own investigations why the decision of the first instance was wrong. There had to be a clear link between the decision on the one hand and the reasons, facts and evidence provided in the grounds of appeal on the other hand. This however did not apply to the present case at least with respect to the discussion of the subject-matter of granted claims 2 to 7.

- 1.1.2 The appellant/opponent was of the opinion that the appeal was admissible since at least the issues of added subject-matter and lack of inventive step were sufficiently substantiated in the statement of grounds of appeal.
- 1.1.3 The Board refers to Article 108 EPC, third sentence, and Rule 99(2) EPC, according to which in the statement of grounds of appeal the appellant must indicate the reasons for setting aside the decision impugned, or the extent to which it is to be amended, and the facts and evidence on which the appeal is based. These provisions do not specifically require that the statement of grounds of appeal addresses the arguments in the decision under appeal. Under the established case law of the Boards of Appeal the grounds of appeal should specify the legal or factual reasons on which the case for setting aside the decision is based. If the appellant submits that the decision under appeal is incorrect, the statement setting out the grounds of appeal must enable the board to understand immediately why the decision is alleged to be incorrect and on what facts the appellant bases its arguments, without first having to make investigations of its own.
- 1.1.4 However, the appellant/opponent does not need to address all points of the impugned decision of the

opposition division. It is established case law of the Boards of Appeal that appeals by opponents - as opposed to appeals by proprietors, which would need to address all objections withstanding the maintenance of the patent - are sufficiently reasoned where they make a substantiated case for the decision under appeal being wrong on one of the objections or grounds for opposition. That is because, if the decision is indeed wrong on that point, the appeal has to be allowed for this reason alone (see *Case Law of the Boards of Appeal of the EPO*, 9th edition 2019, section V.A.2.6.3 e), and in particular decisions T 767/14, T 846/01, and T 950/99).

1.1.5 In the present case the appellant/opponent has made such a substantiated case at least in relation to the issues of added subject-matter of granted claim 1 and lack of inventive step of granted claim 1 (see points III. and IV. of the grounds of appeal). In addition, since the appellant/opponent has established a causal relationship between the decision under appeal and the arguments in the statement of grounds of appeal, both the board and the respondent are enabled to immediately understand why the appealed decision is supposed to be incorrect. Thus, even if the statement of grounds does not contain a full reasoning with respect to each and every ground of the decision, it nevertheless meets the minimum requirements of Article 108 EPC.

1.1.6 Therefore the appeal is admissible (Article 108 and Rule 99(2) EPC).

## **1.2 Admission of documents X5 and X6/X6a**

1.2.1 Documents X5 and X6, including its translation X6a, were filed with the statement of grounds of appeal.

Their admission to the present appeal proceedings is therefore subject to the provisions of Article 12(4) RPBA 2007.

- 1.2.2 The respondent/proprietor requested not to admit the further prior art documents X5 and X6/X6a since they were filed late, i.e. only during the opposition appeal proceedings, and as they were not more relevant than the documents on file with regard to the assessment of inventive step. The appellant/opponent intended to introduce X5 as a proof for the skilled person's common general knowledge. X5 only generally mentioned the use and configuration of standard bolt or pin connections. However, such standard connections were not in dispute in the opposition division's decision.

The respondent/proprietor furthermore argued that X5 did not provide any teaching to the person skilled in the art that such a so-called standard connection was applicable to the specific technical field of the patent in suit. Further, the person skilled in the art was not taught by X5 that the standard connection provided an improved connection over the press-fitting connection of a shaft and the flange of an electrophotographic photosensitive drum of a process cartridge. Thus, X5 was not *prima facie* relevant and since it was filed late, it should not be admitted into the opposition appeal proceedings.

Moreover, document X6 and in particular X6a as its English machine translation, were completely incomprehensible. Accordingly, the reader did not find any useful information in X6/X6a. Therefore, X6/X6a should not be admitted into the proceedings.



- 1.2.3 The appellant/opponent argued that documents X5 and X6/X6a were filed as evidence that pin or bolt connections could be used for attaching a shaft to a hub, in particular in the field of photosensitive drums.
- 1.2.4 The Board finds that document X5 was filed in reaction to the discussions and the decision in the first instance proceedings (see the impugned decision, section VI.1.4.3, where it was challenged that pin connections were applicable to any technical field and more specifically for connecting a shaft to a drum/body). Consequently, the board does not see how it could and should have been filed already in the first instance proceedings. X5 is a short passage from a text book for engineering students proving the general knowledge of a skilled person. X5 has a short and uncomplicated disclosure and is filed with the aim of reinforcing arguments already introduced in the first instance proceedings. Its teachings are quickly and easily understandable, already from the figures.

On the other hand, the board considers that X6 discloses only the fixing of a shaft to a drum (6) via pressing an elastic body and a pair of pins into a V-shaped groove (61a). Furthermore, X6 does neither unambiguously disclose nor teach that the drum shaft is provided with a through-hole extending in a direction perpendicular to said drum shaft. Document X6 therefore neither has any teaching useful for inventive step going beyond the teaching of D6, nor can it be considered as been filed in reaction to the discussions and decisions in the first instance proceedings.

- 1.2.5 Document X5 is therefore admitted into the proceedings, while documents X6 and X6a are not admitted into the proceedings pursuant to Article 12(4) RPBA 2007. For

the sake of completeness, the Board considers also document X4a, a translation of document X4, in the appeal proceedings, the admission of which has not been challenged by the respondent/proprietor.

### **1.3 Admission of auxiliary requests 1 to 7**

- 1.3.1 The respondent/proprietor argued that requests similar to auxiliary requests 1 to 6 had already been filed in the first instance proceedings. Those were only not discussed during the oral proceedings before the opposition division because the patent was maintained as granted. Auxiliary requests 1 to 6 should therefore be admitted into the present proceedings. In relation to auxiliary request 7 it had to be considered that in view of the preliminary opinion of the board non-compliance with Article 123(2) EPC could not be expected. It would therefore be unfair if auxiliary request 7, which overcomes this objection, was not admitted into the proceedings.
- 1.3.2 The appellant/opponent had no objection against the admission of auxiliary requests 1 and 6. However, auxiliary requests 2 to 4 made no attempt to overcome the added subject-matter and inventive step objections, e.g. they all contained the feature "inside the longitudinal end" already objected to under Article 123(2) EPC in relation to auxiliary request 1. Moreover, the additional features were all known from documents X5 and D6. Auxiliary request 5 was based on formal amendments in claim 6 which were not based on a ground for opposition and therefore contravened Rule 80 EPC. Furthermore, some of the auxiliary requests were not convergent. Auxiliary request 7 was filed late and no exceptional circumstances and cogent reasons could

be identified justifying admission of this request into the proceedings.

- 1.3.3 The Board sees no reason to hold inadmissible under Article 12(4) RPBA 2007 auxiliary requests 1 to 4 and 6, because they were filed with the reply to the statement of grounds of appeal in order to overcome added subject-matter and inventive step objections, and this attempt was made already before the opposition division, since these requests correspond essentially to requests filed during the opposition proceedings.

The amendments effected in relation to auxiliary request 5 concern only formal corrections and are thus not occasioned by a ground for opposition. Hence they do not fulfill the requirements of Rule 80 EPC.

In relation to auxiliary request 7, the board agrees that the respondent/proprietor could have expected that the amendments would be judged compliant with Article 123(2) EPC, also in view of the preliminary opinion of the Board expressed in its communication under Article 15(1) RPBA 2020. However, the discussion during the oral proceedings and in particular the explanations of the respondent/proprietor how the feature "position inside the longitudinal end" had to be understood, led the board to the conclusion that this feature did not comply with the requirements of Article 123(2) EPC. Since the respondent/proprietor was taken by surprise by this development, the Board accepts the argument that there were exceptional circumstances as required under Article 13(2) RPBA 2020.

However, the Board finds that, once the presence of exceptional circumstances is established, it still has the discretion to admit the request into the appeal

proceedings. Indeed, when exercising its discretion under Article 13(2) RPBA 2020, the Board may also take into consideration the criteria mentioned in Article 13(1) RPBA 2020, in particular the suitability of the amendments to resolve the issues under dispute (as indicated in the Explanatory remarks on Article 13(2) in Document CA/3/19, section VI). In the present case the same arguments for assessing inventive step of auxiliary request 6 (see section 5.3.3) are applicable to auxiliary request 7. Therefore the subject-matter of claim 1 of auxiliary request 7 does *prima facie* not involve an inventive step. Hence, this request does not appear suitable to overcome the inventive step objection.

1.3.4 In view of the above the Board exercises its discretion under Article 12(4) RPBA 2007 and admits auxiliary requests 1 to 4 and 6 into the proceedings and does not admit auxiliary request 5 into the proceedings. Moreover, exercising its discretion under Article 13(2) RPBA 2020 the Board does not to admit auxiliary request 7 into the proceedings.

## 2. **The invention as claimed**

2.1 In the cartridge of a printer or copying machine a photosensitive drum within a drum frame is fixed to the shaft. The shaft provides free rotation of the drum. It is an object of the invention to attach the drum to the shaft in a detachable manner. This problem is solved by a pin connection. The pin connection improves the mountability and allows easy exchange of the drum or shaft.

- 2.2 As submitted by the proprietor, further advantages are disclosed in paragraph [0080] of the impugned patent, where it is stated that as a result of the invention
- "it becomes possible to obviate the need for forming a locking groove for use in E type retaining ring (a locking member) or the like, on the drum shaft 89. Further, it is possible to reduce the size of the process cartridge 20 in the axial direction of the photosensitive drum 21. Further, it becomes possible to simplify an assembly step of the process cartridge 20. In addition, it becomes possible to realize cost reduction by reducing the number of parts of the process cartridge".*

3. **Main request - inventive step (Article 56 EPC 1973)**

3.1 **Closest prior art**

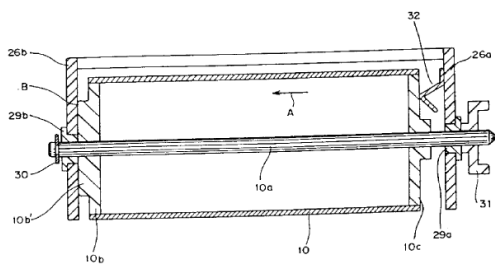
The Board identifies document X4/X4a as the closest prior art as it has most features in common with granted claim 1 and is of the same technical field as the claimed invention. No other document was discussed as starting point by the appellant/opponent in the statement of grounds of appeal.

3.2 **Difference**

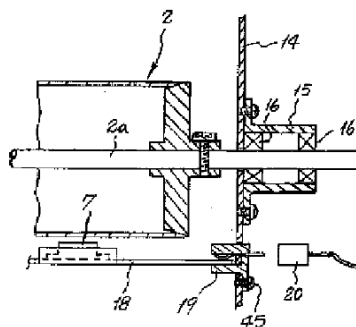
- 3.2.1 It is undisputed between the parties that document X4/X4a discloses features (A) to (L) and (T) to (U) and does not disclose features (M) to (Q).
- 3.2.2 The appellant/opponent argued that the wording of **features (R) and (S)** did not specify the exact position of the projection, i.e. whether it was on the side wall of the drum frame or on the peripheral inner surface.

The position was defined only as being at the inner side of the frame and at - that is in the area of - the longitudinal end. The projection was not specified as being an integral part of the frame. The function was defined as regulating the position of the end flange. The same was described in X4, where spring member 32 projected from the side plate part 26a of the housing 26 towards the drum. X4a disclosed on page 6, second paragraph, second sentence, that spring member 32 was "energizing" the drum in longitudinal direction (direction of "arrow A"). The word "energizing" translated by the computer had to be understood in the present context as exercising a force onto the drum in the longitudinal direction. Therefore, spring member 32 could be considered as a projection regulating the drum position of the end face 10c in the longitudinal direction. X4/X4a therefore disclosed that (reference to X4)

*(R) said first end regulating portion (26a, 32) comprises a projection (32) provided to an inner surface of said drum frame (26, 26a) at a position inside the longitudinal end (26a) of said drum frame (26) and (S) regulates a position of an end surface of said first end flange (10c).*



X4, Fig. 1



D6, Fig. 8

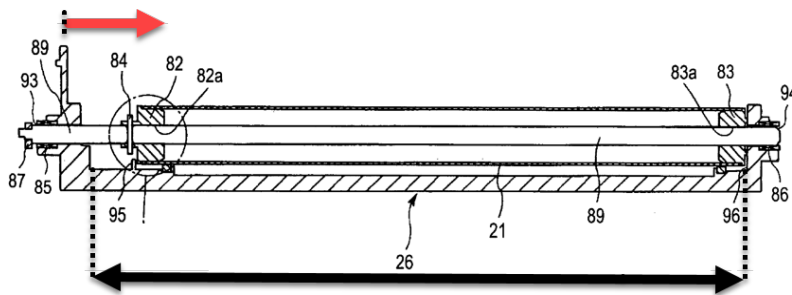


Figure 5 of the patent (arrows added by the Board), the double arrow indicating the possible "position inside the longitudinal end" according to the opponent, the simple arrow indicating the possible "position inside the longitudinal end" according to the proprietor.

3.2.3 The respondent/proprietor argued that features (R) and (S) were not disclosed in document X4/X4a because these features had to be understood in the context of the description of the impugned patent. The projection therefore had to be considered as an integral part of the frame in view of the projection 95 shown in Figure 5 of the patent. The projection 95 was shown as an integral part of the frame. The purpose of the spring member 32 in X4 was entirely different from the purpose of the projection 95 in the present patent. As disclosed in X4a (see page 3, line 3 to the end of page 4; last paragraph of page 6 to the second paragraph of page 7) the spring member provided a "braking torque" and prevented "uneven rotation" of the rotating drum induced by driving the shaft 10a via coupling 31 with a motor.

3.2.4 The Board agrees with the reasoning of the appellant/opponent that the claim wording does not imply that the projection is an integral part of the frame. Document X4/X4a clearly discloses that the spring member 32 is acting in a longitudinal direction (arrow A in Figure 1) and exercises a regulating force onto the side wall

of the drum such that the side wall 10b on the opposite side is pushed toward the frame 26b (see X4a, page 6, second paragraph). This implies that the drum has space to move in the longitudinal direction. Spring 32 therefore regulates the position of section 10b in the longitudinal direction. The term "projection" is very broad. It is not relevant that elements 32 and 26a may in addition to the regulation in the longitudinal direction have other functions.

- 3.2.5 Consequently, the Board concludes that document X4/X4a discloses features (R) and (S). The subject-matter of granted claim 1 therefore differs from X4/X4a only in **features (M) to (Q)**, which relate to a pin connection.

### **3.3 Effect, objective technical problem**

- 3.3.1 The appellant/opponent argued that the specification of document X4/X4a was silent about how the drum 10 was fixed to shaft 10a. The proprietor derived from the figures that the shaft was fixed by means of a press-fit connection.

- 3.3.2 The Board notes that document X4/X4a unambiguously teaches that a connection between shaft 10a and drum 10 has to exist for transferring the driving force acting on the coupling 31 to the drum 10. However, the Board agrees with the opponent that the description of document X4/X4a does not provide any specific detail about the type of connection between the shaft and the drum.

Different types of connections between shaft and drum are known, such as press-fit, glue and pin connections. Each type of connection has its advantages and disadvantages. For example, a pin connection has the



advantage that the shaft is mounted detachably to the drum. This may have the effect of simplifying the mountability and exchangeability of the elements of a cartridge when compared to other types of connections.

Since X4/X4a is silent about the type of connection the problem to be solved by the invention is not to provide an alternative connection or to improve the mountability over a press-fit connection but to provide a suitable connection between the shaft and the drum.

3.3.3 In view of the above the Board is of the opinion that the objective problem to be solved is to provide a suitable connection between the shaft and the drum.

3.4 **Obviousness - X4 in combination with X5**

3.4.1 The appellant/opponent argued that the skilled person for the posed problem was a mechanical engineer with a university degree who was familiar with the design of process cartridges and the production processes required therefore. Features (M) to (Q) described a standard connection as proposed in X5, for example, for the torsionally rigid arrangement of hubs on shafts (see X5, section "Verwendung" on page 222 and Figure 11/5 a) on page 224).

The "mental equipment" of a mechanical engineer undoubtedly included such bolt or pin connections, because these were "probably the simplest and oldest form of connection in mechanical engineering" (see X5, page 222, first paragraph). The claimed solution was obvious to the skilled person in view of its common general knowledge as documented in X5, a standard mechanical engineering textbook. The subject-matter of claim 1 was therefore not based on an inventive step in

view of X4 in combination with the common general knowledge as shown in X5.

- 3.4.2 The respondent/proprietor replied that in X4 the shaft 10a was fitted to the electrophotographic photosensitive drum 10 by means of a press-fit connection, and one side of the shaft 10a was fixed by an E-ring 30, the other side of the shaft 10a was fixed by a coupling 31. This fitting and fixing structure was entirely different from the configuration of the present invention and prevented the skilled person from replacing the press-fit connection by a pin connection.

Furthermore, X5 was at most related with a general technique, i.e. it was not directed to an electrophotographic photosensitive drum, and much less was it concerned with a first end flange or a drum shaft thereof. That is, X5 did not provide any teaching to the person skilled in the art that a so-called standard bolt-and-pin-connection was applicable in the specific technical field of the patent in suit.

- 3.4.3 The Board considers that X5 represents the common general knowledge of the skilled person and teaches in Figure 11/5 a) to detachably mount a shaft to a hub by means of a detachable bolt or screw. The general knowledge, in particular the knowledge described in document X5, would lead the skilled person to features (M) to (Q) when attempting to solve the posed technical problem. The pin connection is a very common fixation for a shaft. For example, wheels may be detachably mounted to a shaft by means of a pin connection. The skilled person would also recognise the advantages of a pin connection, i.e. the improved mountability and exchangeability. Neither the E-ring 30 nor the coupling 31 in X4 prevents the skilled person from providing a

pin connection to the protrusion of the lateral flange of the photosensitive drum. Implementing the connection between the shaft and the drum by means of a pin connection does not represent any technical difficulty for the skilled person and does not require changing the settings, structure and functioning of components 30 and 31.

### 3.5 **Obviousness - X4 in combination with D6**

3.5.1 The appellant/opponent argued that Figure 8 of D6 showed a pin connection between a photosensitive drum and its shaft. D6 therefore taught more specifically than X5 that a photosensitive drum can be fixed to the shaft by means of a pin connection. The skilled person would therefore provide the flange end of the photosensitive drum of X4 with openings for a pin connection according to D6. The pin would be inserted into the openings and into a through-hole in the shaft in a direction perpendicular to the longitudinal direction as taught by D6. Therefore, the skilled person would arrive without any difficulty and without exercising any inventive skills at the combination of features (M) to (Q) in the context of the process cartridge of document X4/X4a.

3.5.2 The opposition division held in relation to the reasoning of the opponent that document D6 was concerned with an image forming apparatus having a toner density detection sensor 7. The subject of D6 was therefore not the connection between the shaft and the drum, no details being given with regard to that aspect. Furthermore, in view of paragraph [0010] and Figure 3 of document D6, it seemed that the shaft was not part of the cartridge. The context of document D6 was therefore different from the context of X4. In X4

there was already a rigid connection between the shaft and the drum such that the man skilled in the art would not consider an additional connection but possibly an alternative better connection. The opposition division considered that the man skilled in the art would not look at D6 to find an alternative better solution for the connection of the drum and the shaft of X4 because D6 did not give any details with regard to the connection between the shaft and the drum (see section VI.1.4.5 of the impugned decision).

- 3.5.3 The respondent/proprietor argued that in D6 the shaft was fixed to a main assembly of an image forming apparatus and was thus not detachably mountable to the main assembly as in the present invention.
- 3.5.4 The Board finds that D6 provides in Figure 8 enough details on how to realise a pin connection. D6 describes as a further detail a toner density detection sensor 7 close to the photosensitive drum. The sensor is an additional feature and does not affect the problem of providing a suitable connection between a photosensitive drum and a shaft. D6 resides in the same technical field (electrophotographic image forming devices) and addresses the same problem, i.e. attaching a photosensitive drum to its shaft. D6 discloses in Figure 8 without any doubt a detachable mounting via a pin connection of a shaft 2a to a photosensitive drum 2. It is not relevant that this attachment is not described in the description and whether the drum is located in a cartridge or not and whether the shaft is fixed to a main assembly or not. The crucial point is that the pin connection of Figure 8 is suitable for attaching the photosensitive drum of the device of document X4/X4a to the shaft.

3.5.5 From Figure 8 of D6 alone without needing any further details in the description the skilled person would consider that a drum shaft can be detachably attached to an electrophotographic photosensitive drum by means of a pin connection. Therefore, when looking for a solution to the problem of providing a connection between a photosensitive drum and a shaft the skilled person would be inspired by the teaching of Figure 8 of D6 and use a pin through both the shaft and through-holes in the end portions of the drum flange and would thereby arrive at the solution proposed by features (M) to (Q).

### 3.6 **Obviousness - conclusion**

Consequently, the subject-matter of claim 1 as granted and maintained does not involve an inventive step over document X4/X4a in combination with either common general knowledge as documented in document X5 or in combination with document D6 (Article 100 (a) EPC 1973 in combination with Article 52(1) EPC and Article 56 EPC 1973).

## 4. **Auxiliary request 1 - amendments and basis in the application as filed (Article 123(2) EPC)**

4.1 The appellant/opponent argued that the initial disclosure of original claims 1 and 2 only related to the area at the longitudinal end of the drum frame. The "area inside the longitudinal end" could be the entire surface of the inner frame opposite the peripheral surface of the drum (double arrow shown in Figure 5 above) between the longitudinal ends of the frame. Extending the scope of the claim to the entire inner surface clearly added new subject-matter. If a drum extending only over a part of the drum frame was

considered (e.g. in Figure 5 at the positions of reference signs 26, 21 or 89), the projection might be placed in the center of the drum frame or even closer to the opposite longitudinal end of the drum frame. Such an arrangement was covered by the new claim wording of the present request, but not by the original disclosure, i.e. original claim 2 and Figure 5.

- 4.2 The respondent/proprietor argued that from Figure 5 of the impugned patent the claimed position of the projection was unambiguously derivable. Figure 5 taught that the projection was placed on an inner surface of the drum frame between the longitudinal ends and facing the peripheral surface of the drum. The projection (95) was therefore projected, at a position inside the longitudinal end of said drum frame (26), from an inner surface of said drum frame (26) which faces an outer peripheral surface of the electrophotographic photosensitive drum (21).

During oral proceedings before the board the proprietor showed in a sketch on the white board that the feature "position inside the longitudinal end" covered the area inside the longitudinal end (simple arrow shown in Figure 5 above) of the inner frame opposite the peripheral surface of the drum.

The skilled person would read the claim wording in the light of the description and Figure 5. Therefore, only technically meaningful solutions would be considered. It would not make sense that the drum extended only over a small part of the drum frame.

- 4.3 The Board is of the opinion that Figure 5 shows only a specific position of the projection 95 in the area at the longitudinal end. The description does not provide

any basis that the projection could be located outside this area. The claim wording of claim 1 of auxiliary request 1 however covers all position inside the frame between the two longitudinal ends, i.e. any location on the inner surface of the frame, and therefore also positions outside this area at the longitudinal end. Therefore, the amendment of claim 1 adds new subject-matter which was not disclosed in the originally filed application.

Therefore, auxiliary request 1 contravenes the requirements of Article 123(2) EPC.

**5. Auxiliary requests 2 to 4 and 6 - amendments and basis in the application as filed (Article 123(2) EPC), inventive step (Article 56 EPC 1973)**

**5.1 Auxiliary request 2**

5.1.1 The respondent/proprietor argued that the term "projection", more specifically the amendment "projection (95) of said drum frame (26)" effected in claim 1 of auxiliary request 2 and the passage "projection provided to the drum frame" on page 27, lines 20-21, of the originally filed description in combination with the teaching of Figure 5 unambiguously defined that the projection was an integral part of the drum frame. The skilled person would not read the claim without considering the context of the description of the application.

Document X4/X4a disclosed a spring member 32 not being part of the drum frame and being mounted after moulding the drum frame, wherein in the impugned patent the projection and the frame were moulded in one manufacturing step. The skilled person did not have any

motivation to change the spring member in X4/X4a to an integral projection. Furthermore, the spring 32 in X4/X4a could not be manufactured in this manner, because a mould spring member could not exercise the force necessary for compensating the uneven rotation. X4/X4a therefore taught directly away from a projection being integral to the frame.

5.1.2 The appellant/opponent argued that neither the term "projection" nor the amendment "projection (95) of said drum frame (26)" nor the passage "projection provided to the drum frame" in the description defined that the projection was an integral part of the drum frame. Therefore, the amendment did not change the reasoning as to inventive step and does not have proper basis in the application as originally filed. Furthermore, Figure 7, left side, of X4/X4a showed an integral projection which was very similar to the projection shown in the impugned patent.

5.1.3 The Board agrees with the opponent in that claim 1 of auxiliary request 2 is to be construed broadly such that the projection is not necessarily an integral part of the frame. Hence, the inventive step objection mentioned above under point 3. also applies to the subject-matter of claim 1 of auxiliary request 2, which therefore does not involve an inventive step (Article 52(1) EPC and Article 56 EPC 1973).

Moreover, claim 1 of auxiliary request 2 comprises the feature "at a position inside the longitudinal end", so that the same added subject-matter objections apply as discussed above. Consequently, auxiliary request 2 does not comply with the requirements of Article 123(2) EPC.



As an aside it is mentioned that if the claim was construed narrowly - as the proprietor suggests - such that the projection was indeed to be considered an integral part of the frame, no basis in the application as originally filed could be identified for the amended claim wording. In particular, a general teaching for forming the projection as an integral part of the frame cannot be derived from Figure 5.

## 5.2 **Auxiliary requests 3 and 4**

- 5.2.1 The appellant/opponent argued that features (V3)/(W3) and (V4) defined more specifically a pin connection. These features were disclosed and taught in documents X5 and D6.
- 5.2.2 The respondent/proprietor argued that these specific features further prevented the skilled person from combining X4/X4a with X5 or D6. The device in X4/X4a already had a press-fit connection. The skilled person had no incentive to modify this connection and to replace it by the specific pin connection as defined in the claims of the present requests. The E-ring in X4/X4a provided an additional connection which prevented the skilled person from adding a pin connection. It was an advantage of the present invention that the E-ring could be omitted resulting in a simpler and more compact cartridge (see paragraphs [0079] and [0080] of the patent specification, see section 2.2 above).
- 5.2.3 The Board however came to the conclusion that the additional features of auxiliary requests 3 and 4 relate to features inherent to a pin connection and are disclosed in documents X5 and D6. The objections of lack of inventive step raised against the claimed subject-matter of the main request therefore also apply

to the claimed subject-matter of auxiliary requests 3 and 4. Consequently, the subject-matter of claim 1 of auxiliary requests 3 and 4 does not involve an inventive step (Article 52(1) EPC and Article 56 EPC 1973).

Moreover, claim 1 of auxiliary requests 3 and 4 comprises the feature "at a position inside the longitudinal end" and the same added subject-matter objections apply as discussed above. Consequently, auxiliary requests 3 and 4 do not comply with the requirements of Article 123(2) EPC.

### **5.3 Auxiliary request 6**

5.3.1 The appellant/opponent argued that the skilled person - faced with the problem of implementing a connection into the device disclosed in X4/X4a - would consider the advantages of a pin connection. This connection provided both a secure connection and detachability of the drum from the shaft. The skilled person would have only one possibility of mounting the shaft to the photosensitive drum and this was the method claimed. The skilled person would not have the choice of changing the order of steps and would arrive at the features (AM) to (JM) in the corresponding order. In detail, the skilled person would position the drum, insert the shaft and close the pin connection. If the E-ring was maintained, the skilled person would in a last step additionally mount the E-ring.

5.3.2 The respondent/proprietor argued that the order of steps and in particular steps (CM) and (DM) were not taught by any of the cited prior art.

5.3.3 The Board came to the conclusion that features (AM) to (JM) correspond to features (A) to (W3) of the previous requests, but are formulated as method steps. Therefore, the problem to be solved can be formulated accordingly as providing a mounting method for a cartridge and a suitable connection between shaft and drum. As to the obviousness of the pin connection the same reasoning as for the main request applies. When the skilled person - faced with the problem to be solved - decides to implement a pin connection in X4/X4a for detachably fixing the drum to the shaft, there is no other solution than the steps defined in features (AM) to (JM). Consequently, the same reasoning for inventive step as discussed for the main request also applies to claim 1 of auxiliary request 6.

Moreover, the same added-subject matter objection as discussed for auxiliary request 1 also applies to claim 1 of auxiliary request 6 ("at a position inside the longitudinal end", see feature (FM)).

The subject-matter of claim 1 of auxiliary request 6 therefore does not involve an inventive step over the cited prior art (Article 52(1) EPC and Article 56 EPC 1973) and contravenes the requirements of Article 123(2) EPC.

## 6. Conclusion

Since the requests on file are either not admitted into the proceedings (auxiliary requests 5 and 7), contain subject-matter extending beyond the content of the application as filed (auxiliary requests 1 to 4 and 6) and/or do not comply with the requirement of inventive step (main request, auxiliary requests 2 to 4 and 6),

the patent has to be revoked (Article 101(3) (b) EPC and Article 111(1) EPC 1973).

## Order

### For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:



S. Sánchez Chiquero

T. Häusser

Decision electronically authenticated