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**Datasheet for the decision  
of 18 June 2012**

**Case Number:** T 0695/09 - 3.5.02  
**Application Number:** 05110815.7  
**Publication Number:** 1659691  
**IPC:** H03K 17/955, A47K 10/36  
**Language of the proceedings:** EN

**Title of invention:**  
Paper towel dispenser

**Applicant:**  
Georgia-Pacific Consumer Operations LLC

**Headword:**  
-

**Relevant legal provisions:**  
EPC Art. 56, 123(2)

**Keyword:**  
"Inventive step (no) - main and first auxiliary requests"  
"Added subject-matter (no) - second auxiliary request"  
"Remittal to first instance (yes)"

**Decisions cited:**  
-

**Catchword:**  
-



Case Number: T 0695/09 - 3.5.02

**D E C I S I O N**  
of the Technical Board of Appeal 3.5.02  
of 18 June 2012

**Appellant:** Georgia-Pacific Consumer Operations LLC  
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**Decision under appeal:** Decision of the Examining Division of the  
European Patent Office posted 7 November 2008  
refusing European patent application  
No. 05110815.7 pursuant to Article 97(2) EPC.

**Composition of the Board:**

**Chairman:** R. Lord  
**Members:** G. Flyng  
R. Moufang

## Summary of Facts and Submissions

I. This is an appeal of the applicant against the decision of the examining division to refuse European patent application No. 05 110 815.7. The reason given for the refusal was that the subject-matter of claim 1 was not new (Article 54 EPC).

II. The following documents of the state of the art were cited during the procedure before the first instance:

D1: WO 99/58040 A,

D5: US 3 573 783 A,

D6: US 3 836 828 A, and

D7: US 3 743 865 A.

III. In a communication accompanying a summons to oral proceedings, dated 30 March 2012, the board informed the appellant *inter alia* of its preliminary opinion that the subject-matter of claim 1 of the main request filed with the statement of grounds of appeal (letter dated 3 March 2009) was new, but did not involve an inventive step (Article 56 EPC) .

With a letter dated 18 May 2012 the appellant filed sets of claims according to a main request and auxiliary requests 1 to 5.

Oral proceedings before the board took place on 18 June 2012. The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the main request or the auxiliary request 1, both filed with the letter dated 18 May 2012, or the auxiliary request 2, filed at the oral proceedings.

IV. Claim 1 of the appellant's main request reads as follows:

"A paper roll dispenser comprising an antenna, means for sensing a change in a capacitance in a field of the antenna caused by the proximity of a user's hand to the dispenser, and means for dispensing paper from the roll in response to the sensed change in capacitance, wherein the antenna is a single wire that is shaped to form a detection field."

Claim 1 of the appellant's auxiliary request 1 differs from that of the main request by the addition at the end of the claim of the following text:

", wherein the paper roll dispenser further comprises means for guarding the antenna, wherein the means for guarding comprise a shield driven at equal potential to the antenna".

Claim 1 according to the appellant's auxiliary request 2 reads as follows:

"A paper roll dispenser comprising an antenna, means for sensing a change in a capacitance in a field of the antenna caused by the proximity of a user's hand to the dispenser, and means for dispensing paper from the roll in response to the sensed change in capacitance, wherein the antenna is a single wire that is shaped to form a detection field. [sic]  
wherein the dispenser comprises comparator means for comparing the capacitance sensed by the antenna with a reference capacitance,

wherein the comparator means is arranged to compare voltages developed across the sensed capacitance and the reference capacitance of a reference capacitor after charging thereof, characterized in that the dispenser further comprises an oscillator circuit having a period set by a hysteresis resistor, a variable trim resistor and, the reference capacitor; wherein the means for comparing the capacitance is a balanced bridge comprising the antenna on one arm of said bridge and the reference capacitor on the other arm of the bridge, wherein the variable trim resistor is adapted to adjust voltage amplitudes on each arm of said bridge; a comparator adapted to compare the voltages across each arm of said bridge, and provide an output voltage; and, an edge-triggered d flip-flop which latches and holds on the leading edge of the comparator output voltage."

V. The appellant essentially argued as follows:

The subject-matter of claim 1 of the main request was new with respect to D1, because the dispenser of D1 did not include a capacitive sensor in which the field sensed was that of an antenna in the form of a single wire.

The objective technical problem addressed by the subject-matter of claim 1 of the main request was not merely to find an alternative type of capacitive sensor, because the selection of the particular type defined gave rise to the advantages described in the application in paragraphs [0013] and [0078] (of the published application EP 1 659 691 A2). In particular, the use of this form of antenna enabled a greater

flexibility in determining the shape and size of the detection field, so that for instance it could be made large enough to ensure that the mechanism was triggered before the user touched the dispenser, thus improving hygiene. The use of the antenna instead of the two electrode sensor of D1 also resulted in a reduction in the number of parts, with consequent benefits in terms of cost and reliability, and reduced power consumption, so that battery operation was practicable. Moreover, in the light of these advantages, the claimed solution to the problem was also not obvious.

The further modification defined in claim 1 of auxiliary request 1 was not obvious, because the obvious way to modify the detection field of D1 would have been to change the size and shape of the electrodes. Moreover, it would not have been obvious to the skilled person to firstly replace the electrode structure of D1 with an antenna, thereby making the sensor less directional, and to then further modify it by adding a guard electrode, so as to make it more directional.

Claim 1 of auxiliary request 2 was based on original claims 1 to 3 combined with paragraph [0121] of the description. This combination was supported by paragraph [0112] and the introductory phrases of paragraphs [0113] to [0115] and [0118] to [0120]. The clarification that both mentions of the "reference capacitor" in paragraph [0121] concerned the same element had a basis in paragraphs [0122] and [0123], and the remaining amendments served only to clarify that the "reference capacitance" of the original claims

was that of the "reference capacitor" of paragraph [0121].

The combination of the additional features of claim 1 of auxiliary claim 2 was not obvious in the light of common knowledge in the technical field. This applied in particular to the feature that the reference capacitor and the variable trim resistor were part of the oscillator circuit and of the balanced bridge, thereby reducing the component count of the detection circuit.

## **Reasons for the Decision**

1. The appeal is admissible.
2. *Main request - Inventive step (Article 56 EPC)*
  - 2.1 The board notes initially that the claims of this request are identical to those which were the subject of the decision under appeal and to those which were filed as the main request with the appellant's grounds of appeal.
  - 2.2 It is not disputed that the document D1 represents the most relevant prior art for the assessment of inventive step. This document describes (see in particular the paragraphs spanning pages 2 and 3 and pages 8 and 9, and figures 2 and 3) a paper roll dispenser 10 comprising a capacitive sensor 38, means for sensing a change in capacitance in the field of the sensor caused by the proximity of a user's hand, and means for

dispensing paper from the roll in response to the sensed capacitance change (see page 12, lines 7 to 11).

2.3 The dispenser of the present claim 1 is thus distinguished from that of D1 in that in the claimed dispenser the field is generated by an antenna in the form of a single wire, whereas in the dispenser of D1 the field is that between the two electrodes 40 and 42, as depicted in Fig. 5. The board notes that in the decision under appeal the examining division concluded that the electrode 42 of D1 could be considered to be an antenna in the form of a single wire. The board is however of the opinion that in the technical field of capacitive sensors the term "antenna" has the specific meaning that it is an electrode used as one side of a capacitance, the other side being formed by the surroundings, as described in the present application, in particular in paragraphs [0014] to [0017], [0063] and [0069] (of the published application). This understanding of the meaning of "antenna" is supported by the documents D5 to D7 (see e.g. the abstract of each document). Thus the subject-matter of claim 1 of the appellant's main request is new with respect to D1.

2.4 The board is of the opinion that the replacement of the two electrode capacitive sensor of D1 with the single electrode (antenna) sensor as defined in the present claim 1 does not result in any technical effect which would be relevant for the assessment of inventive step. The same applies to the forming of the antenna as a single wire, since the dimensions and shape of that wire are undefined in the claim. Therefore the board considers that the objective technical problem to be considered for the assessment of inventive step reduces



to that of providing an alternative type of capacitive sensor in the dispenser of D1. Capacitive proximity sensors making use of a single antenna such that the capacitance change detected is that between the antenna and the surroundings are however well-known in the technical field, as is illustrated by the documents D5 to D7. Moreover, the forming of this antenna as a single wire appears to be a trivial matter with no technical significance. The board therefore concludes that it would have been obvious to the skilled person to address the objective technical problem stated above by replacing the two electrode capacitive sensor of D1 with a single electrode (antenna) sensor in which the antenna is in the form of a single wire.

2.5 The appellant has argued that both the use of an antenna-type sensor and the formation of the antenna as a single wire lead to advantageous technical effects, such that the objective technical problem would be to improve the sensor of D1, and such that the claimed development would not be obvious to the skilled person. The board does not find these arguments convincing, for the following reasons.

2.5.1 The technical effects indicated by the appellant are essentially those described in paragraphs [0013] and [0078] of the application. However, those passages do not relate to a comparison of the presently claimed dispenser with that of D1, because the prior art discussed in the application does not include paper roll dispensers with capacitive proximity sensors. Moreover, the application as a whole concerns also other unrelated developments of the dispenser, such as the mechanism for changing paper rolls and the means

for avoiding static discharge. In order to determine the objective technical problem as part of the problem-solution approach, the technical effects to be taken into account are limited to those which arise from the differences over the closest prior art which are defined in the claim. It appears to the board that the majority of the effects identified by the appellant (see for instance the list on page 4 of the letter dated 18 May 2012) are in fact effects arising from the use of a capacitive sensor *per se*, which are therefore also provided by the dispenser of D1, and are thus not relevant for the assessment of inventive step in the present case.

2.5.2 A number of the alleged effects (e.g. improved reliability, lower cost) are based on the indicated reduced number of parts. The board is not able to see any reason why the claimed dispenser should have fewer parts than that of D1. Indeed, since D1 indicates at page 11, lines 16 and 17, that the electrodes are formed on the circuit board which carries the detection circuitry, whereas the claimed invention requires that the antenna is in the form of a wire, which could be a separate component, it could even be argued that the dispenser of D1 would have fewer parts. The fact that the sensor of D1 has two electrodes, whereas that in the claimed dispenser only has one, clearly has no effect in itself on the number of mechanical parts.

2.5.3 The appellant has presented a number of arguments relating to differences in the shape of the detection field. The skilled person can be expected to be aware that the two electrode sensor of D1 and the known single electrode (antenna) sensor would generally have

differently shaped detection fields, both from the point of view of directionality and from the point of view of the degree of localisation of the field. Furthermore, he would be aware that for a paper towel dispenser the shape and size of the detection field are significant in two respects, firstly in that an increased directionality and localisation would reduce the likelihood of unintentional triggering of the towel feed, and secondly in that the detection field should be sufficiently large that towel feed can easily be triggered by the user. These considerations are for example addressed in D1 in page 1, second paragraph and on page 12, and the skilled person would realise that a trade-off between these considerations is required, in that a smaller detection field with higher directionality reduces the likelihood of unintentional triggering, but makes intentional triggering more difficult, and *vice versa*. The skilled person can moreover be expected to be aware that the single electrode of the antenna type sensor can be arranged in such a manner as to achieve a desired directionality and detection field size to suit any particular environment, in much the same way that page 12 of D1 describes how to achieve such effects in the two electrode case. The issue of whether any particular antenna arrangement might have a particular advantageous effect is of no relevance, since this is neither defined in the present claim nor disclosed in the application. In this respect the board notes that the definition in the claim that the single wire is "*shaped to form a detection field*" has no limiting effect, because whatever the shape of the wire, it will form a detection field. The shape will define merely the form of the detection field (subject to the

additional effect of any ancillary elements, such as the guarding electrodes described in the application). The possible adaptation of the single wire antenna for uses such as doorway detectors (as discussed in paragraph [0072] of the application) is also not relevant, because claim 1, like D1, is restricted to the case of hand detection in a paper roll dispenser. The fact that the antenna is in the form of a single wire, rather than having some other mechanical form, cannot be considered to result in any technical effect which could result in the presence of an inventive step. This is evident from the statement in paragraph [0069] of the application that it can also be in the form of a combination of wire and copper foil tape.

- 2.5.4 The appellant has also argued that the claimed arrangement would have lower power consumption, and would thus be more suitable for operation under battery power, as discussed in paragraph [0078] of the application. It is not apparent to the board that the different electrode structures would lead to any significant difference in power consumption, and the board notes also that the dispenser of D1 is described as being suitable for operation under battery power (see page 4, penultimate paragraph and page 10, second paragraph). Indeed it seems to the board that the only improvement in this respect which might arise as a result of the change in the electrodes would be if this resulted in a significant reduction of the capacitance in the rest state (i.e. with no hand present). However, since D1 describes that in the preferred embodiment that capacitance is only about 1 pF, it seems unlikely to the board that any significant reduction in power

consumption could be achieved by reducing the capacitance further.

3. *Auxiliary request 1 - Inventive step (Article 56 EPC)*

3.1 Claim 1 of this request defines, in addition to the features of claim 1 of the main request, that the dispenser further comprises "*means for guarding the antenna*", these means comprising a "*shield driven at equal potential to the antenna*".

3.2 This additional feature is mentioned in the description of the application only in paragraphs [0072] and [0073] (column 17, lines 10 to 22). In the former of these passages, it is stated that such guards are "*old in the art*", which the board understands as meaning that they have formed part of common knowledge in the technical field for a long period of time. This understanding corresponds to the board's knowledge of this field, and has not been disputed by the appellant. The board is of the opinion that the inclusion of such a well-known feature in the dispenser resulting from the obvious development discussed above with respect to the main request cannot result in the claimed subject-matter involving an inventive step. The board observes also that in addition to the explicit statement noted above, there is an implicit assumption in the application that the use of guard electrodes is well-known in the technical field, since, with the exception of the statement that the guard electrode should be at the same potential as the antenna, the application contains no teaching as to how such guard electrodes should be implemented, so that this must be assumed to form part of the common knowledge of the skilled person.

3.3 The appellant has argued that the improvement achieved by the inclusion of the guard, namely increased directionality (see column 17, lines 14 to 17 of the application) would not be relevant for the electrode structure of D1, since that already provides the necessary directionality, and that if a larger detection field was required for a device according to D1, the obvious solution would be to increase the size of the electrodes. On this basis the appellant then argued that in order to arrive at the subject-matter of claim 1 of auxiliary request 1, the skilled person would need to firstly replace the sensor of D1 with an antenna-based sensor, which would result in poorer directionality, and then to add the guard electrode in order to restore the directionality, thus representing two changes with opposite effects, which would not be obvious. The board does not find the first of these arguments convincing, because, as discussed in paragraph 2.5.3 above, D1 already discusses the issue of electrode size, so that increasing the size of the electrodes would not represent a solution of the objective technical problem of finding an alternative to the sensor of D1. Moreover, the board is of the opinion that the use of guards or shields to improve directionality of an antenna is so well-known that the skilled person, having decided to make use of an antenna-based sensor as an alternative to that of D1, as discussed above with respect to the main request, would immediately recognise that in such a sensor directionality is required, and would therefore include a guard or shield electrode when implementing that alternative, without further consideration.

3.4 The appellant has also argued that the sensor of this claim would have lower power consumption. Concerning this argument, paragraph 2.5.4 above applies correspondingly.

4. *Auxiliary request 2*

4.1 Claim 1 according to the appellant's auxiliary request 2 is based on a combination of the original claims 1, 2 and 3 and paragraph [0121] of the description. The combination of the three claims reflects their original dependency, and the combination of paragraph [0121] with these claims is supported by paragraph [0112], which is the general introduction to the "additional aspects of the invention" in paragraphs [0113] to [0136], and by the opening phrases of each of paragraphs [0113] to [0115] and [0118] to [0120]. The further amendments in the claim serve to clarify the precedent for the reference capacitor of paragraph [0121] in the terminology of the original claims, and to make clear that the two mentions of that reference capacitor in paragraph [0121] relate to the same component, which was clear from paragraphs [0122] and [0123]. Thus, this claim meets the requirements of Article 123(2) EPC, and in particular is not subject to the objection raised by the board with respect to the auxiliary requests 2 to 4 filed with letter dated 18 May 2012 (but withdrawn by the appellant during the oral proceedings before the board) that they defined an undisclosed intermediate generalisation of the teaching of the original application. The board notes that this assessment of the conformity of auxiliary request 2 with Article 123(2) EPC has only addressed the independent claim.

4.2 The amended claim 1 according to this request includes a number of technical features which did not appear in the claims as originally filed, but were instead only disclosed in the lengthy description, so that the board assumes that they were not taken into consideration in either the search or the first instance examination procedure. Given the appellant's submissions concerning the resultant advantageous effect, this assumption applies in particular to the feature that the reference capacitor and the variable trim resistor form part of both the oscillator circuit and the balanced bridge. Under these circumstances the board considers it appropriate to make use of its discretion under Article 111(1) EPC to remit the case to the department of first instance for further prosecution.

## **Order**

### **For these reasons it is decided that:**

1. The decision under appeal is set aside.
2. The case is remitted to the department of first instance for further prosecution.

The Registrar:

The Chairman:

U. Bultmann

R. H. Lord