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D E C I S I O N
of 24 September 2002

Case Number: T 0241/00 - 3.4.2

Application Number: 92308667.2

Publication Number: 0534736

IPC: G01G 23/12, G01G 23/10

Language of the proceedings: EN

Title of invention:
Scale for fast determination of weights

Patentee:
PITNEY BOWES INC.

Opponent:
NEOPOST LTD

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step (yes)"

Decisions cited:
T 0037/82

Catchword:
-



Case Number: T 0241/00 - 3.4.2

D E C I S I O N
of the Technical Board of Appeal 3.4.2
of 24 September 2002

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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 19 January 2000
rejecting the opposition filed against European
patent No. 0 534 736 pursuant to Article 102(2)
EPC.

Composition of the Board:

Chairman: E. Turrini
Members: M. A. Rayner
B. J. Schachenmann

Summary of Facts and Submissions

I. The appellant (opponent) has appealed against the decision of the opposition division rejecting the opposition against the European patent No. 0 534 736 (application No. 92 308 667.2). In the proceedings before the opposition division, reference was made, amongst others, to the following document:

D3: US-A-4 156 472

In the decision under appeal the opposition division held, *inter alia*, that claims 1 to 4 of the patent define patentable subject matter within the terms of Articles 52(1) and 56 EPC. The opposition division found in particular that none of the documents considered during the opposition proceedings discloses or suggests the use in a scale of a low pass filter according to the subject matter of claim 1 of the patent.

II. Claim 1 of the patent as granted reads as follows:

" 1. A scale comprising:

(a) means for supporting an item to be weighed, said support means (12) further comprising:

(a1) a pan (18) for receiving said item;

(a2) transducer means (10) for generating an output representative of the instantaneous response of said support means, said pan and said transducer being connected to form a structure (20);

(a3) said output of said transducer means (10) being processed by a low pass filter (76), said filter (76) having a cut-off frequency less than a

predetermined frequency;

b) means for receiving said output of said transducer means and for determining the weight of said item as a function of said output;

characterised in that:

c) the average time for determining the weight of a representative series of said items is approximately equal to a predetermined time;

d) said structure (20) is designed so that its stiffness is sufficiently great in relation to its mass that it has no substantial resonances below said predetermined frequency, the period of said frequency being substantially less than said predetermined time;

and

e) wherein said filter is a digital filter (76) and there are means so that said cut-off frequency of said digital filter is, in use, temporarily increased for a period approximately coincident with an initial response of said support means (12) to an application of said item to be weighed."

Claims 2 to 4 of the patent as granted are dependent from claim 1.

III. In the appeal proceedings, oral proceedings were requested by both the appellant and the respondent (patent proprietor) on an auxiliary basis. During the oral proceedings, the respondent filed an amended set of claims of which the wording is not herein reproduced consequent to point 7 of the reasons for this decision.

IV. The case of the appellant can be summarised as follows:

(i) Requests

Revocation of the patent and on an auxiliary basis appointment of an expert to clarify whether the measurement process according to document D3 involves filtering by a low pass filter.

(ii) Arguments

Clarity

The reference in paragraph (c) of claim 1 to a series of items is not consistent with the definition in the description of the average time as relating to one item and the features of the claim relative to the predetermined time are indefinite. In addition, it is unclear in paragraph (e) of claim 1 for how long the cut-off frequency is kept increased.

Inventive step

Although a counter does not constitute *per se* a filter, a counter arranged to count signal cycles over predetermined time periods integrates the signal cycles to obtain an average value over each of the time periods and consequently operates as, and constitutes a low pass filter. A pulse counter is a digital integrator and an integrator is a low pass filter, the number of pulses being counted by the counter defining the integration time and determining the cut-off frequency of the low pass filter.

Document D3 relates to a weighing system with a circuit for controlling the display of the weight of an object. The integration time is automatically adjusted during the weighing process on the basis of the variation of the digital variable to be displayed. In particular, the integration time is decreased "when an excessively

large difference between sequential weighing results occurs" (column 2, lines 31 to 39). In an initial weighing period in which the weight varies rapidly the weight is calculated with an integration time of 0,02 sec; as the varying weight stabilizes progressively, the integration time is increased to 0,2 sec and then to 2 sec and the weight is calculated with a higher precision.

Accordingly, document D3 teaches a digital filter having a cut-off frequency decreasing during the weighing process, this teaching anticipating feature (e) of claim 1 of the patent in suit in the context of an electronic scale like that considered in the patent. The period of the initial response referred to in claim 1 corresponds with the period in which the scale of document D3 is said to be "operating in a transient condition" (abstract and column 1, lines 63 to 68). During the initial transient response in which the load varies rapidly, the integration time is relatively low, i.e. the cut-off frequency is high, and as the degree of variation of the load becomes smaller, the weight is determined by the counter with a higher precision by increasing the integration time, i.e. by decreasing the cut-off frequency. The scale disclosed in document D3 was designed to weigh a varying load, but is also suitable for weighing items such as animals (column 7, line 38). Should articles such as letters be weighed with the scale of D3, the cut-off frequency would then increase only in the initial period, as is the case in claim 1 of the patent.

The features defined in paragraphs (c) and (d) of claim 1 correspond with conventional measures known in the art. In addition, these features do not contribute,

either alone or in combination, to solving the technical problem considered in the patent and therefore, following the case law established in decision T 0037/82, should be disregarded in the discussion of the inventive step of the subject matter of claim 1.

Furthermore, the features defined in the preamble of claim 1 are common to all scales and the features defined in paragraph (d) of the claim simply require the obvious measure of filtering out the mechanical resonances.

V. The case of the respondent can be summarised as follows:

(i) Requests

Dismissal of the appeal or on an auxiliary basis that the patent be maintained in amended form according to the amended set of claims submitted during the oral proceedings.

(ii) Arguments

A low pass filter according to the invention integrates the signal from the transducer outputted by the analog-to-digital converter as shown in Figure 4 and, in essence, the lower the cut-off frequency of the filter, the slower the signal integrated by the filter reaches the actual value of the signal. The cut-off frequency of the filter or, equivalently, the sampling rate is momentarily increased during the initial response of the scale in order to better track the transient raise of the signal, thus speeding up the determination of

the weight on the basis of the signal from the transducer. This allows for an accurate and faster determination of the weight of mail pieces in accordance with the method shown in the flow chart of Figure 5 of the patent, thus improving the throughput rate. The features of paragraph (c) of claim 1 are to be understood as referring to a single item as supported by the description of the patent (column 8, lines 10 to 14) and the expression "period approximately coincident with an initial response [...]" referred to in paragraph (e) of the claim corresponds essentially with the time period between t_0 and t_1 in Figure 3 of the patent, i.e. with the initial period of time during which the signal raises sharply in response to the application of the item to be weighed.

Document D3 is not designed to respond to different types of items being weighed such as a letter. The document teaches a weighing scale in which both the rate at which the content of the pulse counter is transferred to the display and the number of significant digits displayed in the display are varied according to the weighing conditions. The actual disclosure of the document, however, fails to support the provision of a digital low pass filter having the characteristics defined in claim 1. In particular, document D3 gives no indication that the variation in the rate of transfer occurs "for a period approximately coincident with an initial response" of the scale upon application of an item to be weighed as required by feature (e) of claim 1. The time periods over which the rate of display of the measured weight value changes are fixed in the manner described in column 3, line 67 to column 4, line 7, and in column 4, lines 30 to 34

and 50 to 54. Therefore, if the scale of document D3 were to be used for weighing letters, then there would be no increase in the cut-off frequency as defined in claim 1. Modulator (22) sets the pulse width as a function of the weight, but only at a constant rate, and integration of the output signals takes indeed place in document D3, but only in the counter (30). Thus, the pulses from the clock are all of the same frequency and there is no momentary modification of the measurement operation for the purpose of finely tracking the transient state of the signal. The integration operation carried out by the counter of document D3 would rather be the counterpart of the integration operation carried out by the microprocessor disclosed in the patent specification when performing the operations disclosed with reference to the flow chart of Figure 5 of the patent. Thus, in document D3 there is no digital filter for filtering the signals from the transducer prior to the processing of the signals for determining the weight on the basis of the filtered signals within the meaning of the invention.

Finally, document D3 also fails to disclose or suggest the features defined in paragraphs (c) and (d) of claim 1.

VI. At the end of the oral proceedings, the Board gave its decision.

Reasons for the Decision

1. *Admissibility of the appeal*

The appeal complies with the provisions mentioned in

Rule 65(1) EPC and is therefore admissible.

2. *Article 84 EPC*

No admissible grounds for opposition are provided in the context of Article 84 EPC and as the main request of the respondent is based on the unamended granted claims, whatever doubts the Board may have in respect of clarity, there is no legal basis for an examination by the Board of objections raised by the appellant to the subject matter of claim 1 as granted. The Board is therefore obliged to rely on a thorough examination as to clarity having been carried out in the pre-grant examination proceedings. The submissions of the appellant in the context of Article 84 EPC were therefore not examined in the present appeal proceedings.

3. *Prior art Document D3*

Document D3 discloses an electrical scale comprising a support including a pan for receiving a load to be weight and a transducer of the magnet-coil type (12) for generating an output representative of the instantaneous response of the support (column 3, lines 6 to 13 and Figures 1 and 5). The scale includes in addition means for determining and displaying the weight of the load and means for controlling the manner the weight is determined and displayed according to the transducer output. The determination of the weight involves essentially generating current pulses varying in width as a function of the transducer output by means of a modulator (22), controlling a gate (26) continuously receiving high frequency counting pulses from a clock generator (28) according to the width of

the current pulses, and counting the clock pulses exiting gate (26) by means of a counter (30). The counting signal generated by counter (30) is then transferred at predetermined time intervals to display (32), (33), (34) in which the transferred values are sequentially displayed (column 3, lines 9 to 28 and Figure 1). These operations are controlled by means of comparators (42) and (44) and a multiplexer (39) which, upon detection of an excessively large difference between sequential weighing results following a quick increase in the load, cause the counting signal to be transferred to the display every 20 msec and to be displayed with a predetermined number of significant digits (column 3, line 56 to column 4, line 15). As the comparators detect that the difference between sequential weighing results becomes gradually smaller and the weighing results gradually approach a predetermined quantity, the counting signal is transferred to the display every 0.2 sec and then every 2 sec and displayed with more significant digits (column 2, lines 10 to 14 and column 4, lines 16 to 54).

The transfer to the display of the counting signal generated by the counter at the predetermined time intervals involves summing up over the predetermined time intervals the clock pulses received by the counter and varying in number as a function of the weight (column 1, lines 8 to 14 and column 2, lines 3 to 8). This transfer operation constitutes therefore an integration of the clock pulses over integration times corresponding to the predetermined time intervals (column 1, lines 63 to 68).

4. *Main request - Novelty (Article 54 EPC)*

Claim 1 of the main request specifies in paragraph (e) that the cut-off frequency of the filter is temporarily increased "for a period approximately coincident with an initial response" of the support means "to an application of said item to be weighed". The language used in this passage of the claim concerned with the period approximately coincident with the initial response leads to this period being understood to designate the lapse of time during which the output generated by the transducer means and representing the instantaneous response of the support means (see paragraph (a2) of the claim) is in a rapidly varying transient state, i.e. varies sharply upon application of the item to be weighed on the scale, in agreement with the respondent's submissions and with the disclosure of the patent specification (column 3, lines 26 to 32).

Lack of novelty was neither raised as a ground of opposition nor has it been contested during the proceedings. Nevertheless, in order to establish a starting point for assessment of inventive step, the Board considers it appropriate to identify at least some novel subject matter in the claim. In particular, the appeal proceedings have become focused on (1) whether the electrical scale disclosed in document D3 includes a low pass filter operating with a varying cut-off frequency and (2) whether document D3 also anticipates the technical relationship of the low pass filter with the remaining features of the scale defined in claim 1.

With respect to the first question, since a periodic integration of pulses constitutes a filtering process of the pulses, the operation carried out by

counter (30) on the clock pulses constitutes a kind of filtering process by a low pass filter. The cut-off frequency of this filter is determined by the predetermined time intervals and an increase of the predetermined time intervals as a function of the variations of the load is tantamount to a decrease of the cut-off frequency of the filter. In so far as the gate (26) and the counter (30) operate in the scale of document D3 as a low pass filter, the scale of document D3 does thus indeed comprise a low pass filter operating with a cut-off frequency as defined in claim 1 of the opposed patent. In addition, as comparators (42), (44) decrease temporarily the predetermined time intervals in response to a signal indicating that the scale operates in a transient condition, it follows that the comparators (42), (44) constitute means arranged to temporarily increase the cut-off frequency of the filter for a period of time corresponding to an initial response of the support to an application of the load (abstract, column 1, lines 63 to 68, column 2, lines 15 to 24 and 31 to 39, and column 3, lines 57 to 59).

With respect to the second question, in the Board's view the wording of claim 1 defines distinct means for processing the output of the transducer by a low pass filter (feature (a3)), on the one hand, and for determining the weight as a function of the output of the transducer means (feature (b)), on the other hand, as is supported by several passages of the patent specification making clear that the determination of the weight involves processing the output of the transducer previously filtered by the low pass filter (see Figure 4 and flow chart shown in Figure 5, and column 5, lines 20 to 40 and column 6, lines 27 to 34).

Thus, the low pass filter according to claim 1 of the patent filters the output of the transducer before the resulting filtered output is processed by the means for determining the weight of the load. This is to be contrasted with the teaching of document D3, where the filtering by counter (30) itself constitutes the determination process by which the weight of the load is determined as a function of the output from the transducer. The sequence of filtered outputs from the counter are successively displayed one after another and then disregarded, and consequently the outputs from the counter are as such not properly used in a weight determination process since each of them already itself constitutes the result of a weight determination process carried out independently of the previous outputs from the counter.

Therefore, the approach of the appellant relying on identification in the claimed subject matter of the filtering and the weight determining processing steps with each other, i.e. on the identification of the low pass filter defined in paragraph (a3) with the receiving and determining means defined in paragraph (b) of claim 1 does not persuade the Board as such identification does not correspond to either the wording of the claim or to the disclosure of the remainder of the patent specification.

Accordingly, while in document D3 filtering by a low pass filter is given by the integration process of the clock pulses constituting itself the process of determination of the weight of the load, the subject matter of claim 1 involves processing by a low pass filter of the output of the transducer means prior to and separate from the determination by distinct means

of the weight on the basis of the resulting filtered output, the cut-off frequency of the filter being momentarily increased upon detection of an initial response of the support means to an application of the item to be weighed.

The subject matter of claim 1 is therefore novel at least in this respect within the meaning of Article 54 EPC.

5. *Main request - Inventive Step (Article 56 EPC)*

5.1 Since no other document considered in the proceedings discloses or suggests a low pass filter operating with a varying cut-off frequency, the Board concurs with the parties in considering document D3 as the most appropriate starting point for the assessment of inventive step. It has been contended that a rapid determination of the weight and an improved throughput of the scale (column 1, lines 9 to 11 and 50 to 54 and column 2, lines 20 to 24) amount to the problems solved by the distinguishing subject matter as this has the effect of causing the filtered output of the transducer to reach more quickly its stable state (column 3, lines 26 to 36). The Board does not see identification of this problem as contributing to inventive step as the problem of rapidly determining the weight of an item or load is a common concern in the present field and indeed is already considered in document D3 (column 1, lines 28 to 38). In the present case, the Board sees the objective problem addressed as that of providing another way of solving the problem referred to above.

5.2 The Board cannot see how any teaching or indication in

the prior art documents considered during the proceedings would lead the person skilled in the art to modify the scale of document D3 to provide distinct weight determination means so as to reach a scale as claimed. Thus the Board concluded that, having regard to the prior art considered by the parties, it was not possible for the skilled person to have reached in an obvious way a scale comprising a low pass filter and a means for determining the weight having the features defined in claim 1. For this reason, the subject matter of claim 1 involves an inventive step, independently of any inventive merit of the features defined in paragraphs (c) and (d) of claim 1, i.e. irrespectively of the relationship between the cut-off frequency, the resonance frequencies of the structure and the average time. The appellant's submissions that the features of paragraphs (c) and (d) are obvious and should in any case not be taken into account in the assessment of the issue of inventive step according to decision T 0037/82 (OJ 1984, 71, headnote II) thus do not affect the Board's conclusion on the issue of inventive step and therefore the Board does not consider it either necessary or appropriate to pursue these submissions further.

5.3 In view of the foregoing, the Board is satisfied that the subject matter of claim 1, and that of claims 2 to 4 which depend therefrom, can be considered to involve an inventive step within the meaning of Article 56 EPC.

6. *Request for appointment of an expert*

Despite not being successful in persuading the Board as to lack of inventive step of the subject matter of

claim 1, the contention of the appellant that the weighing operation disclosed in document D3 involves filtering by a low pass filter having a varying cut-off frequency was accepted in essence by the Board. Therefore, the auxiliary request that an expert be appointed to clarify the question of whether or not the measurement process according to document D3 involves filtering by a low pass filter would, even if complied with by the Board, not add anything to the case of the appellant. For this reason, the Board does not consider it necessary to appoint an expert pursuant to Rule 72(1) EPC.

7. *Respondent's auxiliary request*

Since the subject matter of the claims as granted in accordance with the main request is allowable, consideration of the claims according to the auxiliary request of the respondent is not necessary.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

P. Martorana

E. Turrini

