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Case Number: T112 / 82

**DECISION**  
of the Technical Board of Appeal 3.4.1  
of 24 March 1983

**Appellant:** FUJITSU LIMITED  
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Kawasaki-shi Kanagawa 211  
Japan

**Representative:** Leonard Charles Abbott et al  
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**Decision under appeal:** Decision of Examining Division 062 of the European Patent  
Office dated 17 March 1982 refusing European patent  
application No 79 300 877.2 pursuant to Article 97(1)  
EPC

**Composition of the Board:**

Chairman: R. Kaiser  
Member: O. Huber  
Member: P. Ford

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I. Summary of Facts and Submissions

1. European patent application No. 79 300 877.2 entitled "Time-period comparing device", filed on 18 May 1979 and published on 12 December 1979 (publication No. 0 005 946) and claiming priority of 23 May 1978 from a previous application in Japan, was refused by decision of Examining Division 062 of the European Patent Office, dated 17 March 1982. That decision was based on claims 1-16 received on 3 September 1981. The grounds for refusal were that the two remaining differences between the subject-matter of claim 1 and the system described in US-A-3 877 003 in view of the frequency and the reference period were not relevant. According to the decision, claim 1 and the dependent claims 2-16 were not allowable due to lack of inventive step.
2. On 13 May 1982 the appellant lodged an appeal against the decision by telex. A document reproducing the contents of the telex was filed on 19 May 1982. The appeal fee was paid on 14 May 1982. The appellant submitted a Statement of Grounds on 19 July 1982.

In reply to a communication issued by the rapporteur pursuant to Article 110(2) EPC, the appellant filed a new set of seven claims and amended pages 2, 3, 3a, 3b, 4-10, 13, 15-17 of the description on 7 March 1983. The originally filed and published pages 1, 11, 12, 14 and 16 sheets of drawings are still effective (a new sheet 8 of the drawings including the reference "3" was not enclosed in the letter of the appellant dated 3 March 1983).

The present claim 1 reads as follows:

1. A period comparing device for comparing the period (T) of a first signal (a) with a second period (reference period t) defined by a predetermined multiple of a shorter period ( $t_0$ ) of a second signal (b), the second period (t) being obtained by means of a counter (3) receiving the second signal (b) and reaching a count equal to the predetermined multiple if not previously interrupted by the said first signal (a) and generating either a rectangular signal (Fig. 2C) defining the reference period (t) or a definite level signal (Fig. 3C), the type of signal generated depending on the period (T) of the first signal (a) being longer ( $T_1$ ) or shorter ( $T_2$ ) than the reference period (t), and comprising a signal circuit (4) producing two different definite level signals (Fig. 2F, Fig. 3F) depending on the period (T) of the first signal (a) being longer ( $T_1$ ) or shorter ( $T_2$ ) than the said reference period (t), characterized

(a) in that the first signal (a) is an input signal to be monitored,

(b) an oscillator (2) provides the signal (b) of shorter period ( $t_0$ ) and

(c) by means (5) for preventing the device from operating when the input signal (a) is an irregular signal, the preventing means having two output states (j,k), the preventing means in the first output state counting the number of pulses derived from the input signal (a), following a change in the signal circuit output, and being reset by a subsequent output signal (g) provided by the signal circuit (4) if that signal (g) arrives before the number of pulses has reached a predetermined value, the preventing means in the second

output state counting the number of pulses derived from an output signal (i) of the counter (3), following a change in the signal circuit output, and being reset by another subsequent output signal (f) provided by the signal circuit (4) if that signal (f) arrives before the number of pulses has reached the predetermined value, the preventing means changing from one output state to the other following the corresponding change in the output of the signal circuit, only when the number of pulses derived from the input signal (a) or from the output signal (i) of the counter (3) reaches the predetermined value.

3. The appellant has requested that the decision of the Examining Division be cancelled and that the present application be allowed on the basis of the documents mentioned above (including the insertion of the reference "3" in the drawing sheet 8).

## II. Reasons for the Decision

1. The appeal complies with Articles 106 to 108 and Rule 64 EPC. It is therefore admissible.
2. There is no formal objection to the current claims, since they are adequately supported by the original documents.
3. The preamble of claim 1 is based on the prior art as disclosed in US-A-3 877 003. In this document a warning system for belt-slippage is described in which the period of a first signal (output signal of the control circuit 5) is compared with a second period defined by a

predetermined multiple of a shorter period of a second signal (output signal of the reshaping circuit 3). The second period is obtained by means of a counter (6d - 6j) reaching a count equal to the predetermined multiple if not previously interrupted by the first signal and (in consequence of the identical realization of essential circuits in comparison with the subject-matter of the application) generating either a rectangular signal (defining the reference period) or a definite level signal depending on whether the period of the first signal is longer or shorter than the reference period. A signal circuit (6b, 6c, 7, 8) produces two different definite level signals depending on the period of the first signal being longer or shorter than the reference period.

Means for preventing the device from operating when the input signal is an irregular signal (characterising feature (c)) does not exist. The features (a) and (b) are missing, too, since the first signal is not an input signal to be monitored but a signal proportional to the revolutions of the engine shaft, and the signal of shorter period is not provided by an oscillator but by an alternator driven by the belt.

The subject-matter of US-A-3 361 985 is a circuit for detecting an out-of-frequency condition between an internal signal generated by an oscillator and an external signal and for generating digital signals (error signals) to bring the internal signal into synchronism with the external signal. There are two lines to each of which the error signal in form of a pulse train can be applied depending on whether the frequency of the oscillator has to be raised or lowered. The tracking apparatus is provided with means for preventing the device

from operating when the error signal contains irregular pulses, see Fig. 7. For this purpose, the pulses on the up and down lines (A-7, A-8) are applied to a pair of counters (C-1, C-2) and to the set and reset sides of a flip-flop (71). The outputs of the flip-flop are connected to the reset inputs of the counters and the outputs of the counters are connected to gates (83, 85) to inhibit the passages of pulses on the up and down lines until the counters are full. In this manner, the accumulation of pulses in the counters will only occur for a signal and not for noise because noise will continuously set and reset the flip-flop to reset the counters. Thus, the special preventing circuit according to the characterising feature (c) of the present claim 1 is not disclosed in US-A-3 361 985. The same is true for the features (a) and (b), in consequence of the different technical features designating the preamble of claim 1.

In US-A-3 989 960 a chattering prevention circuit is described including a counter which, upon receiving an input signal of a chattering kind, such as from a switch contact, begins to count clock pulses. When the count reaches a predetermined value, a signal is generated to control a gate for the input signal.

The document "Wireless World" September 1974, pages 316-320, discloses a digital speedometer whereby the number of pulses produced over a period of time (determined by an oscillator) is counted.

In both documents (US-A-3 989 960 and "Wireless World") a comparison of two different periods is not performed and a circuit preventing noise from causing erroneous pulses does not exist.

Thus, the subject-matter of the application, as set out in claim 1, is novel.

4. The question now to be examined is whether the subject-matter of claim 1 involves an inventive step.
- 4.1 According to page 3, second paragraph, of the description the present invention has for its object to provide means preventing a period comparing device from responding to rapid changes of an irregular nature. This problem is already mentioned in the original and published description, see page 3, lines 8 - 12. If the need arises, it is common practice to provide electronic measuring and controlling devices with means for preventing the device from operating when the input signal is an irregular signal, in particular when dealing with pulse trains, see US-A-3 361 985. Therefore, the aims set by the present application cannot be regarded as inventive.
- 4.2 The characterising features (a) and (b) cannot support the inventive activity. It is evident for a person skilled in the field of (digital) electronic measurement that the system described in US-A-3 877 003 is also appropriate to measure the rotating speed of an engine shaft (signal to be monitored). In such a case only the alternator generating a pulse train proportional to the revolutions of the driven member has to be replaced by a local oscillator furnishing a constant pulse sequence. However, the features (a) and (b) are properly included in the characterising part of claim 1, since they are not known in connection with a period comparing device according to the preamble (US-A-3 877 003) and, in addition, they specialize the latter.

- 4.3 It is true that the preventing circuit according to the feature (c) is based on the same principle as that described in US-A-3 361 985, namely counting of pulses and generating a gate signal when the count reaches a predetermined value.

However, the feature (c) provides a very specific way of solving the problem, particularly adapted to the special period comparing device according to the preamble of claim 1 and the features (a) and (b). The preventing circuit disclosed in Fig. 7 in US-A-3 361 985 is tailored to the case that two pulse trains which may be affected by noise are transmitted through the device, whereas in the claimed period comparing device, besides the pulse train generated by the pick-up circuit (1), two definite level signals (f, g) appearing at the outputs of the signal circuit (4) have to be regarded. As a consequence either the first signal (a) or the output pulse train (i) of the counter (3) generating the second signal (c) with the reference period (t) are applied to the counter stage ( $52_1 - 52_5$ ) of the preventing circuit (5). There is no suggestion in US-A-3 361 985 of the particular circuit provided according to feature (c) of claim 1. Nor does the state of the art disclosed in US-A-3 989 960, in which the counter (2), in connection with a gate signal generating circuit (3) and a gate (7), serves only to delay the transmission of clock pulses after closing a contact of a switch or a relay (see paragraph (3)), provide any hint of the claimed performance of a noise preventing circuit.

Finally the document "Wireless World" is irrelevant, since no means for preventing the speedometer from responding to irregular noise signals is disclosed.

In summary, it must be stated that the state of the art provides no clue to the solution of the problem in the form of the characterising feature (c) of claim 1.

Thus, the period comparing device in claim 1 involves an inventive step (Article 56 EPC).

- 4.4 Claim 1 is thus allowable in accordance with Article 52(1) EPC.
5. Dependent claims 2 to 7 relate to special embodiments of the invention in claim 1 and are thus not allowable.
6. The effective description meets the requirements of Rule 27 EPC.

### III. Order

For these reasons it is decided that:

1. The decision of Examining Division 062 of the European Patent Office dated 17 March 1982 is set aside.
2. The case is remitted to the first instance, with the order to grant a European patent on the basis of the following documents:

Description pages 1, 11, 12, 14 as published;

Description pages 2, 3, 3a, 3b, 4 to 10, 13, 15 to 17 received on 7 March 1983 provided that on page 3, line 14, the words "consists in" are replaced by "starts from", on page 5, line 26 and 2 "uF" and "k" are amended to read " $\mu F$ " and  $K\Omega$ ;

Claims 1 - 7 received on 7 March 1983 provided that in claim 7, line 4, after the word "one" the reference "(24)" is inserted;

16 sheets of drawings as published provided that in Fig. 6B (sheet 8/16) the reference "3" of the counter is inserted.

The Registrar:

signed: J. Rückerl

The Chairman:

signed: R. Kaiser

