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Aktenzeichen / Case Number / N<sup>o</sup> du recours : T 246/85

Anmeldenummer / Filing No / N<sup>o</sup> de la demande : 80 101 548.8

Veröffentlichungs-Nr. / Publication No / N<sup>o</sup> de la publication : 0 017 801

Bezeichnung der Erfindung: Amorphous antipilferage marker and detection  
Title of invention: system comprising same.  
Titre de l'invention :

Klassifikation / Classification / Classement : G08B 13/24

**ENTSCHEIDUNG / DECISION**

vom / of / du 1 December 1987

Anmelder / Applicant / Demandeur :

Patentinhaber / Proprietor of the patent /  
Titulaire du brevet :

Allied Corporation

Einsprechender / Opponent / Opposant :

Vacuumschmelze GmbH

Stichwort / Headword / Référence : Amorphous marker/AC

EPÜ / EPC / CBE Article 56

Kennwort / Keyword / Mot clé : Inventive step (denied)

**Leitsatz / Headnote / Sommaire**

Europäisches  
Patentamt

Beschwerdekammern

European Patent  
Office

Boards of Appeal

Office européen  
des brevets

Chambres de recours



Case Number : T 246/85

**D E C I S I O N**  
of the Technical Board of Appeal 3.5.1  
of 1 December 1987

Appellant :  
(Opponent)

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Decision under appeal :

Decision of the Opposition Division of the European  
Patent Office dated 23 May 1985, posted on 14 August  
1985, rejecting the opposition filed against  
European patent No. 0 017 801 pursuant to  
Article 102(2) EPC

Composition of the Board :

Chairman : P.K.J. Van den Berg

Members : J.A.H. van Voorthuizen

J.D. Roscoe

O.P. Bossung

E. Persson

## Summary of Facts and Submissions

- I. European patent 0 017 801, incorporating seven claims, was granted 25.05.83 on the basis of European patent application 80 101 548.8, filed on 24.03.80 and claiming priority of 23 April 1979, from an earlier application in the United States.

Independent Claims 1 and 7 read as follows:

1. For use in a magnetic theft detection system (10), an elongated strip marker (16) adapted to generate magnetic fields at frequencies that are harmonically related to an incident magnetic field applied within an interrogation zone (12) in order to provide said marker (16) with signal identity, characterised in that said marker (16) is fabricated from an amorphous ferromagnetic material, is sufficiently ductile that it can be bent to a round radius as small as ten times the strip thickness without fracture and is capable of retaining its signal identity after being flexed or bent.
  
7. A magnetic detection system (10) responsive to the presence of an article within an interrogation zone (12), comprising:
  - (a) an interrogation zone (12);
  
  - (b) means (14) for generating a magnetic field within said interrogation zone (12);
  
  - (c) a marker (16) secured to an article (19) appointed for passage through said interrogation zone (12), said marker (16) being an elongated strip of

ferromagnetic metal capable of producing magnetic fields at frequencies which are harmonics of the frequency of an incident field; and

- (d) detecting means (20) for detecting magnetic field variations at selected tones of said harmonics produced in the vicinity of the interrogation zone (12) by the presence of the marker (16) therewithin, said selected tones providing said marker with signal identity, characterised in that the marker (16) is as claimed in any one of the preceding claims.

Claims 2 to 6 are dependent on Claim 1.

- II. A notice of opposition was filed on 18.02.84 by the present appellant requesting revocation of the patent on the ground of lack of inventive step. The opposition was supported by the following documents: Journal of Magnetism and Magnetic Materials (1978) (referred to henceforth as JMMM), pages 191-199 and US-A-4 075 618.
- III. The opposition was rejected by a decision of the Opposition Division of 14.08.85 on the ground that the subject-matter of Claims 1 and 7 was considered to involve an inventive step with regard to the cited prior art.
- IV. On 28.09.85 the appellant lodged an appeal against this decision. The appeal fee was paid on 02.10.85. The Statement of Grounds was filed on 11.12.85.

Following a submission in answer hereto by the patentee (respondent), a communication from the Board and further submissions by both parties, in which attention was drawn to several further prior art documents, oral proceedings were held on 01.12.87.

- V. The appellant requested that the decision under appeal be set aside and that the patent be revoked.
- VI. The respondent requested that the appeal be dismissed and the patent maintained unamended. He also presented the auxiliary request that the patent be maintained in amended form by limiting the invention so as to include deactivation means.
- VII. The appellant's submissions can be summarised as follows:

In the article in JMMM it is explained that for amorphous ferromagnetic materials plastic deformation plays a significantly smaller part as far as the soft magnetic behaviour is concerned than for the known crystalline alloys. Furthermore, this article proposes in general terms the application of such amorphous materials in theft protection systems which in themselves are well known. In fact all the materials specifically mentioned in the article exhibit, even after certain annealing operations, the minimum ductility required by Claim 1. At the oral proceedings, the appellant presented examples of the materials in question and stated that all of them had been prepared and put at the disposal of the public before the priority date of the patent-in-suit. It was further submitted that the amorphous materials available on the market at the priority date under the name METGLAS also had the required ductility. Besides, the minimum value of ductility stated in Claim 1 was arbitrary. Thus, merely by following the teaching given in the article referred to, the person skilled in the art would arrive at markers falling within the scope of Claim 1. It could not be validly said that the patentee had made a selection since, on the one hand, the amorphous materials on the market had already at least the required ductility and, on the other

hand, the materials indicated in the patent as being unsuitable did not have ferromagnetic properties and so would be excluded from the beginning.

VIII. The patentee's submissions can be summarised as follows.

Claim 1 states three requirements for the marker strip according to the invention. The JMMM article specifies only in general terms the properties of amorphous materials. It suggests the use of markers made of such materials in a particular anti-theft system described in a further article to which explicit reference is made and which does not employ a simple marker as proposed by the invention. The JMMM article does not disclose any desirable value for the ductility of the described materials and in particular does not even hint at the desirability of a high ductility for markers applied in an anti-theft system. Neither can such a hint be found in any of the other cited documents pertaining to such systems. On the contrary, it is stated in US-A-4 075 618 that the markers should be provided with stiffening supports, notwithstanding the fact that in this document the use of an amorphous METGLAS material is mentioned.

#### Reasons for the Decision

1. The appeal complies with Articles 106-108 and Rule 64 EPC and is, therefore, admissible.
2. Elongated strip markers for use in a magnetic theft detection system, which are adapted to generate magnetic fields at frequencies that are harmonically related to an incident magnetic field applied within an interrogation zone in order to provide the markers with signal identity

are widely known, cf. FR-A-763 681, US-A-3 665 449, US-A-3 790 945. Such markers in combination with deactivation means are known from US-A-3 747 086 and US-A-3 820 104.

3. The marker according to Claim 1 is characterised in that it is fabricated from an amorphous ferromagnetic material, is sufficiently ductile that it can be bent to a round radius as small as ten times the strip thickness without fracture and is capable of retaining its signal identity after being flexed or bent.
4. The patentee made it clear during the oral proceedings that this last characteristic applied to the marker when brought back to its original straight shape after having been flexed or bent.
5. Ductility of a material is a measure of the plastic deformation it can withstand without fracturing. The appellant argued with regard to the permalloy strips which were commonly used in the known theft protection systems and had thicknesses of 0,1-130 $\mu$ m (US-A-3 665 449), 12,5 $\mu$ m (US-A-3 747 086 and 3 790 945) or 17,8 $\mu$ m (US-A-3 820 104) that these strips already show the degree of ductility required by Claim 1. The patentee did not contest this statement.
6. The signal identity of a magnetic marker strip is caused by its high permeability (cf. the documents cited in paragraph 2). It is, on the other hand, a characteristic of amorphous magnetic materials that they can be plastically deformed without appreciably changing their soft-magnetic behaviour (cf. JMMM, page 191, left-hand column and US-A-4 038 073). It follows that the

requirement stated in Claim 1 that signal identity is retained after flexing or bending has to be regarded as an inherent property of amorphous ferromagnetic materials.

7. Therefore, Claim 1 essentially seeks protection for a strip of ferromagnetic amorphous material having a certain minimum ductility, for use in a theft protection system.
8. As far as the value for the ductility stated in Claim 1 is concerned, the patentee admitted that this value was arbitrary and that no unexpected or surprising effects were connected with it.
9. Amorphous ferromagnetic materials generally and their properties are known from a number of publications, including US-A-3 856 513, US-A-4 038 073, US-A-4 067 732; JMMM, pages 191-199, Journal C & EN, 19.11.1973, pages 24/25 and Materials research report Allied Chemical, July 1977.
10. In JMMM, page 191, left-hand column, it is stated that ferromagnetic metallic glasses can be magnetically soft and mechanically hard and that plastic deformations play a significantly smaller part for the soft magnetic behaviour than in deformation sensitive crystalline alloys (of which permalloy is a well known example). It is pointed out subsequently that a low magnetostriction is desirable in this respect. Applications are described in which the insensitivity to deformation is particularly important such as screening and the fabrication of ring cores. On page 195, left column, line 15, reference is made to the material METGLAS 2826. On page 196, right-hand column the application of such materials is proposed for magnetic strip markers, e.g. in theft protection systems in department stores.

11. US-A-4 038 073 equally draws attention to the fact that soft magnetic properties of amorphous materials, in particular those of the zero magnetostriction type, are insensitive to mechanical strain in contrast to crystalline materials.
12. In the other publications cited in paragraph 9 no particular attention is paid to the soft magnetic behaviour under stress but they all point to the high ductility of amorphous materials (cf. Journal C & EN, page 25: "a METGLAS wire can be folded back on itself in a 180° bend without breaking"; US-A-4 067 732, end of column 6 implies that certain materials can be bent to a round radius between 1,7 and 5 times the thickness; US-A-3 856 513, beginning of column 6: "some specimen can be bent over radii less than their thickness"; AC Research reports, page 2, mentions as a general characteristic the high ductility).
13. Although in the documents referred to in paragraphs 11 and 12 several possible applications of ferromagnetic amorphous materials are proposed no specific mention is made of the application in theft preventing systems.
14. As the patentee contends, in JMMM no desirable value for the ductility is explicitly mentioned, either generally or for the application in a theft protection system. Furthermore, it is pointed out in this publication that the mechanical properties may be degraded by annealing processes and in particular embrittlement may result. Nevertheless, after consideration of the prior art documents, the arguments and samples provided by the appellant and the patentees rejoinder, the Board is satisfied (and this remained unchallenged) that indeed all the amorphous magnetic materials which were available to the public at the priority date had at least the minimum

ductility required by Claim 1. The Board also finds it plausible that the person skilled in the art would refrain from using amorphous materials which have been annealed in such a manner as to become brittle as it was already known that a marker when broken would generate a signal of insufficient level to be reliably detected, i.e. would lose its signal identity.

15. In JMMM the passage cited in paragraph 10 above, proposing the use of strips of amorphous ferromagnetic material in an anti-theft system contains a reference reading: "cf. indications in Techn. Mitt. Krupp-Werksberichte 30 (1972), S149." The patentee has argued that this passage has therefore to be interpreted as only suggesting that such strips should be applied in a configuration as described in that reference, that is in combination with a strip of hard magnetic material (Koerflex) for deactivation purposes. The Board, however, is of the opinion that the said passage in JMMM should not be interpreted so narrowly. In view of the fact that theft prevention systems of the kind referred to in the preamble of Claim 1 are widely known and that in many of them simple strips without deactivation means are provided, the person skilled in the art will understand the passage in question as a general suggestion to replace the ferromagnetic materials hitherto used in theft preventing systems by the newly developed amorphous materials and that the reference given is a mere example of such application. This view is strengthened by the fact that there is absolutely nothing in JMMM which could lead the skilled person to believe that the materials would be unsuitable for substitution for the materials hitherto proposed for markers in the form of a simple elongated strip.
16. The patentee has argued furthermore that US-A-4 075 618 would point away from the invention as it proposes

asymmetrically shaped markers and although mentioning the use of METGLAS recommends the provision of a stiffening support for the markers. He also pointed out that markers of curved shape are proposed in US-A-4 074 249 which would also point away from the use of elongated straight strip markers. The Board cannot accept these arguments. The first mentioned document seeks to provide a solution for the case where the required length of the marker would be greater than the dimensions of the article to be protected but certainly does not teach that straight elongated strip markers as such would be undesirable. It is true that the author of this patent (which was issued in February 1978) recommends the use of a stiffening support for the marker to protect it from mechanical deformation such as is known to lower its permeability (cf. column 3, lines 56-60). When filing the corresponding application in July 1976 he appears not to have appreciated or at least did not take fully advantage of the remarkable magneto-mechanical properties of amorphous ferromagnetic materials. However, the article in JMMM, which was published later (in September 1978) clearly draws attention to these properties as set out already before. Therefore, even if this US patent could have been regarded as pointing away from the invention in February 1978 such a teaching must be considered to be superseded by the later article. The second mentioned document US-A-4 074 249 deals with an entirely different problem in that it seeks to provide markers so shaped that they give a good signal response over a wider range of orientations than an elongated straight marker.

17. In view of the foregoing considerations the Board has come to the conclusion that it would have been obvious to the person skilled in the art to use in a theft protection system as known e.g. from Figure 7 of US-A-3 790 945 an elongated strip marker fabricated from an amorphous

ferromagnetic material as described in the documents cited in paragraph 9 above, in particular JMMM, whereby he would inevitably have arrived at a marker falling within the scope of the present Claim 1. Therefore, this claim must be held unallowable.

18. It might be true, as the patentee contends, that under certain circumstances the high ductility of such markers would present further advantages, e.g. when used on a flexible article or when being affixed on an article by a method causing mechanical strain. Claim 1, however, is not limited to the use of the marker under such special conditions.
19. The patentee presented an auxiliary request that the patent be maintained in amended form with the presence of deactivation means introduced into Claim 1. As appears from the documents cited in paragraph 2 above and Techn. Mitt. Krupp-Werksberichte 30 (1972), such deactivation means are widely known. Therefore, the introduction of such feature into Claim 1 could not lend to that claim the required inventive step.

#### 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. Fabiani

P.K.J. Van den Berg