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Datasheet for the decision of 25 February 2010

Case Number: T 1084/07 - 3.5.02

Application Number: 97938515.0

Publication Number: 0922274

IPC: G08B 13/181

Language of the proceedings: EN

Title of invention:
Magnetomechanical electronic article surveillance marker with low-coercivity bias element

Patentee:
Sensormatic Electronics Corporation

Opponent:
Phenix Label Company

Headword:
-

Relevant legal provisions:
EPC Art. 123(2), 83, 84, 56

Relevant legal provisions (EPC 1973):
EPC Art. 54(3)

Keyword:
"Added subject-matter (yes) main request"
"Insufficiency of disclosure (no)"
"Novelty - Inventive step - (yes) as maintained"

Decisions cited:
-

Catchword:
-

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Case Number: T 1084/07 - 3.5.02

D E C I S I O N
of the Technical Board of Appeal 3.5.02
of 25 February 2010

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Decision under appeal: **Interlocutory decision of the Opposition Division of the European Patent Office posted 8 March 2007 concerning maintenance of European patent No. 0922274 in amended form.**

Composition of the Board:

Chairman: M. Ruggiu
Members: R. Lord
E. Lachacinski

Summary of Facts and Submissions

I. Both the proprietor and the opponent appealed against the interlocutory decision of the opposition division concerning the European patent No. 0 922 274 that, account being taken of the amendments made by the patent proprietor, the patent and the invention to which it related met the requirements of the EPC.

In the decision under appeal, the opposition division held, *inter alia*, that claims 4 to 42 of the patent as granted contravened Article 123(2) EPC, that the patent disclosed the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art, and that the subject-matter of claims 1 to 3 of the auxiliary request filed in the oral proceedings of 9 January 2007 (which were identical to claims 1 to 3 of the patent as granted) was new and involved an inventive step.

II. The following documents of the state of the art played a role in the appeal proceedings:

P1: US 5 351 033 A;
P2: US 5 527 399 A;
P4: WO 98/00821 A
P6: US 5 469 140 A; and
P7: US 4 510 489 A.

The following additional documentary evidence submitted by the parties also played a part in the appeal proceedings:

Memo from M. Nakonechny (of Arnold Magnetic Technologies) to M. Hibshman (of the appellant opponent), as submitted with the then opponent's letter of 1 December 2006 (referred to in the following as the "Nakonechny memo");

Affidavit by Dennis M. Gadonniex filed with the appellant opponent's statement of grounds of appeal dated 10 July 2007 ("Gadonniex affidavit");

Affidavit by Gordon E. Fish filed with the appellant opponent's statement of grounds of appeal dated 10 July 2007 ("Fish I affidavit");

Affidavit by Gordon E. Fish filed with the appellant opponent's letters of 7 July 2008 and 24 July 2008 ("Fish II affidavit");

Affidavit by Ryusuke Hasegawa filed with the appellant opponent's letter of 25 January 2010 ("Hasegawa affidavit"); and

Letter from R. Siikarla and R. Copeland (of the appellant proprietor) to N. Manning (of Arnold Engineering) filed with the appellant proprietor's letter of 25 January 2010 ("Siikarla letter").

III. Oral proceedings before the board took place on 25 February 2010.

The appellant patent proprietor requested that the decision under appeal be set aside and that the patent be maintained in amended form on the basis of claims 1 to 9 of the main request received during the oral

proceedings, or if that was not possible, to dismiss the appeal of the opponent and maintain the patent in the form accepted by the opposition division, or if that was not possible, that the patent be maintained in amended form on the basis of claims 1 to 3 of the auxiliary request received during the oral proceedings.

The appellant opponent requested that the decision under appeal be set aside, that the patent be revoked in its entirety, and that the appeal of the proprietor be dismissed.

IV. Claim 1 of the patent in suit as accepted by the opposition division in the decision under appeal (which is identical to claim 1 of the patent as granted) reads as follows:

"A marker (10) for use in a magnetomechanical electronic article surveillance system, comprising:
an amorphous magnetostrictive element (12);
and
a biasing element (16) located adjacent said magnetostrictive element,
characterized in that
said marker (10) has a deactivation-field-dependent resonant-frequency-shift characteristic having a slope that exceeds 100 Hz/Oe."

Claims 2 and 3 as accepted by the opposition division are dependent on claim 1, and are also identical to claims 2 and 3 of the patent as granted.

Claim 1 according to the main request of the appellant proprietor filed during the oral proceedings before the board is practically identical to claim 1 of the patent as granted and accepted by the opposition division, the only difference being that the words "use in" have been deleted from the first line of the claim.

Claims 6 to 8 according to the main request of the appellant proprietor filed during the oral proceedings before the board read as follows:

"6. A marker (10) according to claim 1 wherein said biasing element (16) is formed of a semi-hard magnetic material having a DC magnetization field characteristic such that a DC magnetic field Ha required to achieve saturation of said biasing element is about 150 Oe.

7. A marker (10) according to claim 1 wherein said biasing element (16) is formed of a semi-hard magnetic material having an AC demagnetization field characteristic such that an AC demagnetization field Hmd having a peak amplitude of 100 Oe, when applied to said biasing element with said biasing element being in a fully magnetized condition, demagnetizes said biasing element to a level that is no more than 5 % of a full magnetization level.

8. A marker (10) according to claim 1 wherein said biasing element (16) has an AC demagnetization field characteristic such that when said biasing element is in a fully magnetized condition and is exposed to an AC field Hms having a peak amplitude

of 20 Oe or less, said biasing element remains magnetized at a level that is at least 95 % of a full magnetization level."

V. The arguments of the appellant proprietor, as far as they are relevant to the present decision, can be summarised as follows:

Claim 6 of his main request had a basis in the description relating to Fig. 4 of the original application, and similarly claims 7 and 8 had a basis in the description relating to Fig. 5. These claims had been amended with respect to the corresponding granted claims in order to overcome the objection in the decision under appeal to the inclusion in those claims of ranges which had not been disclosed in the description of the related embodiments. The combination of features related to the different independent claims of the original application was allowable, because all of those independent claims were concerned with the same concept, namely that of the "abruptness" of the deactivation of the marker, and merely used different parameters to express that concept.

The development of the claimed invention concerned the slope of the deactivation-field-dependent resonant-frequency-shift characteristic. The patent described three different embodiments covering a wide range for this parameter. Moreover, the materials used in these embodiments were commercially available, and their relevant magnetic properties were known to the skilled person, as was apparent from documents such as P1, P2 and P7. It was also significant that the opponent had experienced no apparent difficulty in producing markers

according to the invention, as evidenced by the Gadonniex and Fish affidavits. Thus, the patent disclosed the invention in a manner sufficiently clear and complete to meet the requirements of Article 83 EPC. The fact that the ranges defined in claims 1 to 3 were open-ended was not relevant to this issue, because the skilled person would not have interpreted the claims as covering slopes so large as to be physically impossible.

The document P4 was prior art under Article 54(3) EPC 1973 for the contracting states DE, FR, GB and SE, so for these states was relevant only for the assessment of novelty. This document disclosed the magnetostrictive element only by reference to P7, but in table 1 in column 7 of that document five different materials for the element were disclosed, each in two possible states (as-cast or optimal annealed). The opponent's objection of lack of novelty required the selection of only the last of those materials in its as-cast state. Such a selection was not disclosed in these prior art documents. Moreover, the document P4 itself disclosed a number of different materials for the biasing element, only one of which was relevant for the opponent's objection, and that objection also relied on the combination of the processing technique described on page 9, lines 21 to 38 with the material Metglas® 2605SB1 described earlier in that document, which combination was not clearly disclosed. Thus the subject-matter of claim 1 of the patent was new with respect to P4. For similar reasons that subject-matter was also new with respect to P1 and P2, since they also relied on references to P7 to identify the magnetostrictive element.

The Gadonniex affidavit should not be admitted into the procedure, because its author was a former employee of the proprietor who had worked closely with Mr. Copeland, one of the inventors of the patent in suit, on closely related devices, and thus his experiments were biased by his extensive prior knowledge of the invention of the patent in suit.

The Fish I and Fish II affidavits should not be admitted into the procedure, because their author was a US patent agent and representative of the opponent, so could not be regarded as an independent expert.

The materials for the biasing elements described in the Gadonniex and Fish I affidavits having lot identifications "Coil#1" and "B-9-C-A-LD2#37" were not according to the teaching of P2, because the table in paragraph 21 of the Gadonniex affidavit and paragraph 25 of the Fish I affidavit indicates that these had coercivities of 23 and 18 Oe respectively, whereas P2 taught in column 8, lines 40 to 45 that, for use in electronic article surveillance, values from at least 35 to about 70 Oe should be used, with narrower sub-ranges within this range being more preferable. Moreover, P2 was generally concerned with the issue of increasing coercivity so as to improve the stability of the marker. Therefore the results presented in Exhibits 2 and 3 of each of these affidavits should not be taken into account.

The Arnakrome™ 4 material used in the experiments of the Gadonniex and Fish I affidavits could not be a material available at the priority date of the patent in suit, as was demonstrated by the Siikarla letter. In

Figure 2 attached to that letter, the curve "S12" showed the magnetisation behaviour of Arnokrome™ 4 (the designation "4S" indicating only that it was a sample), in particular that 90% magnetisation was achieved at a field of about 120 Oe. By contrast, Exhibit 4 of the Gadonniex affidavit and the apparently identical Exhibit 4 of the Fish I affidavit showed that for the three material samples used in the experiments of those affidavits 90% magnetisation was achieved at fields between 30 and 80 Oe. This discrepancy was confirmed by the difference between the coercivity of about 49 Oe achieved in Example 3 of P2 and those indicated in the affidavits, which were 40 Oe or less. Therefore the materials used in these affidavits could not have been the same as those which Arnold Engineering were supplying shortly before the priority date of the patent in suit. It therefore had to be concluded that the processing parameters employed for preparing the samples supplied to Gadonniex and Fish represented a selection from the processing parameter ranges disclosed in P2 which was made only later, possibly in the light of the teaching of the patent in suit.

The Fish II affidavit described in the table of paragraph 24 that the samples with numbers TCA7-10 and TCA11-15 had undergone a 30 minute treatment at 675°C and 686-696°C respectively. This was however contrary to the teaching of P1, since that document described with reference to Fig. 3E that the aim of the invention of that document was to select annealing conditions to provide maximum coercivity (i.e. region "c" in that figure). This requirement was also apparent from the introductory part of that document. Thus by comparison with curve B_3 of Fig. 4 of P1, it was apparent that

annealing temperatures of 675°C or more were according to that document too high. Thus the results presented in Exhibits 5TCA and 6TCA of this affidavit also should not be taken into account.

Even for the biasing element used to produce the experimental results in Exhibit 7TCA of the Fish II affidavit, the coercivity indicated in the affidavit (65 Oe) was somewhat different from the values which according to Fig. 4 of P1 should have been achieved for the stated annealing conditions (slightly more than 70 Oe for treatment at 600°C for 30 minutes). Thus it appeared that the material used for that experiment was not exactly the same as that which would result from following the teaching of P1.

The graphs in the Gadonniex and Fish affidavits depicting the slope characteristics (Exhibits 1 to 3 in the Gadonniex and Fish I affidavits, Exhibits 5TCA, 6TCA and 7TCA in the Fish II affidavit) showed significant experimental noise, so that it was not possible to derive clear teaching from these as to what the maximum slopes of the curves were. This was of particular significance for the three curves with maximum slopes close to 100 Hz/Oe (i.e. Exhibit 1 of each of the Gadonniex and Fish I affidavits and Exhibit 7TCA of the Fish II affidavit), which were the only ones of those curves which could be considered to be relevant to novelty and inventive step, for the previously noted reasons. Moreover, these slopes close to 100 Hz/Oe could not be considered to be as claimed in the patent in suit, because the definition in claim 1 that the slope of the characteristic "exceeds 100 Hz/Oe" must be interpreted as meaning that the

slope should exceed that value by a margin greater than mere experimental variation. Considering all of these points together, none of these curves could be considered to demonstrate clearly that the markers concerned, to the extent that they reflected the teaching of P1 or P2, were as defined in claim 1 of the patent as accepted by the opposition division.

The claimed subject-matter was not "inherently obvious" or obvious in the light of the teaching of P2, as argued by the opponent, because the slope characteristic criterion defined in the present claims was not disclosed anywhere in the prior art, and because P2 (as well as P1) taught to avoid biasing elements with low coercivity for the type of marker claimed, so that these arguments were based on hindsight.

VI. The relevant arguments of the appellant opponent can be summarised as follows:

Claims 6 to 8 of the proprietor's main request defined the features of those claims separately, whereas in the original application Figs. 4 and 5 and the corresponding description (page 12, lines 26 to 29 and page 13, lines 3 to 10) all related to a single embodiment, and in the context of the features defined in those claims, to a single material for the biasing element (i.e. MagneDur 20-4). The application as originally filed provided no basis for the extraction of each of these features separately from that embodiment. In particular the most closely related original claims (claims 12, 17 and 16 respectively) could not provide such a basis, because their

dependencies resulted in different combinations of features from those now claimed.

The patent did not disclose the claimed invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art, because the definition of the slope parameter in claims 1 to 3 results in the claims covering an entire class of markers. The disclosure of only three embodiments, with no teaching as to how to generalise them, would not enable the skilled person to select appropriate materials for markers across the full scope of the claims. In particular, the fact that the ranges defined for the slope parameter are open-ended resulted in the claims covering markers for which this parameter is much larger than any of the embodiments in the patent, and for which there was thus no enabling disclosure in the patent.

The document P4 represented prior art according to Article 54(3) EPC 1973 for the contracting states DE, FR, GB and SE. It described a marker for magnetomechanical electronic article surveillance systems, comprising a magnetostrictive element as known from P7 (see page 4, lines 26 to 37 of P4), and by reference to column 4, lines 4 to 6 of P6 it could be seen that the last material in the list in Table 1 in column 7 of P7 is Metglas® 2826MB. In the main example of P4, as described from page 5, line 20 to page 6, line 37, the biasing element is of Metglas® 2605SB1. The combination of these two materials corresponded to the second embodiment of the patent in suit in the variant described at page 18, lines 23 to 27 (of the published application). Moreover, P4 described in

page 9, lines 21 to 38 a processing technique for use with the Metglas® 2605SB1 material which corresponded exactly to that described in the cited embodiment of the patent in suit. Since the patent also makes clear that the selection of the magnetostrictive element is not critical for the claimed invention, it had to be concluded that this known marker would have a slope characteristic similar to that of the embodiment of the patent, and thus fall within the scope of at least claim 1 of the patent as accepted by the opposition division.

The Gadonniex and Fish I affidavits described experimental tests carried out on markers which were prepared according to the teaching of P2. The magnetostrictive elements used in these markers were made of as-cast Metglas® 2826MB (as confirmed by the Hasegawa affidavit) which corresponded to what was taught in P2 via the references in column 9, lines 12 to 19 and 26 to 29 to the document P7 (as for the argument based on P4). The material of the biasing element was Arnakrome™ 4 supplied by Arnold Magnetic Technologies, the composition of which was as described in P2 from column 7, line 62 to column 8, line 36 (and in particular was exactly as in Example 3 of that document as described in column 11), and the mechanical processing and heat treatment was indicated by the supplier as being in accordance with the teaching of P2. The tests carried out on the resultant markers, in particular those shown in Exhibits 1 to 3 of each affidavit, showed slope characteristics of more than 100 Hz/Oe. Thus the markers known from the document P2 were as defined in at least claim 1 of the patent as accepted by the opposition division, so that the

subject-matter of that claim was not new.

Similarly the Fish II affidavit described experimental tests carried out on markers which were prepared according to the teaching of P1. The magnetostrictive elements were again of as-cast Metglas® 2826MB, in accordance with the reference to P7 in the passage of P1 from column 3, line 68 to column 4, line 3. The biasing elements were of Metglas® 2605TCA as described in Examples 1 to 4 of P1, and as was confirmed in the Hasegawa affidavit, these were annealed under the conditions shown in the table on paragraph 24 of the Fish II affidavit, which corresponded to various points along the curve B_3 in Fig. 4 of P1. The results shown in Exhibits 5TCA, 6TCA and 7TCA of that affidavit demonstrated slope characteristics of more than 100 Hz/Oe, so that the markers known from P1 were also as defined in at least claim 1 of the patent as accepted by the opposition division. Therefore the subject-matter of that claim was also not new for this reason.

Even if it were not accepted that the specific combinations of the biasing elements of P1 and P2 with the as-cast Metglas® 2826MB magnetostrictive element was disclosed in those documents, these combinations would have been obvious to the skilled person, since this magnetostrictive material was known to be commonly used in markers of the type described in P1 and P2.

The claimed subject-matter was inherently obvious in the light of the teaching of the prior art, since the skilled person would have been aware of the desirability of ease of activation and deactivation of

the marker (see e.g. P7, column 2, lines 20 to 27), and would also have been aware that this was linked to the coercivity of the biasing element (e.g. from P1, column 1, lines 25 to 30 and 35 to 39, or from P2, column 1, lines 59 and 60). He would thus have considered it obvious to use a biasing element of lower coercivity, thereby increasing the slope characteristic. The limit of 100 Hz/Oe set in the present claim 1 for that parameter was arbitrary, and therefore could not result in the presence of an inventive step.

The claimed subject-matter also did not involve an inventive step in the light of P2, since that document disclosed biasing elements with coercivities as low as 20 Oe (for instance in Table 1 in column 11). On the basis of the teaching of the patent in suit, it must be assumed that the obvious use of such biasing elements for article surveillance markers would result in markers having the slope characteristic defined in the present claim 1.

Reasons for the Decision

1. The appeals are both admissible.

Appeal of appellant proprietor

2. Main request - added subject-matter (Article 123(2) EPC)

2.1 Claims 6, 7 and 8 of the proprietor's main request as filed during the oral proceedings before the board define subject-matter which extends beyond the content of the application as originally filed, contrary to the

requirements of Article 123(2) EPC, for the following reasons.

2.2 The proprietor has cited figures 4 (for claim 6) and 5 (for claims 7 and 8) and the corresponding description of the application as providing the basis for these claims. The specific features defined in these three dependent claims can indeed be seen to be described in similar terms in the application as filed and published (WO98/09263 A) at page 12, lines 26 to 29, page 13, lines 3 to 6 and page 13, lines 6 to 10 respectively. However, these three passages do not form part of the general disclosure of the invention, but are instead part of the description of the first embodiment, and specifically describe the properties of the MagneDur 20-4 material used for the biasing element in that embodiment (here the board notes that, as the opponent has pointed out, the spelling "MagnaDur" used in the application and patent is incorrect). Thus, these passages in the description and the corresponding figures disclose the technical features of these three dependent claims only in combination with one another, and with the other properties of MagneDur 20-4, such as the coercivity of about 20 Oe mentioned at page 10, lines 5 and 6, so cannot provide a basis for their separate definition as in the present claims 6 to 8. The remainder of the detailed description of the embodiments provides no basis for the generalisation represented by these claims, since the second and third embodiments have much lower magnetisation and demagnetisation fields, as is apparent from figures 6, 9 and 10.

2.3 The original claims and the general part of the description also do not support the separate extraction of these three features from the disclosed embodiment, for two distinct reasons. Firstly, the original claims most closely related to the technical features of the present claims 6 and 7 (i.e. original claims 12 and 17) and the corresponding passages in the introductory part of the description (page 5, lines 12 to 28) defined only ranges for the magnetisation and demagnetisation fields, whereas the present claims define specific values for these fields. Secondly, those parts of the original application disclosed these features in different contexts from those now claimed, specifically:

(a) concerning the present claim 6, the passage on page 5, lines 12 to 18 disclosed the DC magnetisation field as an independent aspect of the invention, not in combination with the feature of claim 1, on which the present claim 6 is dependent, and with a different maximum value, whereas original claim 12 (which defined the value of 150 Oe as the upper limit, as in the present claim 6) was dependent directly or indirectly on claims 9 to 11, so disclosed this feature in combination with the feature which is now defined in claim 5, but not in combination with the feature of claim 1, on which the present claim 6 is dependent;

(b) similarly, concerning present claim 7, the passage on page 5, lines 19 to 28 disclosed the AC demagnetisation field as an independent aspect of the invention, not in combination with the feature of claim 1, on which the present claim 7 is

dependent, and with a different maximum value, whereas original claim 17 (which defined the value of 100 Oe as the upper limit, as in the present claim 7) was dependent directly or indirectly on claims 14 and 15, so also disclosed this feature in combination with the feature which is now defined in claim 5, but not in combination with the feature of claim 1, on which the present claim 7 is dependent;

(c) and, concerning the present claim 8, the general part of the description included relevant disclosure in the passage from page 5, line 36 to page 6, line 1, but only in combination with the feature of page 5, lines 19 to 28 discussed above with respect to claim 7, and not in combination with the feature of claim 1, on which the present claim 8 is dependent, whereas original claim 16 (which defined the value of 20 Oe for the demagnetisation field, as in the present claim 8) was dependent directly or indirectly on claims 14 and 15, so again disclosed this feature in combination with the feature which is now defined in claim 5, but not in combination with the feature of claim 1, on which the present claim 8 is dependent.

Thus, neither the introductory part of the description nor the claims of the original application provided any suggestion that the three specific technical features of the first embodiment as discussed in paragraph 2.2 above could be extracted and generalised in the manner defined in the present claims 6 to 8.

2.4 The proprietor has presented two further arguments in favour of the allowability *inter alia* of the present claims 6 to 8, neither of which is found convincing by the board, for the following reasons. Firstly, the fact that the amendment of these claims to define specific values instead of the ranges in the granted claims was carried out in order to address an objection in the decision under appeal that those ranges represented added subject-matter does not automatically imply that the resultant claims no longer define added subject-matter. Whether or not that is the case clearly depends on both the specific nature of the further amendment and the totality of the original disclosure. Secondly, the board is not convinced by the proprietor's argument that the combination of the original independent claims which was introduced in the granted claims is allowable for the reason that the different original independent claims all attempted to define the concept of "abruptness", merely using different parameters to do so, because it is immediately apparent from the original independent claims that most are at best indirectly related to that concept. The board notes moreover that this latter argument of the proprietor is not directly relevant to the claims at issue, since these claims are (as argued by the proprietor himself) based primarily on the original description, not the claims.

2.5 Since claims 6, 7 and 8 according to the main request of the appellant proprietor filed during the oral proceedings before the board contravene Article 123(2) EPC, that request is not allowable. Since this is the only request by the proprietor forming part of his appeal against the decision of the opposition division,

his appeal has to be dismissed.

Appeal of appellant opponent

3. Sufficiency of disclosure (Article 83 EPC)

3.1 In each of the claims as accepted by the opposition division the slope of the deactivation-field-dependent resonant-frequency-shift characteristic of the marker is restricted only by a lower limit. The appellant opponent has argued that this results in the patent not disclosing the invention in a manner sufficiently clear and complete for it be carried out by a person skilled in the art, contrary to the requirement of Article 83 EPC, since the open-ended ranges encompass extremely high, even infinite, slopes of the characteristic, which are clearly not physically possible. The board considers that this form of claiming does not result in a contravention of Article 83 EPC, since the claims are to be interpreted as they would be understood by a skilled reader, who would immediately recognise that they are merely intended to fix lower limits for the specified parameter within the overall scope of that which is physically achievable.

3.2 The opponent argued also that, given that the claims encompass the entire class of markers for magnetomechanical electronic article surveillance systems comprising an amorphous magnetostrictive element adjacent to a biasing element and having a deactivation-field-dependent resonant-frequency-shift characteristic with a slope exceeding particular threshold values, the detailed description of only three embodiments is not sufficient to enable the

skilled person to carry out the invention over the full extent covered by the claims. The board considers however that the description of three embodiments making use of different materials for the biasing element (i.e. the element the selection of which is of more importance for achieving the desired effects), these embodiments covering a wide range of the slope characteristic which is the characterising feature of the invention, and including description of permissible variants, would enable the skilled person to select appropriate materials for both elements and thus carry out the invention over substantially the whole scope of the claims. Two points are of particular significance in this context. Firstly, the extensive data provided for the three embodiments would enable the skilled person to deduce in general terms the manner in which the slope characteristic (a parameter not mentioned in the prior art) varies with conventionally quoted material parameters, in particular the coercivity of the biasing element. Secondly, the embodiments make use of commercially available materials for both elements of the marker, and as is apparent from documents P1 and P2 and from the various affidavits filed by the opponent, the skilled person was at the priority date of the patent in suit aware of how to modify the magnetic properties of, in particular, the bias element by techniques such as annealing.

3.3 The board is of the opinion that the further question raised by the opponent in this context as to whether it is justified for the proprietor to claim the broad scope of all markers having the defined slope characteristics, or whether he should be restricted to a method of selecting markers by measuring that

characteristic, is not relevant for the consideration of compliance with Article 83 EPC, because in the light of the conclusion of the previous paragraph, that becomes an issue of support in the description within the meaning of Article 84 EPC, which is not a ground for opposition.

3.4 Therefore the board concludes that the patent in the form accepted by the opposition division discloses the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art, thus satisfying the requirement of Article 83 EPC.

4. Admissibility of the affidavits

4.1 The proprietor has requested that the affidavit by Mr. Gadonniex and the two affidavits by Mr. Fish which were filed by the opponent not be admitted into the procedure. The proprietor argued that Mr. Gadonniex was previously employed by him and was closely involved with an inventor of the patent at issue, so that his experiments were "biased by a deep prior knowledge concerning the invention" (see section 5.1.1 of the proprietor's letter of 14 February 2008). He also argued that Mr. Fish is "not able to give his opinion as an independent expert" (see section 5.2 of the same letter), because he is a registered patent agent representing the opponent in US court proceedings against the proprietor. The board considers that, although these two points do need to be taken into account when considering whether these affidavits convincingly demonstrate what they purport to show, they do not represent grounds for not admitting them into the procedure, because their consideration is part

of the substantive evaluation of the affidavits.

4.2 The board is of the opinion that the Gadonniex affidavit and the Fish I affidavit are at least *prima facie* relevant, as they purport to demonstrate that the subject-matter of claims 1 to 3 lacks novelty or inventive step with respect to the teaching of the document P2, and that the Fish II affidavit is at least *prima facie* relevant, as it purports to demonstrate that the subject-matter of claims 1 to 3 lacks novelty or inventive step with respect to the teaching of the document P1. For these reasons the board decided to admit these three affidavits into the procedure. Moreover, the Hasegawa affidavit appears to address questions raised by the proprietor with respect to all three of those affidavits, so the board considered it appropriate to also admit that affidavit into the procedure.

5. Novelty (Article 54 EPC)

5.1 Novelty with respect to P4

5.1.1 Document P4 claims the priority date of 1 July 1996 and was published on 8 January 1998. Thus, since the patent at issue claims the priority date of 28 August 1996, and since both priority claims appear to be valid, P4 represents prior art according to Article 54(3) EPC 1973 for the patent in suit for the commonly designated contracting states for which designation fees have been paid (i.e. DE, FR, GB and SE).

5.1.2 The gist of the objection of lack of novelty raised by the opponent with respect to P4 is that this document discloses a marker for a magnetomechanical electronic article surveillance system which comprises the same active element and biasing element as one of the embodiments of the invention in the patent in suit, so that this known marker must be assumed to have the slope characteristic as defined in the characterising portion of the present claim 1. Specifically the opponent argues that the marker of P4 comprises an active element of as-cast Metglas® 2826MB and a biasing element of Metglas® 2605SB1, which thus corresponds to the second embodiment of the patent in suit in the variant described at page 18, lines 23 to 27 of the application as filed, the processing of the biasing element described in P4 being identical to that in the cited embodiment.

5.1.3 The board notes however, that the document P4 does not explicitly disclose any complete markers, but instead states (see page 4, lines 26 to 37) that the biasing element, which is the main subject of that document, can be used as part of a marker using an amorphous magnetostrictive element as described in either of two cited documents, one of which is the document P7. That document in turn discloses a material composition for such a magnetostrictive element (see P7, column 7, last entry in Table 1), which is known to be that of Metglas® 2826MB (see P6, column 4, lines 4 to 6). However Table 1 of P7 discloses five different possible compositions for the magnetostrictive material, each in two possible states ("as-cast" or "optimal annealed"), resulting in a total of ten different options, only one of which corresponds to the material used in the

relevant embodiment of the patent in suit. The board considers that the reference in document P4 to document P7 in its entirety does not result in P4 implicitly disclosing the combination of the biasing element with this specific magnetostrictive element of P7 (i.e. the last material of Table 1 in its as-cast state), since this would require a selection from the ten different options disclosed in P7. Such a selection extends beyond what can be considered to be clearly and unambiguously disclosed in the sense of the requirement for novelty. For similar reasons, the board also cannot accept the argument of the opponent that the reference in P4 to P7 implies the individual disclosure of the biasing element of P4 with each of the different magnetostrictive elements disclosed in P7. The board finds therefore that the subject-matter of claim 1 as accepted by the opposition division is new with respect to the document P4.

5.1.4 The board notes moreover that in order to arrive at the combination of biasing element and magnetostrictive element which is the basis of the opponent's argument, selections within the teaching of P4 itself are also necessary, with respect to both the material of the biasing element and its heat treatment. Concerning the first of these points, P4 describes not only the Metglas® 2605SB1 material of the main example (page 5, line 20 to page 6, line 37), but also the alternative materials Metglas® 2605TCA and Metglas® 2605S2 (see page 7, lines 31 to 36). Concerning the second point, the heat treatment of P4 which corresponds exactly to that described in the second embodiment of the patent in suit is that described at page 9, lines 21 to 38. It is however not clear from P4 whether this treatment

procedure is to be applied to the Metglas® 2605SB1 material as an alternative to the treatment described on page 6 of P4, or to one or more of the other disclosed materials. That the combination underlying the opponent's objection involves selections within the teaching of P4 as well as within that of P7 emphasises that such a combination extends beyond what can be considered to be implicitly disclosed by P4.

5.2 Novelty with respect to P1 or P2

The board considers that the conclusion of section 5.1 above applies also to the opponent's objections of lack of novelty based on the document P1 in combination with the Fish II affidavit and based on the document P2 in combination with the Gadonniex and Fish I affidavits, since neither P1 nor P2 explicitly discloses the magnetostrictive material of the marker, but instead each includes a reference for this purpose to the document P7. Therefore, for the purpose of the assessment of novelty, the argument and conclusion of paragraph 5.1.3 above applies correspondingly to both of these objections, regardless of the question as to whether or not the affidavits actually demonstrate that the markers have the slope characteristic defined in the present claims.

6. Inventive step (Article 56 EPC)

6.1 Inventive step with respect to P2 in the light of the Gadonniex and Fish I affidavits

6.1.1 The opponent's objection of lack of inventive step with respect to the document P2 in combination with the

Gadonniex and Fish I affidavits is based on the argument that each of these affidavits describes the testing of markers constructed in accordance with an obvious interpretation of the teaching of P2, and that this testing demonstrates that the resultant markers have the slope characteristic defined in the present claims. Specifically, the affidavits state that the material of the biasing elements used (Arnakrome™ 4) had a composition as described in P2 from column 7, line 62 to column 8, line 36 and that they were prepared "*in accordance with the mechanical processing and heat treatment techniques set forth in* [P2]" (see Gadonniex affidavit, section 20; Fish I affidavit, section 24), that the magnetostrictive elements were of as-cast Metglas® 2826MB, in accordance with the references in column 9, lines 12 to 19 and 26 to 29 of P2 to markers using the magnetostrictive element of P7 (see paragraph 5.1.3 above concerning the identification of that material by reference to P6), and that in each affidavit exhibits 1 to 3 showed that the resultant markers had a slope characteristic exceeding 100 Hz/Oe, as defined in claim 1 as accepted by the opposition division.

6.1.2 The board observes that the Gadonniex and Fish I affidavits do not purport to describe tests carried out on prior art devices as such, but rather describe tests carried out on devices fabricated after the priority date of the patent in suit and with knowledge of the teaching of that patent, so that the question has to be addressed as to whether the devices described accurately reflect the teaching of the document P2 as it would have been understood at the priority date of the patent in suit. Questions also arise concerning the

interpretation of the graphs presented in the affidavits in the light of the wording of the present claims. In these two contexts, the board notes the following.

(a) The composition of Arnakrome™ 4, as indicated in the tables of section 20 of the Gadonniex affidavit and section 24 of the Fish I affidavit, falls within the ranges described in the passage of columns 7 and 8 of P2 referred to above. This is also consistent with the Nakonechny memo. Moreover, it appears that the material used in the sole relevant example of P2 (example 3 in column 11) has substantially that composition. Thus in terms of the composition of the material of the biasing element it appears that these two affidavits accurately reflect the teaching of P2.

(b) Although, as observed in section 5.2 above, the selection of as-cast Metglas® 2826MB from among the alternatives disclosed in P7 cannot be considered to be part of the implicit teaching of P2, that selection would be obvious to the skilled person, when taking into account that according to the submissions of both parties this is a commonly used material for such markers. This conclusion is supported by the teaching of P6, by the Hasegawa affidavit, and by the fact that the sole system experiment of P7 makes use of this material (see P7, column 10, Table 3).

(c) Although, as noted by the opponent, P2 discloses magnetic strips having coercivity levels in the range from about 20 to about 100 Oe (column 8,

lines 37 to 40), the following sentence of that document (lines 40 to 45) states that, for uses such as electronic article surveillance, coercivities from at least 35 to about 70 Oe are preferred, more preferably from at least 40 to about 65 Oe and even more preferably from about 45 to about 60 Oe. However, from the (identical) tables in section 21 of the Gadonniex affidavit and section 25 of the Fish I affidavit relating to the biasing elements, it is apparent that the first and third lots (identified as Coil#1 and B-9-C-A-LD2#37) have coercivities well below these ranges (23 and 18 Oe respectively), and that only the second lot (Coil#4) has a coercivity within them (40 Oe, which falls within the broader two of the three ranges).

(d) As mentioned in paragraph 6.1.1 above, the two affidavits state with respect to the processing of the biasing element only that the supplier indicated that they had been processed according to the teaching of P2. Exactly what that processing entailed is however not clear, since the description of this in column 7, lines 16 to 61 of P2 only gives ranges for the various processing parameters (primarily the temperatures and durations of the different steps), the majority of which can be assumed to influence the final coercivity. The opponent described that the manner in which such elements are procured is that the customer (i.e. in this case the opponent) defines the required magnetic characteristics, and the supplier (i.e. in this case Arnold Magnetic Technologies) carries out the processing according

to a scheme selected so as to achieve those requirements, based on their proprietary knowledge. Since this processing was apparently carried out after the publication of the patent in suit, it cannot be excluded that this selection of processing parameters made use of knowledge gained after the priority date of the patent, in particular knowledge gained in the light of the teaching of the patent. At the very least a selection within the general teaching of P2 would be required to achieve a coercivity within the restricted ranges mentioned in paragraph (c) above. Further doubt in this respect is established by the Siikarla letter, which was dated 20 May 1996. In Figure 2 attached to that letter, the curve "S12" shows the magnetisation behaviour of Arnokrome™ 4 (the added letter S in the designation "4S" indicating, according to Mr. Copeland, only that it was a sample), in particular that 90% magnetisation was achieved at a field of about 120 Oe. By contrast, Exhibit 4 of the Gadonniex affidavit shows that for the three material samples used in that affidavit (and in the Fish I affidavit) 90% magnetisation was achieved at fields between 30 and 80 Oe. This suggests that the material used in the experiments described in these two affidavits is not the same as the material available under the name Arnakrome™ 4 at a date shortly before the priority date of the patent in suit. Since the compositions used are indicated as being identical, it must be assumed that the difference lies in the processing. In this context it is noted also that in the sole detailed embodiment of P2 relating to the material

with this composition, i.e. example 3 of that document, the treatment described resulted in a strip with coercivity of 49 Oe (see column 11, lines 51 and 52), which is significantly higher than any of those described in the affidavits (see the results cited in paragraph (c) above), which indicates that the mechanical processing and heat treatment referred to in the affidavits is different from what was described in that example of P2.

(e) The test results in the affidavits relating to the slope characteristic for the markers constructed using the "Coil#4" lot for the biasing element (i.e. the marker which is designated "M1" in the Gadonniex affidavit and that designated "M11" in the Fish I affidavit) are presented in Exhibit 1 in each case, and described in paragraph 27 of the Gaddoniex affidavit and paragraph 31 of the Fish I affidavit. In each case the line designated "S1" on the graph of resonant frequency against demagnetising field is indicated as being a guide line showing a slope of 100 Hz/Oe, and the text states that the marker "*exhibited a deactivation-field-dependent resonant frequency shift of more than about 100 Hz/Oe*". However, for two reasons, the board has doubts as to whether these results clearly demonstrate that these markers have "*a deactivation-field-dependent resonant-frequency-shift characteristic having a slope that exceeds 100 Hz/Oe*", as defined in the present claim 1. Firstly, as argued by the proprietor, the curves depicted in the graphs in both affidavits show a significant amount of measurement noise, which,

when combined with the uncertainty concerning the exact course of the actual (as compared to the measured) curves resulting from the limited number of measurement points, renders the actual values of the maximum slope of the curves uncertain. In this context it is noted also that the author's of the affidavits do not indicate what value they consider the slope to have, so that this is left for the board to estimate. Secondly, the definition in claim 1 of the patent in suit requires that the slope "exceeds" the value of 100 Hz/Oe, which the board interprets as meaning that it must exceed that value by an amount extending beyond that which would be attributed to experimental error, whereas inspection of the two graphs suggests that the maximum slopes of the curves are in both cases close to the 100 Hz/Oe value of the depicted guide line.

6.1.3 On the basis of point (c) above, the board concludes that the markers described in the affidavits making use of the first and third lots of material for the biasing element do not reflect the teaching of P2, since the coercivities of their biasing elements fall well below the ranges described in that document as being suitable for article surveillance markers.

6.1.4 On the basis of points (d) and (e) in section 6.1.2 above, the board considers that, for the markers fabricated using the lot of material for the biasing element which has a coercivity which does fall within the general teaching of P2, the combination of the uncertainty as to whether the processing of the biasing element was carried out according to the teaching of P2,

as it would have been understood at the priority date of the patent in suit, with the uncertainty in the measurement of the corresponding slope characteristics, in the light of the wording of the present claim, is such that it is not possible to conclude reliably that the slope characteristic of a marker according to P2 would be as defined in the present claim 1.

6.1.5 The board therefore concludes that the experimental results presented in the Gadonniex and Fish I affidavits do not demonstrate that the obvious implementation of the teaching of the document P2 would result in a marker according to claim 1 as accepted by the opposition division.

6.2 Inventive step with respect to P1 in light of the Fish II affidavit

6.2.1 The opponent's objection of lack of inventive step with respect to the document P1 in combination with the Fish II affidavit is generally similar to that discussed in section 6.1 above, but with the difference that the markers tested comprise a biasing element of Metglas® 2605TCA and an active element of Metglas® 2826MB, which are thus argued as representing an obvious implementation of the teaching of P1, since most of the examples in that document describe the Metglas® 2605TCA material as the bias element, and since that document has in the passage from column 3, line 68 to column 4, line 3 a similar reference to P7 regarding the magnetostrictive element, the graphs in Exhibits 5TCA, 6TCA and 7TCA depicting that the resultant slope characteristics are greater than 100 Hz/Oe.

6.2.2 The opening paragraph of section 6.1.2 above applies correspondingly to this objection. Paragraph (b) in that section also applies correspondingly, since P1 refers to P7 in the same way as P2, and paragraph (e) also applies correspondingly to the graphs in the Fish II affidavit, in particular that of Exhibit 7TCA, and with guide line "S7", as referred to in paragraph 42 of the affidavit, describing the testing of the marker designated "T23". Concerning the biasing element, the board notes the following.

(a) That the composition and general processing of the bias element used to fabricate the markers of the Fish II affidavit are as disclosed in P1 is not in dispute, given that P1 describes the use of a commercially available material, and that the affidavit describes in paragraph 24 the use of exactly this material. The source of this material is confirmed by the Hasegawa affidavit (see paragraphs 14, 19 and 20).

(b) The passage in column 5 of P1 referring to Fig. 3 describes that the aim of the invention discussed there is to select the annealing conditions so as to achieve the maximum coercivity, i.e. to be in the region designated "c" in Fig. 3E. In terms of the specific embodiments of P1 using the Metglas® 2605TCA material, the application of this principle is clearest from Example 1 and Fig. 4. Comparing this with the data in the Fish II affidavit concerning the annealing process (see the table at the end of paragraph 24, which is confirmed in paragraph 20 of the Hasegawa

affidavit), it can be seen that the curve B_3 of Fig. 4 of P1 is the one which is relevant to the affidavit, since that relates to a heat treatment of 30 minutes duration. Comparing the curve B_3 of Fig. 4 of P1 with that shown in Fig. 3E of the same document, it is immediately apparent that any annealing temperature significantly greater than 600°C would not correspond to the optimum conditions, since this would result in the coercivity being significantly reduced with respect to the maximum value.

(c) However, the treatment of the samples with numbers TCA1-5, at a temperature of 600°C, corresponds clearly to the maximum coercivity depicted in Fig. 4 of P1. There is nonetheless a discrepancy in respect of this sample between P1 and the affidavit, since P1 indicates that the coercivity should be about 70 Oe (and this is confirmed by Fig. 6, which relates to a similar embodiment), whereas the affidavit gives a value of 65 Oe. Since it appears from the patent and from the results in the Gadonniex affidavit and both Fish affidavits (Exhibits 1 to 3 in the Gadonnniex and Fish I affidavits and Exhibits 5TCA to 7TCA in the Fish II affidavit) that lower coercivity is correlated with a steeper slope characteristic, this discrepancy suggests that the slope which would be achieved with a biasing element fabricated strictly in accordance with P1 would be somewhat less steep than described in the Fish II affidavit (i.e. that depicted in Exhibit 7TCA).

6.2.3 On the basis of point (b) above, the board concludes that, of the samples described in the table in paragraph 24 of the Fish II affidavit, those in the second and third rows of the table (i.e. samples nos. TCA7-10 and TCA11-15) do not reflect the teaching of the document P1.

6.2.4 On the basis of point (c) in section 6.2.2 above and in the light of the comment in the opening paragraph of that section referring to paragraph (e) of section 6.1.2, the board considers that, for the marker fabricated using the sample of material for the biasing element which was annealed according to conditions within the general teaching of P1 (i.e. that designated "Marker T23" in the Fish II affidavit), there is significant doubt firstly as to whether the annealing of the biasing element was carried out according to the teaching of P1 and secondly as to how to assess the corresponding slope characteristics as depicted in exhibit 7TCA in the light of the wording of the present claim. The combination of these two uncertainties is such that it is not possible to conclude reliably that the slope characteristic of the marker based on P1 is as defined in the present claim 1.

6.2.5 The board therefore concludes that the experimental results presented in the Fish II affidavit do not demonstrate that the obvious implementation of the teaching of the document P1 would result in a marker according to claim 1 as accepted by the opposition division.

6.3 Further inventive step issues

6.3.1 In his statement of grounds of appeal the opponent has raised an objection of lack of inventive step under the heading "Inherent Obviousness of Subject Matter". This objection is based on the argument that the skilled person would be aware of the requirement in electronic article surveillance systems for ease of activation and deactivation of the marker (for instance from P7, column 2, lines 20 to 27), and would also be aware that this requirement is related to the coercivity of the material of the biasing element (for instance from P1, column 1, lines 25 to 30 and 35 to 39, or from P2, column 1, lines 59 and 60). On this basis, the opponent argues that the skilled person would recognise that it would be advantageous to decrease the deactivation field required, that this could be achieved by reducing the coercivity of the material of the biasing element, and that by carrying out that modification he would automatically increase the slope of the deactivation-field-dependent resonant-frequency-shift characteristic, the limit for this parameter set by the present claim 1 of 100 Hz/Oe then being an arbitrary boundary.

6.3.2 The board is not convinced by this argumentation, because it does not take into account the teaching of documents P1 and P2 concerning the coercivity values required to obtain stable markers, which suggests higher coercivity, and thus leads in the opposite direction to what is argued by the opponent. The opponent has not indicated any clear motivation in the prior art for the skilled person to ignore that teaching, and to reduce the coercivity. The board notes moreover, that although the effect of coercivity on

marker performance has been described extensively in the prior art, the parameter defined in the characterising part of the present claim 1 has not been mentioned anywhere in the prior art, whereas the patent in suit describes clearly the purpose of the selection based on this parameter (see for instance paragraph [0008], first nine lines, and paragraph [0009] of the granted patent), so that it cannot be considered to be purely arbitrary.

6.3.3 The opponent has raised a further objection of lack of inventive step based on the document P2 alone. This objection is based on the argument that P2 discloses biasing elements having coercivities as low as 20 Oe (as shown in Table 1 in column 11 of that document), and that from the patent in suit low coercivity must be assumed to result in the steep slope of the deactivation-field-dependent resonant-frequency-shift characteristic underlying the claimed invention. The opponent then argues on the basis of these considerations that it would be obvious to the skilled person to produce a marker using a biasing element with a coercivity of about 20 Oe, and that this would inherently have the slope characteristic defined in the present claim 1. The board does not find this argumentation convincing for essentially the same reasons as explained in paragraph 6.3.2 above, i.e. that it goes against the explicit teaching of P2 that for electronic article surveillance markers the biasing element should have a coercivity significantly larger than 20 Oe, specifically at least 35 to about 70 Oe.

6.4 Inventive step - Concluding remarks

To summarise, the board does not find the objections of lack of inventive step based on prior art documents P1 and P2 in combination with the affidavits filed by the opponent to be convincing, because most of the experiments described in the affidavits are clearly not consistent with the teaching of those two documents, and because the board has significant doubts with respect to the remaining experiments as to whether the heat treatment of the biasing elements accurately reflects the teaching of those documents, as it would have been understood at the priority date of the patent in suit, and as to how to interpret the resultant graphs. Moreover, the board is not convinced by the further objections of lack of inventive step based on "inherent obviousness" or on the teaching of P2 alone, since these are not consistent with the teaching of P1 or P2, and are thus considered to rely on hindsight.

7. Since none of the grounds discussed in sections 3, 5 and 6 above prejudice the maintenance of the patent in the form accepted by the opposition division in the decision under appeal, and since the appellant opponent has raised no further objections against the patent in that form, the appeal of the opponent must be dismissed.

8. Since the auxiliary request filed by the appellant proprietor during the oral proceedings before the board was filed solely to address aspects of the opponent's appeal, and since the board has followed the appellant proprietor's request that that appeal be dismissed, this auxiliary request does not need to be discussed.

Order

For these reasons it is decided that:

Both appeals are dismissed.

The Registrar: The Chairman:

U. Bultmann M. Ruggiu