

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 26

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte E. PAUL SHANNON

Appeal No. 96-0998
Application 08/180,288¹

ON BRIEF

Before HARKCOM, *Vice Chief Administrative Patent Judge*, and KRASS and CARMICHAEL, *Administrative Patent Judges*.

CARMICHAEL, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal from the final rejection of Claims 1, 4, 5, and 7-18, constituting all the claims remaining in the application.²

We affirm.

¹ Application for patent filed January 12, 1994.

² Claims 2, 3, and 6 were canceled by amendment. Claim 19 was withdrawn from consideration as being directed to a non-elected invention. Office action dated December 2, 1994 (Paper No. 8) at 2, paragraph 2.

BACKGROUND

The claims

Appellant's Claim 1 is illustrative of the invention involved in the present appeal:

1. An impact sensor comprising:

a non-ferrous housing having a passage therein and an end member provided at each end of said housing for enclosing said passage at opposite ends thereof;

a first magnetic member mounted in and being rigidly secured in said housing, a second magnetic member being slidably positioned in said passage for movement in an axial path, each of said first and second magnetic members having opposite magnetic poles and being positioned in said passage with a pair of poles of like polarity facing each other and with only the repelling magnetic force between said poles of like polarity serving to maintain said spaced relation between said first and second magnetic members;

voltage generating and pick off means comprising a single inductance coil winding circumferentially wound about said housing, said inductance coil winding having a bore and being positioned intermediate said first and second magnetic members and so disposed relative to the path of said magnetic member so that an impulse voltage is induced in said single winding by movement of said second magnetic member in said axial path responsive to an impact force acting on said housing, said impact force being of a magnitude which causes said second magnetic member to overcome the repelling magnetic force between said first and second magnetic members so that said second magnetic member will move into said bore of said winding and thereby generate said impulse voltage; and

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conducting means extending from said inductance coil winding, said conducting means including only a pair of electrical leads extending from said inductance coil winding to transmit said voltage from said inductance coil winding.

The only other independent claim is Claim 18. Claim 18 is similar to Claim 1 but recites a third magnetic member and a second inductance coil and specifies that the inductance coils are positioned between like poles of the moveable magnet and the fixed magnets.

Claim 8 depends from Claim 1 via Claim 7 and additionally recites damping means. Claim 9 depends from Claim 8 and specifies that the damping means is an anti-freeze solution.

Claim 13 depends from Claim 1 via Claim 12 and additionally recites an automotive vehicle for supporting the sensor. Claim 14 depends from Claim 13 and specifies that the vehicle includes an air bag for actuation by the impact sensor.

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The rejections

The Examiner's Answer lists the following prior art as relied upon in rejecting the claims:

Warner, Jr. et al. (Warner)	3,100,292	Aug. 6, 1963
Tognola	3,129,347	Apr. 14, 1964
Chapman et al. (Chapman)	4,737,774	Apr. 12, 1988
Valentini	4,754,644	Jul. 5, 1988.

The examiner has maintained eight grounds of rejection numbered in the Examiner's Answer as follows:

1. Claims 1, 4, 5, and 7-18 stand rejected under 35 U.S.C. § 112, first paragraph, on the ground that the specification as originally filed lacked a written description of the presently claimed subject matter. Examiner's Answer at 5, lines 2-9.

2. Claims 11 and 15-18 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Examiner's Answer at 5-6.

3. Claims 1, 7, 10 and 12 stand rejected under 35 U.S.C. § 103 as being unpatentable over Tognola. Examiner's Answer at 6-7.

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4. Claims 4, 5, 8, and 9 stand rejected under 35 U.S.C. § 103 as being unpatentable over Tognola in view of Chapman. Examiner's Answer at 7-8.

5. Claims 13 and 14 stand rejected under 35 U.S.C. § 103 as being unpatentable over Tognola in view of Valentini. Examiner's Answer at 8.

6. Claims 1, 7, 10-12, and 18 stand rejected under 35 U.S.C. § 103 as being unpatentable over Warner. Examiner's Answer at 8-9.

7. Claims 4, 5, 8, and 9 stand rejected under 35 U.S.C. § 103 as being unpatentable over Warner in view of Chapman. Examiner's Answer at 9-10.

8. Claims 13 and 14 stand rejected under 35 U.S.C. § 103 as being unpatentable over Warner in view of Valentini. Examiner's Answer at 10.

The invention

The disclosed invention relates to an impact sensor especially useful in triggering inflation of an air bag in an automotive vehicle. The sensor has a fixed magnet and a moveable magnet held apart by the repelling force of like poles facing each other. An induction coil is wrapped around a passage between the magnets. When the sensor experiences an impact

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sufficient to overcome the repelling force, the moveable magnet moves through the induction coil toward the fixed magnet. In this way, a voltage is induced in the coil. The voltage may be transmitted over a pair of electrical leads to an air bag actuation means.

The prior art

Warner discloses a vibration sensor that can be modified for the measurement of "jerk" (rate of change of acceleration). Column 5, lines 33-35. The sensor has fixed magnets and a moveable magnet 10 held apart by the repelling force of like poles facing each other. Induction coils 13 and 14 are wrapped around a passage 11 containing the magnets. When the sensor experiences motion, the moveable magnet 10 moves inside an induction coil toward a fixed magnet. In this way, voltages are induced in the coils. The voltages may be transmitted over a pair of electrical leads 15 from each coil. Column 2, lines 18-29; Figure 1. Any movement of magnet 10 relative to the coils 13 and 14 will generate a voltage proportional to the velocity of the movement. Column 3, lines 6-25. When modifying the device to measure jerk, the motion of moveable magnet 10 would be damped. Column 5, lines 35-37.

Tognola discloses a motion sensor similar to Warner's.

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Chapman discloses a motion sensor in which a moveable magnet in a tube is subject to repelling force between opposing poles of fixed magnets. An impact or shock to a person wearing the sensor causes the moveable magnet to move in the tube toward the fixed magnets. Any movement of the moveable magnet results in a change in an output signal. A processing circuit can indicate that a threshold level of motion has been reached or exceeded. Column 1, line 63 through column 2, line 17. Oscillations of the moveable magnet can be dampened with dampening materials in the tube. Column 2. Lines 50-52.

Valentini discloses an accelerometer with a moveable magnet 12 subject to repelling force between opposing poles of fixed magnets. Figure 1 shows inductance coil 8 positioned entirely between moveable magnet 12 and fixed magnet 6. When the accelerometer is subject to acceleration, magnet 12 moves in relation to coil 8. This results in a proportional variation of the magnetic flow in coil 8. Column 3, lines 18-37. Comparators can output a signal indicating when a respective reference value has been exceeded. Column 3, lines 47-57. That output signal can be employed in the control of actuators used on motor vehicles (e.g. regulating the vehicle suspension as a function of

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the amount of vertical acceleration detected). Column 1, lines 35-39; Column 4, lines 24-28.

DISCUSSION

As indicated above, the Examiner has maintained eight grounds of rejection. We will address each one in turn.

1. Written description

Claims 1, 4, 5, and 7-18 stand rejected under 35 U.S.C. § 112, first paragraph, on the ground that the specification as originally filed lacked a written description of the presently claimed subject matter. Examiner's Answer at 5, lines 2-9. Appellant does not include this rejection as an issue to be decided on appeal. Appeal Brief at 4, line 19, through 5, line 5. No argument is presented with respect to this rejection. Appeal Brief at 5-16. Because Appellant does not contest it, this rejection is affirmed.

2. Indefiniteness

Claims 11 and 15-18 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Examiner's Answer at 5-6. Appellant does not include this rejection as an issue to be decided on appeal. Appeal Brief at 4, line 19, through 5,

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line 5. No argument is presented with respect to this rejection. Appeal Brief at 5-16. Because Appellant does not contest it,³ this rejection is affirmed.

3. *Obviousness over Tognola*

Claims 1, 7, 10 and 12 stand rejected under 35 U.S.C. § 103 as being unpatentable over Tognola. Examiner's Answer at 6-7. These claims stand or fall together because appellant has not argued them separately. Appeal Brief at 5-9 and 14-15.

Appellant argues that Tognola discloses a continuous vibration pick up and does not suggest an impact sensor providing an impulse voltage only in response to a predetermined impact force and having the coil positioned between the magnets so that the moveable magnet does not enter the coil until impact occurs. Appeal Brief at 5-9 and 14-15. The examiner contends that Tognola suggests sensing a level of movement from a transmitted voltage due to a magnet's movement in a coil toward an opposing fixed magnet and rendered obvious the impact sensor recited in

³ Appellants submitted an amendment (Paper No. 18, dated April 28, 1995) with the Appeal Brief in order to address the rejection of Claims 15-17. Appeal Brief at 12, lines 4-9. However, this amendment has not been entered. Examiner's Answer at 2, line 6. Therefore, the amendment does not affect the disposition of this appeal.

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Claim 1. Examiner's Answer at 6-7 and 11. We agree with the examiner.

Although Tognola uses his motion detector to detect vibrations in a jet engine, Tognola states that it may also be used to advantage in a large number of other applications. Column 1, line 64 through column 2, line 2. We agree with the examiner that detecting vibration versus detecting impact is only a matter of degree and the difference was suggested by Tognola.

Tognola specifically teaches appreciable adjustment of the spacing between a fixed magnet and the neutral position of moveable magnet 54. Column 3, line 70, through column 4, line 2. One skilled in the art would understand that teaching as a suggestion to vary the sensitivity of the motion detector for other applications including detecting large movements.

Appellant attempts to distinguish Tognola on the basis that Tognola's moveable magnet and coil are continuously flux coupled. Appeal Brief at 7, line 26, through 8, line 14. However, this distinction is not recited in the claim.

Claims undergoing examination are given their broadest reasonable interpretation consistent with the specification, and limitations appearing in the specification are not to be read

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into the claims. *In re Etter*, 756 F.2d 852, 858, 225 USPQ 1, 5 (Fed. Cir. 1985) (in banc).

Appellant relies on the claim phrase "impulse voltage" but the broadest reasonable interpretation encompasses a continuously flux coupled arrangement. Tognola's motion detector will respond to an impact with an impulse voltage as broadly recited. Column 4, lines 31-38. Appellant's specification does not define "impulse voltage." Specification at 4, lines 17-21 and at 6, lines 9-15.

We do not interpret the claim terms "intermediate" or "into" to require that the moveable magnet's neutral position be entirely outside of the coil. Thus, we are not persuaded by Appellant's argument regarding the movable magnetic member being positioned "outside" of the coil. Appeal Brief at 13, lines 19-24. In our view, Tognola's coil 17 is positioned intermediate (between) moveable magnet 19 and fixed magnet 21 as shown in Tognola's Figure 1 such that the moveable magnet will move into the coil to generate an impulse voltage when subject to an impact force sufficient to overcome the repelling magnetic force as recited.

We note that the voltage generating and pick off means is not recited in means plus function form. To invoke the sixth

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paragraph of 35 U.S.C. § 112, a claim element must not recite a definite structure which performs the described function. *Cole v. Kimberly-Clark Corp.*, 102 F.3d 524, 531, 41 USPQ2d 1001, 1006 (Fed. Cir. 1996). In the present case, Claim 1 recites the definite structure of the "voltage generating and pick off means." Moreover, Appellant has not argued that 35 U.S.C. § 112, sixth paragraph, should apply.

Appellant argues that in his invention a single winding is used, requiring only two output leads. Appeal Brief at 12, lines 22-23. Apparently, Appellant believes that Claim 1 is restricted to the embodiment of Figure 1 in which a single voltage generating and pick off means comprises a single winding, and a single conducting means comprises a single pair of output leads. However, by its terms Claim 1 is not restricted to only a single voltage generating and pick off means, nor to only a single conducting means. Claim 1 uses the open ended word "comprising" and reads equally well on the embodiment of Figure 2 which, like Tognola, includes more than one voltage generating and pick off means and more than one conducting means.

Thus, we agree with the examiner that the claimed subject matter would have been obvious and the rejection is sustained.

4. ***Obviousness over Tognola and Chapman***

Claims 4, 5, 8, and 9 stand rejected under 35 U.S.C. § 103 as being unpatentable over Tognola in view of Chapman. Examiner's Answer at 7-8. Claim 8 recites damping means, Claims 4 and 5 recite fluid damping means, and Claim 9 specifies that the damping means is an anti-freeze solution.

Appellant's only challenge to the rejection of Claims 4, 5, and 8 is that they depend from Claim 1 and Chapman does not overcome the argued deficiencies of Claim 1's rejection. Appeal Brief at 9, lines 1-21.

Chapman suggests that a continuous flux signal be compared against a predetermined value to indicate when an acceleration exceeds a certain threshold. Column 4, lines 9-32. Such a predetermined value corresponds to the predetermined "impact" level argued by appellant.

In any event, the subject matter of Claim 1 was suggested by the cited art with or without Chapman. Thus, the rejection of Claims 4, 5, and 8 will be sustained.

With respect to Claim 9, Appellant argues that Chapman makes no suggestion of using anti-freeze solution as the damping means. Appeal Brief at 9, lines 1-8. The examiner contends that the particular solution was only one of numerous dampening solutions

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a person of ordinary skill in the art would find obvious for the purpose of providing damping.

There is no mention in the cited references of using an anti-freeze solution for damping or for any other purpose. Tognola is concerned with elevated temperatures on the order of 800 degrees Fahrenheit and nowhere mentions freezing temperatures. Column 4, lines 59-64. There is no suggestion in the cited references to use an anti-freeze solution instead of the damping fluid (air) used in Tognola. Column 3, lines 23-47. Having no reference teaching or suggesting an anti-freeze solution as a damping means, we cannot conclude that the subject matter of Claim 9 would have been obvious.

Thus, we will sustain the rejection of Claims 4, 5, and 8, but not the rejection of Claim 9.

5. ***Obviousness over Tognola and Valentini***

Claims 13 and 14 stand rejected under 35 U.S.C. § 103 as being unpatentable over Tognola in view of Valentini. Examiner's Answer at 8.

With respect to Claim 13, Appellant's only argument is that Valentini fails to overcome the argued deficiencies of Tognola with respect to Claim 1 from which Claim 13 ultimately depends. Appeal Brief at 9, line 23, through 10, line 10. We disagree.

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Valentini suggests processing a proportionally varying signal from the motion sensor to indicate when a predetermined reference value is exceeded. Column 3, lines 53-56. Such a predetermined value corresponds to the predetermined "impact" level argued by appellant. Valentini shows in Figure 1 an inductance coil 8 positioned entirely between moveable magnet 12 and fixed magnet 6. Such an arrangement fully satisfies the limitations of Claim 1 asserted by Appellant.

In any event, the subject matter of Claim 1 was suggested by Tognola with or without Valentini. Thus, the rejection of Claims 4, 5, and 8 will be sustained.

Claim 14 specifies connection to an air bag actuation means. The examiner argues that an air bag is nothing more than one of numerous uses for which an accelerometer would be used. Examiner's Answer at 8, lines 9-14. Appellant argues that the references make no inference or suggestion regarding an air bag. We agree with Appellant.

Although Valentini suggests that the output signal can be employed in the control of actuators used on motor vehicles (e.g. regulating the vehicle suspension as a function of the amount of vertical acceleration detected), there is no mention of an air bag. Column 1, lines 35-39; Column 4, lines 24-28. Having no

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reference teaching or suggesting connecting an accelerometer to an air bag actuator, we cannot conclude that the subject matter of Claim 14 would have been obvious.

Therefore, we will sustain the rejection of Claim 13 but not the rejection of Claim 14.

6. *Obviousness over Warner*

Claims 1, 7, 10-12, and 18 stand rejected under 35 U.S.C. § 103 as being unpatentable over Warner. Examiner's Answer at 8-9. These claims stand or fall together because Appellant has not argued them separately.

The examiner and Appellant take the same positions on this rejection over Warner as discussed in paragraph 3 above with respect to Tognola. Examiner's Answer at 9, lines 8-9; Appeal Brief at 8, lines 2-14 and at 10, lines 13-16. Appellant's arguments, discussed above, are no more persuasive when applied to Warner. Warner suggests adjusting his sensor by varying over a wide range the number of turns of wire as well as the wire size employed in the windings. In this way, Warner teaches, a vibration sensor can be advantageously modified to indicate shock or jerk. Column 5, lines 21-40. This would include "impact" and "impulse" signals as recited in Claim 1.

Thus, this rejection will be sustained.

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7. *Obviousness over Warner and Chapman*

Claims 4, 5, 8, and 9 stand rejected under 35 U.S.C. § 103 as being unpatentable over Warner in view of Chapman. Examiner's Answer at 9-10. The positions of the examiner and Appellant are the same as discussed above in paragraph 4. Examiner's Answer at 9, lines 19-20; Appeal Brief at 11, lines 1-6.

We sustain the rejection of Claims 4, 5, and 8 for the reasons expressed above in paragraph 4.

We will not sustain the rejection of Claim 9 because there is no suggestion in the cited art to use an anti-freeze solution as a damping fluid instead of the damping fluid (air) used by Warner. Column 4, lines 3-6. Warner achieves his air damping by using an airtight seal. Warner states that the seal also serves to protect the interior of the device from moisture. Column 5, lines 8-37. Warner's desire to protect the interior from moisture would discourage use of a liquid such as the recited anti-freeze solution. Moreover, no cited reference even mentions anti-freeze solution.

Thus, we sustain the rejection of Claims 4, 5, and 8, but not the rejection of Claim 9, over Warner and Chapman.

8. ***Obviousness over Warner and Valentini***

Claims 13 and 14 stand rejected under 35 U.S.C. § 103 as being unpatentable over Warner in view of Valentini. Examiner's Answer at 10. The position of the examiner is the same as discussed above in paragraph 5. Examiner's Answer at 10, lines 1-5. Appellant argues that Warner makes no suggestion of the environment of the sensor. Appeal Brief at 11, lines 7-10.

With respect to Claim 13, Valentini suggests use of a motion sensor in a motor vehicle, column 4, lines 23-28, and Warner teaches that his vibration sensor can be modified for a wide range of applications including sensing shocks and jerks. Column 5, lines 21-40. We agree with the examiner that it would have been obvious to use Warner's sensor as an impact sensor in a motor vehicle as suggested by Valentini. Therefore, the rejection of Claim 13 is sustained.

However, for the reasons set forth above in paragraph 5, we will not sustain the rejection of Claim 14.

Thus, we sustain the rejection of Claim 13, but not the rejection of Claim 14, over Warner and Valentini.

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CONCLUSION

All of the eight rejections are sustained except for the obviousness rejections as they apply to Claims 9 and 14.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED

GARY L. HARKCOM)	
Vice Chief Administrative Patent Judge)	
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)	BOARD OF PATENT
ERROL A. KRASS)	
Administrative Patent Judge)	APPEALS AND
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)	INTERFERENCES
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)	
JAMES T. CARMICHAEL)	
Administrative Patent Judge)	

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John C. Garvin, Jr.
P.O. Box 18485
Huntsville, AL 35804-8485