

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 12

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte IRA E. BASKETT
and ANDREW C. McNEIL

Appeal No. 1998-1364
Application 08/722,384¹

ON BRIEF

Before BARRETT, RUGGIERO, and LALL, Administrative Patent Judges.

BARRETT, Administrative Patent Judge.

DECISION ON APPEAL

¹ Application for patent filed September 30, 1996, entitled "Circuit And Method Of Compensating For Membrane Stress In A Sensor."

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This is a decision on appeal under 35 U.S.C. § 134 from the final rejection of claims 1-22.

We affirm-in-part.

BACKGROUND

The invention relates to a sensor and method of sensing membrane stress in a sensing structure such as a diaphragm. The invention is clearly summarized in Appellants' brief in the Summary of Invention at pages 2-3.

Claim 1 is reproduced below.

1. A sensor, comprising:

a sensing structure having a first location with substantially zero bending in response to a physical condition; and

a first transducer disposed at the first location for converting a membrane stress in the sensing structure to a first sense signal.

The Examiner relies on the following prior art:

Huck et al. (Huck)	5,107,710	April 28, 1992
Inoue et al. (Inoue)	5,166,892	November 24, 1992

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Claims 1-4, 6, 7, 10,² and 14-20 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Huck.

Claims 5, 11-13, and 21 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Huck.

Claims 8, 9, and 22 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Huck and Inoue.

We refer to the Final Rejection (Paper No. 5) (pages referred to as "FR__") and the Examiner's Answer (Paper No. 11) (pages referred to as "EA__") for a statement of the Examiner's position, and to the Appeal Brief (Paper No. 10) (pages referred to as "Br__") for Appellants' arguments thereagainst.

OPINION

Claims 1 and 10-13

The Examiner finds that "Huck et al.[]" disclose a pressure sensor teaching the features of the claimed invention including: a sensing structure having a first location with zero bending (col. 3, lines 1-17), [and] a set of first

² Claim 10 has been inadvertently omitted from the Examiner's statements of the rejection. However, since it is mentioned in the discussion of the anticipation rejection (Final Rejection, p. 2), we include it in this claim grouping.

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transducer[s] disposed at this region[] (element[s] 26, 28, 30 and 36)" (FR2). The Examiner states for the first time in the Examiner's Answer that "these claims do not support any limitation to show that the membrane is stressed due to an external physical force[;] it is clear that [the membrane] can be stressed due to temperature variations which is indeed a physical condition, as in the case of Huck et al." (EA5).

It is clear that the Examiner finds the claims anticipated because they are so broad they read on Huck in an unintended manner, rather than finding that Huck teaches the disclosed pressure sensor structure. We agree with the Examiner.

Claim 1 recites "a sensing structure having a first location with substantially zero bending in response to a physical condition." The "physical condition" is not defined to be a force, such as a pressure. The term "sensing structure" is defined (specification, p. 7, lines 27-30): "A sensing structure is defined as the portion of a sensor which produces a stress in response to a physical condition." The term "sensor" is discussed as follows (specification, p. 1, lines 9-16):

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Sensors are commonly used for converting physical conditions such as temperature, pressure, and acceleration to an electrical sensor signal for further processing. A typical sensor, such as a pressure sensor, includes a diaphragm for converting a pressure into a stress. A transducer converts the stress into the sensor signal which is typically amplified and filtered to provide a sensor output signal. [Emphasis added.]

It is consistent with Appellants' specification to read the "physical condition" in claim 1 on temperature and the "sensing structure" on the surface of the diaphragm 16 in Huck. The resistors 26-32 are deposited in the non-active (or inactive) part 34 of the diaphragm 16 "to prevent their resistance values from being changed by the mechanical deformation of the diaphragm" (col. 3, lines 4-6). Since the resistance values are not changed by mechanical deformation, the inactive area 34 must be a "location of substantially zero bending," as claimed. That is, claim 1 reads on a part of the overall Huck sensor. Since Appellants themselves are claiming only a part of an overall sensor, this interpretation is reasonable.

Claim 1 further recites "a first transducer disposed at the first location for converting a membrane stress in the sensing structure to a first sense signal." The temperature sensors R_{T1} and R_{T2} in Huck correspond to transducers in the

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first location. The expansion and contraction of the surface of diaphragm 16 in Huck due to temperature is considered to produce a membrane stress, which is converted in the sensors to a sense signal.

It appears that Huck establishes a prima facie case of anticipation. We now consider Appellants' arguments.

Appellants arguments are based on the disclosed pressure transducer rather than the broad language of claim 1. The "physical condition" in claim 1 does not have to be a condition that produces bending in the sensing structure, as assumed in Appellants' arguments (Br5), but could be a physical condition such as temperature. It is clear from claim 14 that Appellants knew how to claim that the physical condition produces bending, but elected not to include such limitation in claim 1.

Appellants argue that "[m]embrane stress is a particular type of stress that results from the sensing structure's stretching in response to the applied physical condition" (Br6) and that membrane stress is not present in the inactive area 34 of Huck because the inactive area 34 is not deformed by applied pressure (Br6). We find the expansion and

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contraction (stretching) of the surface of diaphragm 16 in Huck due to temperature (the physical condition) results in a membrane stress, which is sensed by the temperature sensors. That is, it has not been shown that membrane stress, broadly, is limited to stress produced by bending. Appellants' arguments are based on membrane stress being caused by bending due to physical conditions, which is not claimed.

Appellants argue that "the Huck pressure sensor does not address the problem of sensor nonlinearity due to membrane stress" (Br7) and operates in a fundamentally different way (Br7). However, claim 1 does not recite a solution to this problem; it merely recites a transducer at a particular location. We are not persuaded that claim 1, as broadly worded, distinguishes over Huck.

In summary, Appellants' arguments are not persuasive of error in the finding of anticipation of claim 1. Claims 10-13 are said to be allowable for the reasons stated with respect to claim 1 (Br9), which does not constitute an argument of separate patentability. Thus, claims 10-13 fall with claim 1. The rejections of claims 1 and 10-13 are sustained.

Claims 2-9

Claim 2 recites that "the substantially zero bending occurs at a transition between tensile stress and compressive stress at a surface of the sensing structure in response to the physical condition." This implicitly requires bending in a constrained structure so as to produce an inflection point between tensile stress and compressive stress, as shown in Appellants' figure 2. Since no bending occurs in the inactive area 34 of Huck, there is no transition between tensile stress and compressive stress in Huck. Thus, we find that claim 2 is not anticipated. Claims 3-7, which depend on claim 2 and are rejected as being anticipated by, or unpatentable over, Huck incorporate the limitation of claim 2 and are patentable thereover. Inoue, which is applied to the rejection of claims 8 and 9 to show an error compensation circuit, does not cure the deficiency of Huck with respect to claim 2. For these reasons, the rejections of claims 2-9 are reversed.

Claims 14-17

Independent claim 14 recites a first step of "providing a sensing structure that bends in response to a physical condition and develops a membrane stress at a first location that has substantially zero bending." Thus, claim 14 is not

just a method counterpart to claim 1, but is narrower than claim 1 in that it specifically recites that the sensing structure bends in response to a physical condition.

Accordingly, the broad interpretation taken with respect to claim 1 does not apply here. The corresponding sensing structure in Huck is the active area 17 of the diaphragm 16, not the inactive area 34 (which does not bend). There is no disclosure in Huck of any of the sensors R_1 - R_4 in the active area 17 being at a location of substantially zero bending. Therefore, we find that Huck does not anticipate claim 17 or claims 15-17. The rejection of claims 15-17 is reversed.

Claims 18-22

Claim 18 recites, in part, "a sensing structure having a first location with substantially zero bending and a second location that bends in response to a physical condition." The "physical condition" has to be the kind of condition that produces bending in part of the sensing structure, e.g., a force or pressure. However, so far, claim 18 is broad enough to read the "first location" on the inactive area 34 of the sensor in Huck and the "second location" on the active area 17 of Huck.

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Claim 18 further recites "a first transducer disposed at the first location of the sensing structure for providing a first sense signal representative of an error component introduced by a membrane stress in the sensing structure in response to the physical condition." At this point, we see a contradiction that prevents claim 18 from reading on Huck. The temperature sensors in Huck, which correspond to the first transducer in the Examiner's interpretation, do not produce "an error component introduced by a membrane stress in the sensing structure in response to the physical condition" because the "physical condition" has to be the kind of condition that produces bending, e.g., a pressure, not just any physical condition, e.g., temperature. We find that claim 18 is not anticipated by Huck. Claims 19-21, which depend on claim 18 and are rejected as being anticipated by, or unpatentable over, Huck incorporate the limitations of claim 18 and are patentable thereover. Inoue, which is applied to the rejection of claim 22 to show an error compensation circuit, does not cure the deficiency of Huck with respect to claim 18. For these reasons, the rejections of claims 18-22 are reversed.

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CONCLUSION

The rejections of claims 1 and 10-13 are sustained.

The rejections of claims 2-9 and 14-22 are reversed.

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

AFFIRMED-IN-PART

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Administrative	Patent Judge)
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Administrative Patent Judge)	APPEALS
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