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(2) is not binding precedent of the Board.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. 16

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JAMES L. NOVAK

Appeal No. 96-2194
Application 08/042,292[1]

ON BRIEF

Before HAIRSTON, MARTIN, and TORCZON, Administrative Patent Judges.

MARTIN, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision in an appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 1, 6-9, 13-15 and 17-19 over prior art. Claims 2-5 and 16 stand objected to for

[1] Application for patent filed April 2, 1993.

depending on rejected claims. Claims 10-12 have been allowed. We reverse.

The invention is a probe for tracking a feature on a workpiece. In the capacitive embodiment depicted in Figures 1-9, the probe includes four rectangular capacitor electrodes 1-4, of which two are mounted on each side of tab 12 of a printed circuit board (Fig. 1; Spec. at 5, lines 9-11). As shown in Figure 8, the outputs of first and second oscillators 62 and 64, which operate at different frequencies, are applied to "transmitting" electrodes 3 and 2, respectively. Each of these transmitting electrodes is coupled via an inherent capacitance to each of the "receiver" electrodes 1 and 4, with the amount of capacitance being determined by the proximity and position of the workpiece (Spec. at 5, lines 37-38). As shown in Figure 8, the receiver electrodes 1 and 4 are connected to the inputs of inverting charge amplifiers 66 and 67, respectively (Spec. at 7, lines 44-47). The output signals from these amplifiers and the oscillator signals are combined in different pairs in signal conditioning electronics 70, 80, 81, and 82 to produce four "sensed field signals" for application to processor means 83, which adds or subtracts the sensed field signals to provide the location and orientation for the sensor relative to the seam (Spec. at 7, line 47 et seq.).

Claim 1, which is the broader of the two independent claims (claim 13 is the other independent claim), reads as follows:

> 1. Apparatus for tracking a feature on a workpiece comprising:
>
> at least two pairs of electrodes disposed on a planar mount oriented parallel to the axis of the feature and above the workpiece with one electrode in each pair operating as a transmitter of an electric field and the other electrode in each pair operating as a receiver of the field;
>
> means to drive each of the transmitting electrodes at a separate frequency;
>
> means to combine the signals from the receiver electrodes to provide information indicative of the position of the mount relative to the feature; and
>
> means to drive the mount in response to the position information.

The references relied on by the examiner are:

Houskamp	4,656,406	Apr. 7, 1987
Hüschelrath et al. (Hüschelrath)	4,792,755	Dec. 20, 1988

Claims 1, 6-9, 13-15 and 17-19 stand rejected under 35 U.S.C. § 103 as unpatentable over Hüschelrath in view of Houskamp. Appellant treats the rejected claims as standing or falling together (Brief at 3) and specifically argues the limitations of only claim 1. As a result, we will treat claims 6-9, 13-15 and 17-19 as standing or falling with claim 1.

See 37 CFR § 1.192(c)(7) (1995) (The Board shall select a single claim for consideration from a group of claims that an appellant treats as standing or falling together).

Hüschelrath discloses a method and apparatus for non-destructively examining ferromagnetic bodies for structural faults. The disclosed embodiment shows apparatus for inspecting a sleeve portion 2 at the end of a tubular body 1. Referring to Figures 1-3, an electromagnet 10 and a pair of magnetic shoes 6 and 7 extending along either side of sleeve 2 produce a magnetic field in the sleeve. The strength of this field is measured at a plurality of points by Hall generators 12, which are supported on holders 8 and 9. Two layers of Hall generators may be arranged one above the other with any two Hall generators that lie one above the other being electrically connected by a differential connection (col. 4, lines 18-22). A differential connection of this type is shown in Figure 4, wherein the outputs of two Hall detectors 12 are connected via a differential amplifier to an input of multiplexer 20 (col. 4, lines 59-61). As all of the inputs to multiplexer 20 are provided by detectors 12, the examiner is incorrect to state that "[p]oles 6, 7 and sensors 12 are connected as pairwise probes to the multiplexer" (Answer at 6). The electromagnet 10, magnetic pole shoes 6 and 7 and detector holders 8 and 9 are all mounted on rotary plate 14, which is rotated by driving mechanism 15 so as to move the pole shoes and detectors around the end portion 2 of tubular body 1, which remains stationary (col. 4, lines 28-32).

Houskamp discloses several different types of guidance systems for controlling the path of a self-propelled vehicle. Among the prior art systems described are an optical system using fluorescent markings on the floor (col. 1, lines 25-30) and magnetic field systems using buried conductors carrying AC currents (col. 1, line 43 to col. 2, line 38; col. 4, line 66 to col. 7, line 10; Figs. 3-7). According to Houskamp, buried conductor magnetic field systems have a number of disadvantages. The first, which is dictated by the fact that the guide path must be formed as a current carrying conductor, is the need to use a relatively low resistance material such as solid or stranded wire, which does not stretch appreciably and thus can break due to flexing of floor sections (col. 2, lines 43-51). Another problem is that the wire may be subject to the corrosive effects of industrial chemicals or chemicals contained in the floor material itself (col. 2, lines 51-65). Still another problem, which is due to the need for closed current paths, is that each path segment in a multiple path system must be formed of only parts of a plurality of closed current loops, which means a substantial amount of wire length is required that is not actually used for guidance.

Houskamp solves these and other problems by using a buried guidewire wire which generates an AC electrical field instead of an AC magnetic field. Referring to Figure 9, this is accomplished by connecting one end of the wire to one terminal of an AC voltage source 190, with the other terminal being connected to the ground. The current flow in the wire is substantially less than in a magnetic field system, thereby permitting the wire to be formed of a more flexible material, such as materials containing carbonized rubber (col. 9, lines 35-38). The electric field strength can be detected by a probe 206 and voltmeter 202 (col. 8, lines 2-6). Referring to Figure 10 and to column 8, lines 21-34, a capacitor 218 connected between voltmeter 202 and ground 220 is selected to be several times larger than the inherent capacitance 216 between the probe and wire 194. Figure 11 shows a pair of voltage probes 222 and 224 for providing the inputs to either of the processing circuits shown in Figures 12 and 13, which generate a steering error signal on line 242 (col. 8, line 35 to col. 9, line 8).

The examiner explains the proposed modification of Hüschelrath in view of Houskamp as follows (Answer at 4):

> Hüschelrath et al. does not teach to utilize electric sensors.
>
> Houskamp teaches that it is known in the art to utilize either inductive, optical or capacitive type sensors for tracking sensors. The use of capacitive ie. [sic, i.e.,] electrical sensors allows for detection in corrosive environments and multiple path detection.
>
> Thus, it would have been obvious to one of ordinary skill in the art to utilize the electrical sensors of Houskamp to provide improved detection with electrical type sensors.

The examiner's position appears to be that it would have been obvious in view of Houskamp to replace Hüschelrath's means for generating a magnetic field in body 1 (i.e., electromagnet 10 and magnetic poles 6 and 7) with means for generating an electric field in the body and to replace Hüschelrath's magnetic field sensors 12 with electric field sensors. Appellant does not contend that it would have been unobvious to combine the teachings of these references in this manner. Instead, he argues, <u>inter alia</u>, that "[t]he references do not suggest any combination that would yield a sensing apparatus that creates and senses at least two electric fields as required by claim 1" and that "[b]oth references require only a single field, and consequently do not suggest the desirability of more than one field, electrical or magnetic" (Brief at 4). We agree with appellant that the creation and sensing of at least two electric fields is required by claims 1's recitations of "at least two pairs of electrodes . . . with one electrode in each pair operating as a transmitter of an electric field" and "means to drive each of the transmitting electrodes at a separate frequency." Independent claim 13 states the same requirement in different language: "means to create an oscillating electric potential at one of the electrode means at each side of the planar region and means to sense the oscillating electric potential at the other of the electrode means at each side."

We note that the opening brief, in arguing that the claims require at least two electric fields, did not contend that the fields must have different frequencies; this argument appeared for the first time in the reply brief (at 2). This argument will not be considered in connection with this appeal, because the reply brief fails to identify the new point or points in the Answer to which the new argument is addressed, as required by 37 CFR § 1.193(b).

Nevertheless, we agree with appellant that the rejection of claim 1 should be reversed on the ground that the references fail to suggest a sensing apparatus using two transmitting electrodes to create two electric fields.

Hüschelrath's electromagnet 10 and poles shoes 6 and 7 produce a single magnetic field which, as distorted by the presence of ferromagnetic end portion 2 of body 1, is detected by detectors 12. In Houskamp's buried-wire electric field guidance system, the buried wire produces a single electric field whose strength is detected at two different locations by a pair of probes. The examiner has not explained, and it is not apparent to us, why the artisan would have been motivated to replace Hüschelrath's single magnetic field with two or more electric fields. For this reason, we are reversing the rejection of claim 1 under 35 U.S.C. § 103 as unpatentable over Hüschelrath in view of Houskamp is reversed, as well as the rejection of claims 6-9, 13-15 and 17-19, which stand or fall therewith.

REVERSED

KENNETH W. HAIRSTON Administrative Patent Judge	)	
JOHN C. MARTIN Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
RICHARD TORCZON Administrative Patent Judge	)	

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