Paper No. 17

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte EDWARD S. KOLESAR

Appeal No. 94-3696
Application 07/995,230[1]

ON BRIEF

Before KRASS, JERRY SMITH and LEE, Administrative Patent Judges.

LEE, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 1-20. No claim has been allowed.

References relied on by the Examiner

Carson et al. (Carson)	5,160,870	Nov. 3, 1992
Jarvis et al.	4,539,554	Sep. 3, 1985

[1] Application for patent filed December 22, 1992.

(Jarvis)		
May, Jr.	3,902,084	Aug. 26, 1975
Rudnick	3,474,268	Oct. 21, 1969

The Rejections on Appeal

Claims 1-20 stand rejected under 35 U.S.C. § 103 as being unpatentable over Carson or Jarvis, in view of Rudnick or May.

The Invention

The invention is directed to a tactile sensing apparatus and method which senses physical force and generates a corresponding electrical signal through a piezoelectric effect material. A temporary low voltage electrical charge is applied to the piezoelectric effect material for preconditioning the material. Claims 1 and 20 are the sole independent claims and are reproduced below:

1. Force magnitude and force pattern responsive tactile sensing apparatus comprising the combination of:

a two-dimensional array of electrode elements disposed in electrical and physical isolation across a planar surface area portion of a semiconductor substrate member;

a force responsive physically deformable film of piezoelectric effect material disposed over said array of electrode elements and said substrate member surface area portions, in electrical capacitance coupling with said electrode element array;

an electrically conductive common electrode member disposed over a second distal surface portion of said film of

piezoelectric effect material and connected with a common return electrical node of said sensing apparatus;

electronic amplifier means, including a plurality of high input impedance electronic amplifier circuits physically disposed adjacent to said array of electrode elements with each said amplifier circuit having respective input nodes connected with one of said electrode elements and with said common return electrical node for amplifying a piezoelectric effect electrical charge signal received on said electrode element during sensed tactile force physical deformations of said film of piezoelectric effect material;

low voltage electrical charge generating means temporarily connected with each said electrode element of said array for pre-conditioning said piezoelectric effect material to a substantially uniformed signal generation state prior to each said tactile force physical deformation.

20. The method of tactile force sensing comprising the steps of:

generating a spatial map related array of discrete electrical signals each representing a force magnitude at a predetermined planar location within an applied force field;

said signal generating step including capacitively sensing local quantums of electrical charge displaced to surface adjacent portions of a piezoelectric film by physical deformation of said film from said applied force field;

each said signal generating step being preceded by a temporary low voltage electrical signal induced output signal range limiting physical preconditioning of said piezoelectric film; and

amplifying each said discrete electrical signal of said array in an amplifying location disposed adjacent said

spatial map signal location.

Claims 2-19 depend either directly or indirectly from claim 1, and no claim depends from claim 20.

Opinion

We do not sustain the rejection of claims 1-20 as being unpatentable over prior art.

The examiner found that the sole difference between the claimed invention and either Carson or Jarvis is that the sensor of Carson and Jarvis does not include an electric charge generating means for preconditioning the piezoelectric effect material (answer at 3). The recitation in claim 1 actually further specifies that the electrical charge generating means is only "temporarily" connected to the two-dimensional array of electrodes. At least with respect to independent claim 1, the appellant does not dispute the examiner's finding. Independent method claim 20 recites a corresponding feature, i.e., "each said signal generating step being preceded by a temporary low voltage electrical signal induced output signal range limiting physical preconditioning of said piezoelectric film."

The appellant persuasively argues that the applied

combination of references would not have reasonably suggested to one with ordinary skill in the art the subject matter of each claim, all of which include the temporary application of a low voltage electrical signal to the piezoelectric effect material or film to precondition the material. We agree with the appellant.

The examiner relied on Rudnick and May, Jr., each in the alternative, in an attempt to make up for the deficiencies of Carson and Jarvis with regard to the application of a low biasing voltage to the piezoelectric material to precondition the material prior to the voltage generating step or application of physical force to the sensor. According to the examiner, however, the biasing voltage of either Rudnick or May, Jr. satisfies the claimed biasing voltage and could reasonably have been used by one with ordinary skill in the art in the sensor of Carson or Jarvis. We disagree.

Neither Rudnick nor May, Jr. uses the piezoelectric material as a physical force sensor. Also, the biasing voltage applied by both Rudnick and May, Jr. is not temporary.

Rudnick discloses a piezoelectric ceramic transducer which converts electrical signal input to mechanical motion output. A

biasing voltage is applied on a permanent basis to ensure that the piezoelectric material returns to its original polarization state after each application of the signal voltage (column 5, lines 65-69). Rudnick further discloses that such biasing voltage increases the potential extent of elongation which can be produced from the piezoelectric material in response to the applied voltage signal (column 5, lines 69-74). This teaching would not have given one of ordinary skill in the art reasonable motivation to apply a "temporary" biasing voltage to a piezoelectric material being used as a sensor and providing an electrical signal as an output. The connection between the two is simply too remote and over stretched to form the necessary suggestion to render the claimed invention obvious.

May, Jr. discloses a piezoelectric transducer which provides mechanical motion in incremental steps in response to electrical signal input. A biasing voltage is applied "continuously to the piezoelectric driver sections causing them to expand or contract in order to accommodate and compensate for thermal effects, wear of the shaft or driver and for changes in load on the shaft" (Emphasis added.) (column 6, lines 34-38). As is the case with Rudnick, this teaching would not have given one of ordinary skill in the art reasonable motivation to apply a "temporary" biasing

voltage to a piezoelectric material being used as a sensor and providing an electrical signal as an output. The connection is too remote. The appellant is correct that the claims do not simply recite the sensor aspect of the invention in the preamble of the claims. Rather, physical force sensing is recited clearly in the body of the independent claims.

The examiner has not cited sufficient evidence revealing that the particular problems relating to using piezoelectric material to convert electrical energy to mechanical energy were also known to plague using the material to convert mechanical energy to electrical energy. Also, even assuming that the same problems were recognized, it cannot be assumed that the same solutions would work in the different settings, given the reverse nature of the operations and requirements for inputs and outputs. There can be no presumption that whatever one would do when using piezoelectric material to provide mechanical motion one would do the same when using the material as a sensor. Moreover, in this case, while the claims call for "temporary" application of a low biasing voltage to precondition the material, the biasing voltages of Rudnick and May, Jr., as identified by the examiner are not temporary.

The mere fact that the prior art may be modified in the

manner suggested by the examiner does not make the modification obvious unless the prior art suggested the desirability of the modification. In re Fritch, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1783-84 (Fed. Cir. 1992). Here, as we explained above, they do not. It is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious. In re Fritch, 972 F.2d at 1266, 23 USPQ2d at 1784.

Conclusion

For the foregoing reasons, the rejection of claims 1-20 under 35 U.S.C. § 103, as being unpatentable over Carson or Jarvis in view of Rudnick or May, Jr. is reversed.

REVERSED

ERROL A. KRASS Administrative Patent Judge	)
JERRY SMITH Administrative Patent Judge	) BOARD OF PATENT APPEALS AND INTERFERENCES
JAMESON LEE Administrative Patent Judge	)

AFLSA/JACP
2240 B Street
Suite 5
Wright Patterson, AFB OH 45433-7109
Arlington, VA 22209