

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opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.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. 31

UNITED STATES PATENT AND TRADEMARK OFFICE

---

BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

---

Ex parte MARIUS CLOUTIER, SYLVAIN SAVARD,  
JEAN M. BOURGEOIS, and FRANCOIS LALONDE

---

Appeal No. 95-1994  
Application 07/732,493<sup>1</sup>

---

ON BRIEF

---

Before THOMAS, FLEMING and CARMICHAEL, Administrative Patent Judges.

THOMAS, Administrative Patent Judge.

DECISION ON APPEAL

---

<sup>1</sup> Application for patent filed July 18, 1991.

Appeal No. 95-1994  
Application 07/732,493

Appellants have appealed to the Board from the examiner's final rejection of claims 1 to 12, which constitute all the claims in the application.

Representative claim 1 is reproduced below:

1. Method for dynamic and non-contact measurement of a displacement of a grounded conductive substance with respect to a capacitive sensor formed of two parallel conductive plates, superimposed, electrically insulated one from the other, and fed by a high frequency signal at a predetermined voltage originating from a signal generator, said capacitive sensor being connected to a device for detecting a current value, said method comprising the steps of:

(a) positioning said capacitive sensor close to and at a perpendicular fixed distance from a plane in which said conductive substance extends, said plates being substantially parallel to said plane and displacing said conductive substance in said plane to modify an overlapping surface formed by portions of said conductive substance and said capacitive sensor which are superimposed;

(b) detecting a current induced by said high frequency signal in said capacitive sensor, said current having a value varying in a directly proportional relationship with said overlapping surface; and

(c) determining the value of the displacement of said conductive substance with respect to said capacitive sensor according to the value of said current.

The following references are relied on by the examiner:

Lalonde et al. (Lalonde)	4,675,670	Jun.
23, 1987		
Andermo	4,959,615	Sep. 25,
1990		

Appeal No. 95-1994  
Application 07/732,493

Claims 1 to 12 stand rejected under 35 U.S.C. § 103. As evidence of obviousness, the examiner relies upon Lalonde in view of Andermo.

Rather than repeat the positions of the appellants and the examiner, reference is made to the briefs and the answers for the respective details thereof.

#### OPINION

For all the reasons expressed by the examiner in the answers, and for the additional reasons presented here, we will sustain the prior art rejection of claims 1 to 5 and 7 through 10. Inasmuch as we are in agreement with the well-reasoned positions and legal-factual analysis of the teachings of the references done by the examiner, for the sake of brevity we will not repeat that which has been clearly set forth in the answer. To round out the examiner's detailed analysis of the claimed invention and appellants' arguments, we add the following, including our reasons for reversing the rejection of dependent claims 6, 11 and 12.

As noted earlier, the examiner's rejection is based in part upon Lalonde. This reference is discussed in detail as a

part of the prior art admitted by appellants and discussed at specification page 1, line 25 through page 3, line 20. Page 2 of the specification discusses in detail the formula  $C = KAr$  divided by  $D$ . Thus, the capacitance "C" of a sensor is determined by the product of the permittivity "K" and the overlapping surface area "Ar" of a conductive area with a sensor, divided by the distance "D" between the respective conductive area and the sensor. The sensor during its use itself forms a separate capacitor with the conductive surface which is grounded. The above equation is labeled equation (1).

The text at page 3 of the specification as filed at lines 8 through 20 states the following:

Equation (1) shows that for constant dielectric value K and overlapping surface Ar, the capacitance C, ..., varies according to the inverse of the distance D separating the sensor from the conductive part, making possible the mentioned method for dynamic and non-contact measurement of the distance between the nearest capacitive sensor plate from a conductive part and the conductive part.

Appeal No. 95-1994  
Application 07/732,493

As it can be easily seen,  
the apparatus can be similarly  
used to carry out the measurement  
of another variable parameter in  
equation (1), such as the  
permittivity K or the overlapping  
surface Ar for instance, as long  
as the other parameters are fixed  
(emphasis added).

The bottom of page 1 of the specification as filed indicates Lalonde functions in a manner to determine the distance separating the surfaces of two capacitive plates. The first paragraph quoted above explains how this is done according to the equation. It is done in such a manner that certain parameters are held constant according to the equation such as to determine the unknown variable "D". The above quoted second paragraph indicates that other parameters may be determined from the equation such as permittivity K or the overlapping surface area Ar as long as the other respective parameters of the equation remain fixed or constant. Page 2 of the specification as filed indicates clearly that the earlier reproduced equation in this opinion is a known equation in the capacitive sensing art.

Appeal No. 95-1994  
Application 07/732,493

In our view, the examiner correctly relies upon this equation and the statement of the ability of the artisan to determine other parameters from the second above quoted paragraph to indicate to the artisan the desirability of modifying the Lalonde function not to sense distance  $D$  but to sense displacement or permittivity. Andermo, on the other hand, is properly relied upon in our view to indicate that it was known in the art to determine other parameters in a capacitance-type measuring transducer when the distance has been fixed. Andermo includes an extensive discussion of the desirability of fixing the distance to increase the accuracy of the measurement. In fact, displacement sensing is suggested in the discussion at col. 1, lines 24 through 31 of Andermo. It is clear to us that appellants' disclosed and claimed invention operates under the principles of the above noted equation and the determination of other parameters is based upon basic algebraic manipulations as correctly argued by the examiner.

Moreover, we note that in Para-Ordnance Mfg., Inc. v. SGS Importers Int'l, Inc., 73 F.3d 1085, 1090, 37 USPQ2d 1237, 1240-41 (Fed. Cir. 1995), cert. denied, 117 S. Ct. 80 (1966),

Appeal No. 95-1994  
Application 07/732,493

the court emphasized that the artisan's own common sense analysis of the specific prior art relied upon may be properly coupled with his or her own experience and general knowledge of the prior art. A reference must be considered not only for what it expressly teaches, but also for what it fairly suggests. In re Burckel, 592 F.2d 1175, 1179, 201 USPQ 67, 70 (CCPA 1979) and In re Lamberti, 545 F.2d 747, 750, 192 USPQ 278, 280 (CCPA 1976). Not only the specific teachings of a reference but also reasonable inferences which the artisan would have logically drawn therefrom may be properly evaluated in formulating a rejection. In re Preda, 401 F.2d 825, 826, 159 USPQ 342, 344 (CCPA 1968) and In re Shepard, 19 F.2d 194, 197, 138 USPQ 148, 150 (CCPA 1963). Skill in the art is presumed. In re Sovish, 769 F.2d 738, 743, 226 USPQ 771, 774 (Fed. Cir. 1985). The conclusion of obviousness may be made from common knowledge and common sense of a person of ordinary skill in the art without any specific hint or suggestion in a particular reference. In re Bozek, 416 F.2d 1385, 1390, 163 USPQ 545, 549 (CCPA 1969).

Appellants' apparent focus upon alleged structural incompatibility of Andermo and Lalonde forces them to lose

sight of the teaching value of Andermo. With respect to the above noted equation, Andermo clearly teaches that the D or distance should remain fixed to improve accuracy of the readings in capacitive-type sensors. The gap between the sensing scales 20 and 30 should be uniform over the entire area of the overlap. Column 1, lines 59 to 65. Note also col. 4, lines 16 through 20 as well as col. 5, lines 48 through col. 6, line 1. The focus of Andermo's teachings is such as to minimize the tilt represented by Fig. 2F. Andermo's discussion also indicates from Fig. 2A and Fig. 2E that lateral displacement can adversely affect the accuracy of the readings. Rather than teaching away as argued by appellant, Andermo's Fig. 2E actually teaches the artisan that which is clearly evident in the above noted formula that the overlapping surface area  $A_r$  in the equation actually does in fact measurably affect measurably the reading values obtained from a capacitive sensor. Thus, this would have clearly indicated to the artisan that displacement of the respective scales 20 and 30 in a lateral sense may itself be a measurable item as long as the other parameters of the equation are held

Appeal No. 95-1994  
Application 07/732,493

constant as noted earlier at page 3 of the prior art noted in appellants' specification as filed.

We therefore conclude that the examiner has properly weighed in substance the various teachings of the prior art applied in light of Para-Ordnance Mfg., Inc. v. SGS Importers Int'l, Inc., 73 F.3d 1085, 1090, 37 USPQ2d 1237, 1240-41 (Fed. Cir. 1995), cert. denied, 117 S. Ct. 80 (1966), which relied upon In re Gurley, 27 F.3d 551, 553, 31 USPQ2d 1130, 1131 (Fed. Cir. 1994) and In re Young, 927 F.2d 588, 591, 18 USPQ2d 1089, 1091 (Fed. Cir. 1991).

Appellants' reliance upon In re Rijckaert, 9 F.3d 1531, 28 USPQ2d 1955 (Fed. Cir. 1993), is inapposite. The prior art relied upon by the examiner here does in fact discuss and relate the claimed relationship of the variables of a known prior art equation in contrast to the fact situation in Rijckaert. We are also concerned here with method claims relating to the operation or functioning of a prior art device exemplified by the prior art to Lalonde relied upon by the examiner, which prior art also functions in accordance with the above noted admitted prior art equation. The structural

Appeal No. 95-1994  
Application 07/732,493

similarity of Lalonde to the claimed invention is noted by appellants at least at page 8 of principal Brief on appeal.

We have discussed earlier the teaching value of Andermo as indicating to the artisan that displacement of sensing plates may be sensed in accordance with the sensitivity of Andermo's device to lateral displacements. On the other hand, in accordance with the above noted equation, permittivity,  $K$ , is defined at page 2 of appellants specification noting this equation as a prior art equation as being relative permittivity of the dielectric substance between the nearest sensor plate from the conductive part and another conductive part. Hence the subject matter of independent claim 7 requires the permittivity of the dielectric substance to be measured between the structural elements recited in this claim in accordance with the above equation.

Furthermore, in light of this understanding, we do not agree with appellant's assertion at page 14 of the brief that the physical meaning of the variable  $A_r$  is not the same in both the equation noted at page 2 of appellants' specification relating to the prior art and of that which is set forth as it applies to the disclosed claimed invention herein. Rather

Appeal No. 95-1994  
Application 07/732,493

than referring to the surface of the sensor itself in Lalonde as argued at the bottom of page 14 of the principal Brief on appeal, the bottom of page 2 of appellants' specification as filed indicates that the term Ar is the overlapping surface of the conductive part on the sensor plate or, in other words, the overlapping surface of the conductive part with respect to the sensor plate.

In addition to the examiner's arguments with respect to claims 4 and 10 on appeal, we note that the teachings at the bottom of col. 4 of Lalonde indicate that the comb-shaped surfaces of a groove 15 in the embodiment shown in Fig. 2 would have indicated or suggested to the artisan plural sensors. In any event, such is clearly taught in Andermo.

Finally, as to the specifics of dependent claims 6, 11 and 12, we reverse the rejection as it applies to these claims. Although we recognize that the collective teachings of the references relied upon may or could have been modified to measure the fluid contained in a tank such as to measure displacement in claim 6 and permittivity in claim 11 as well as the more specific recitation in claim 12 of a conduit having a dielectric substance therein whose level of

Appeal No. 95-1994  
Application 07/732,493

contamination may be varied and therefore measured, such would not have been obvious to the artisan based upon the prior art relied upon. There is simply no evidence of record that the prior art would have utilized capacitive sensors to measure fluid levels or substances in the specific manner recited in these claims. Therefore, the rejection of claims 6, 11 and 12 must be reversed.

Inasmuch as appellants have not presented any arguments with respect to dependent claims 2, 3, 5, 8 and 9, they fall with our affirmance of the rejection of the respective independent parent claims 1 and 7. We therefore affirm the rejection of claims 1 to 5 and 7 to 10 under 35 U.S.C. § 103. However, we reverse the rejection of dependent claims 6, 11 and 12 under 35 U.S.C. § 103. Therefore, the decision of the examiner is affirmed-in-part.

Appeal No. 95-1994  
Application 07/732,493

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

JAMES D. THOMAS	)	
Administrative Patent Judge	)	
	)	
	)	
	)	BOARD OF PATENT
MICHAEL R. FLEMING	)	
Administrative Patent Judge	)	APPEALS AND
	)	
	)	INTERFERENCES
	)	
JAMES T. CARMICHAEL	)	
Administrative Patent Judge	)	

Appeal No. 95-1994  
Application 07/732,493

FOLEY and LARDNER  
Suite 500  
3000 K Street, N.W.  
Washington, DC 20007-5109