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17 results found for Tekscan, Inc

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Query language: en / de / fr

Filters:

Applicants: TEKSCAN INC



US006032542A

# United States Patent [19]

[11] **Patent Number:** **6,032,542**

**Warnick et al.**

[45] **Date of Patent:** **Mar. 7, 2000**

[54] **PREPRESSURED FORCE/PRESSURE SENSOR AND METHOD FOR THE FABRICATION THEREOF**

*Primary Examiner*—Joseph L. Felber  
*Attorney, Agent, or Firm*—Wolf, Greenfield & Sacks, P.C.

[75] Inventors: **Thomas Warnick**, Wilmington; **Boris Oreper**, Newton, both of Mass.

[57] **ABSTRACT**

[73] Assignee: **Tekscan, Inc.**, South Boston, Mass.

A pressure sensitive element or array is provided which includes at least one first conductor on a first substrate and at least one second conductor on a second substrate, with a first conductor and a second conductor intersecting adjacent to each other at a sensor point and a pressure sensitive material being between the first and second conductors at each such sensor point. A mechanism is also provided which applies a predetermined prepressure to the substrates at least at selected ones of the sensor points. The prepressure for a preferred embodiment is provided by joining the substrates with an air-tight seal around a periphery of at least the pressure point to which prepressure is to be applied and by creating a reduced pressure area between the substrates within the sealed periphery. For preferred embodiments, the reduced pressure is a substantial vacuum, causing substantially atmospheric pressure to be applied to the sensor points.

[21] Appl. No.: **09/102,290**

[22] Filed: **Jun. 22, 1998**

**Related U.S. Application Data**

[60] Provisional application No. 60/051,622, Jul. 7, 1997.

[51] **Int. Cl.<sup>7</sup>** ..... **G01L 1/04**

[52] **U.S. Cl.** ..... **73/862.627; 73/862.474**

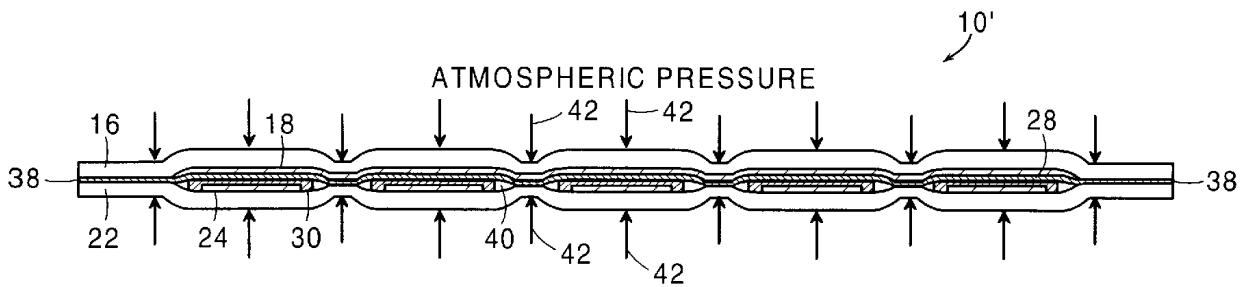
[58] **Field of Search** ..... 73/862.042, 862.044, 73/862.045, 862.046, 862.52, 862.627, 172, 862.473, 862.474, 862.68, 862.625, 777

[56] **References Cited**

**U.S. PATENT DOCUMENTS**

5,033,291 7/1991 Podoloff et al. .... 73/172

**13 Claims, 1 Drawing Sheet**





US006225814B1

(12) **United States Patent**  
**Oreper et al.**

(10) **Patent No.:** **US 6,225,814 B1**  
(45) **Date of Patent:** **May 1, 2001**

(54) **CONTACT WIDTH SENSORS**

(75) Inventors: **Boris Oreper**, Newton; **Mark Lowe**, Sharon; **Charles McWilliams**, Wellesley; **Charles Malacaria**, Medfield; **Anthony Coviello**, Tewksbury; **Jay Winters**, Andover, all of MA (US)

(73) Assignee: **Tekscan, Inc**, South Boston, MA (US)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/290,288**

(22) Filed: **Apr. 13, 1999**

(51) **Int. Cl.**<sup>7</sup> ..... **G01R 27/08**; G01L 1/16

(52) **U.S. Cl.** ..... **324/713**; 73/862.68

(58) **Field of Search** ..... 324/713, 421, 324/525; 73/862.68; 33/772

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

5,060,527 \* 10/1991 Burgess ..... 73/862.68

\* cited by examiner

*Primary Examiner*—Safet Metjahic

*Assistant Examiner*—J. Kerveros

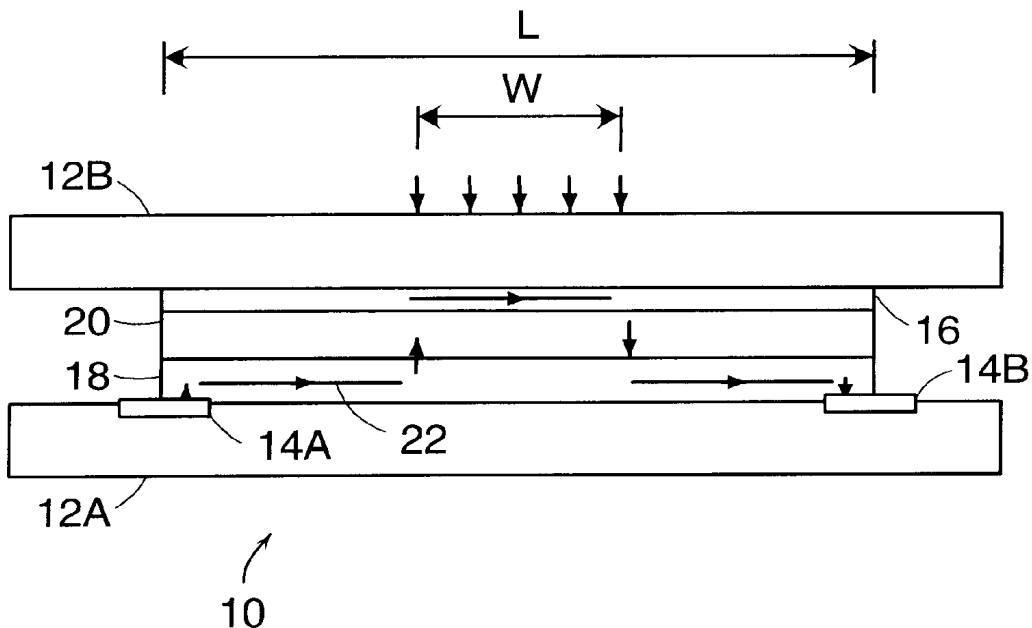
(74) *Attorney, Agent, or Firm*—Wolf, Greenfield & Sacks, P.C.

(57) **ABSTRACT**

This invention relates to apparatus for detecting the contact or nip width between two contacting surfaces. The apparatus

includes first and second insulating substrates each of which has a pattern of conductive material formed on a facing inner surface thereof, which substrates are adapted to be fitted between the contacting surfaces. For a first embodiment, the pattern of conductive material on one substrate includes a pair of conductive terminals spaced by a distance greater than the contact width to be measured and the conductive pattern on the other substrate includes a conductor which extends over at least a distance greater than the maximum width  $W$  to be measured. A resistance path is provided between the conductive terminals having a resistance  $R_0$  which is higher than that of the conductor and material is provided in the space between the conductor and the resistance path which material substantially permits current flow therethrough between the conductor and the resistance path in areas where the contacting surfaces are not in contact and which has a resistance less than  $R_0$  permitting current flow therethrough in areas where the contact surfaces are in contact. Circuitry is also provided for applying current to one of the terminals and for utilizing the difference in current flow between the terminals to determine contact width. For a second embodiment, the conductive pattern on one substrate includes  $N$  substantially parallel and evenly spaced conductive columns and the pattern on the other substrate is a plurality of substantially parallel and evenly spaced rows. The columns are divided into  $M$  groups, where  $M$  is an integer which is at least 2, and each of the rows is at an angle  $\theta$  to a line perpendicular to the columns when extending across alternate ones of the groups and at an angle  $-\theta$  when extending across the remaining groups. The number of columns in each group is selected to achieve a desired resolution, and  $\theta$  is selected so that the distance in the direction of the columns between the ends of a row for each group is substantially equal to the spacing between adjacent rows.

**12 Claims, 2 Drawing Sheets**





US 20050268699A1

(19) **United States**

(12) **Patent Application Publication**  
**Papakostas et al.**

(10) **Pub. No.: US 2005/0268699 A1**

(43) **Pub. Date: Dec. 8, 2005**

(54) **SENSOR WITH A PLURALITY OF SENSOR ELEMENTS ARRANGED WITH RESPECT TO A SUBSTRATE**

**Related U.S. Application Data**

(63) Continuation of application No. 10/748,718, filed on Dec. 30, 2003.

(75) Inventors: **Thomas Papakostas**, Boston, MA (US); **Christopher George**, Lynn, MA (US); **Charles Malacaria**, Medfield, MA (US); **Mark Lowe**, Sharon, MA (US)

**Publication Classification**

(51) **Int. Cl.<sup>7</sup>** ..... **G01M 3/08**

(52) **U.S. Cl.** ..... **73/46**

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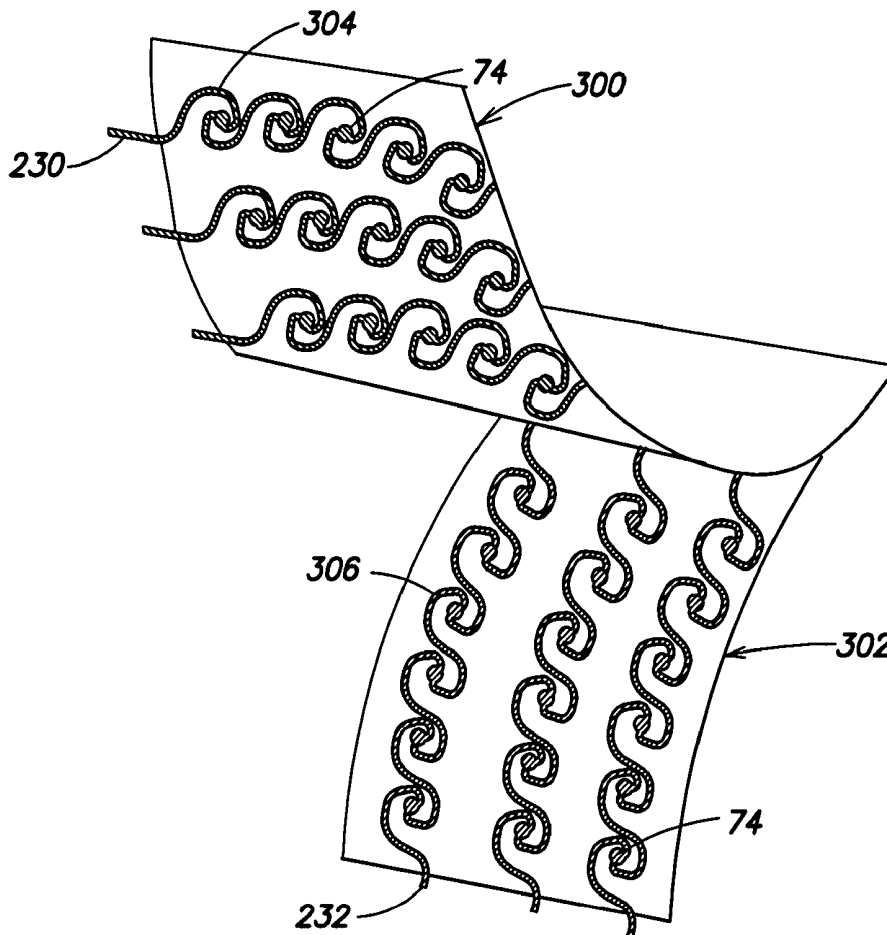
(57) **ABSTRACT**

A sensor for measuring a parameter applied to a surface is provided. The sensor includes at least one substrate layer, a plurality of individual sensor elements operatively arranged with respect to the substrate layer, and a conductive trace disposed on the substrate layer. The conductive trace is electrically coupled to an individual sensor element and wraps around at least a portion of the sensor element in a spiral-like manner. Further, by employing slits or cut-outs of material between sensor elements, a sensor element may move independent of an adjacent sensor element, thereby allowing the sensor to conform to an irregularly shaped surface or otherwise when subject to relatively large deflections. The sensor may be employed to detect force distribution of a seating surface, such as a seat cushion of a wheelchair.

(73) Assignee: **Tekscan, Inc.**, South Boston, MA

(21) Appl. No.: **11/178,994**

(22) Filed: **Jul. 11, 2005**





(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2006/0021418 A1**

**George et al.**

(43) **Pub. Date:**

**Feb. 2, 2006**

(54) **SENSOR EQUILIBRATION AND CALIBRATION SYSTEM AND METHOD**

(52) **U.S. Cl.** ..... 73/1.15; 73/1.58; 73/1.08

(75) **Inventors:** Christopher George, Lynn, MA (US); Charles Malacaria, Medfield, MA (US)

(57) **ABSTRACT**

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A system and method for equilibrating and calibrating a pressure or force sensor is provided. The system includes a flexible bag arranged to receive the sensor, and a vacuum source, connectable with the flexible bag, adapted to reduce the pressure within the flexible bag. By reducing the pressure within the flexible bag, such that the pressure inside of the bag is less than the pressure outside of the bag, the resultant uniform pressure acting on the sensor is used to calibrate and equilibrate the sensor. The system may include a porous material in the flexible bag to facilitate the evacuation of air from within the flexible bag as the pressure is reduced. The system may also include an opening, such that when the sensor is placed in the bag, a portion of the sensor extends outside of the bag to communicate with a controller. The opening may be provided either on the flexible bag, or on a clamp attached to the flexible bag. The system and method for calibrating and equilibrating a sensor may be employed to correct for sensor variations and/or to correlate sensor output to force or pressure.

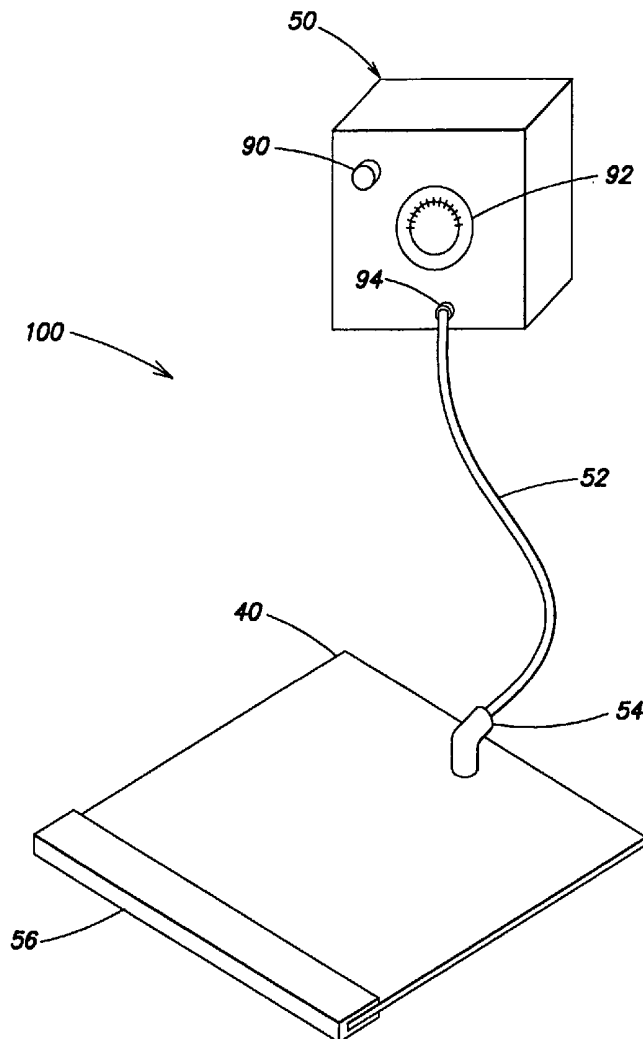
(73) **Assignee:** Tekscan Incorporated, South Boston, MA

(21) **Appl. No.:** 10/899,790

(22) **Filed:** Jul. 27, 2004

**Publication Classification**

(51) **Int. Cl.**  
**G01L 25/00** (2006.01)  
**G01L 27/00** (2006.01)





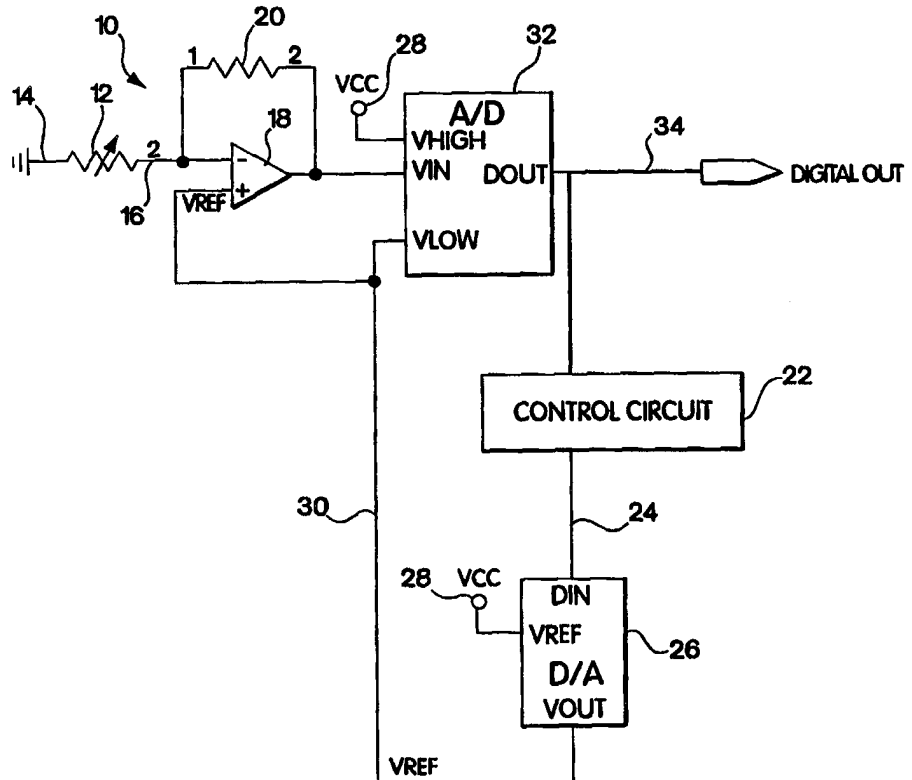
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification <sup>6</sup> : <b>G01L 1/18, 25/00</b></p>	<p><b>A1</b></p>	<p>(11) International Publication Number: <b>WO 99/05492</b> (43) International Publication Date: 4 February 1999 (04.02.99)</p>
<p>(21) International Application Number: PCT/US98/07450 (22) International Filing Date: 10 April 1998 (10.04.98) (30) Priority Data: 08/898,366 22 July 1997 (22.07.97) US (71) Applicant: TEKSCAN, INC. [US/US]; 307 West First Street, South Boston, MA 02127 (US). (72) Inventor: OREPER, Boris; 19 Broadlawn Park, Newton, MA 02167 (US). (74) Agent: KRANSDORF, Ronald, J.; Wolf, Greenfield &amp; Sacks, P.C., 600 Atlantic Avenue, Boston, MA 02210 (US).</p>	<p>(81) Designated States: JP, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).  <b>Published</b> <i>With international search report.</i> <i>With amended claims.</i></p>	

(54) Title: OUTPUT CIRCUIT FOR PRESSURE SENSOR

(57) Abstract

Circuit (10) has a variable pressure sensitive resistance sensor point (12) formed at the intersection of a first electrode (14) and a second electrode (16) which is connected to the negative input of an operational amplifier (18) which has its output connected through feedback resistor (20) to its negative input. Control circuit (22) generates a sensitivity control signal on line (24) which is applied to digital to analog converter (26) which is also connected to a fixed voltage reference source (28). Output line (30) provides an analog reference voltage (Vref) both to a positive input to operational amplifier (18) and to a ratiometric analog to digital converter (32) which is also connected to the output of operational amplifier (18). The digital output of the A/D (32) is connected both as an input to control circuit (22) and the output of circuit (10) on line (34).





US 20070234825A1

(19) **United States**

(12) **Patent Application Publication**  
**Loomis et al.**

(10) **Pub. No.: US 2007/0234825 A1**

(43) **Pub. Date: Oct. 11, 2007**

(54) **CONTROL CIRCUIT FOR SENSOR ARRAY AND RELATED METHODS**

**Publication Classification**

(75) Inventors: **Gary Loomis**, Leominster, MA (US); **Janet Lefko**, Brookline, MA (US); **Boris Dubinsky**, Newton, MA (US)

(51) **Int. Cl.**  
**G01L 1/22** (2006.01)  
(52) **U.S. Cl.** ..... **73/862**

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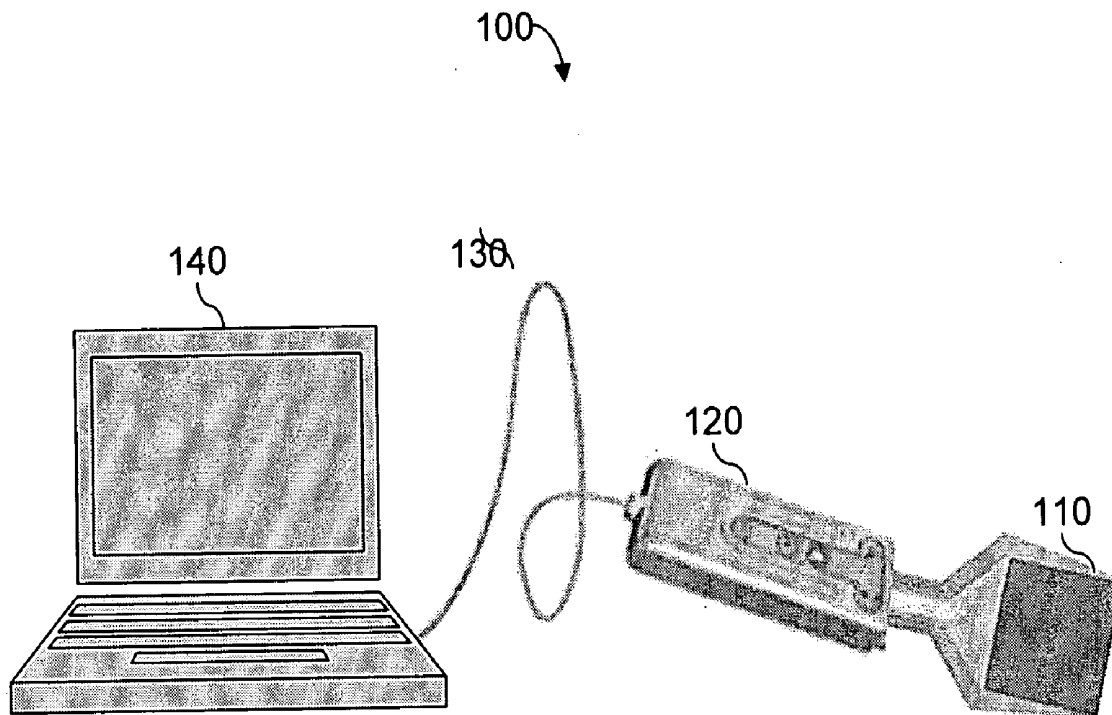
(57) **ABSTRACT**

A control circuit for scanning a pressure or force responsive sensor array is disclosed. Pressure or force sensors formed of an array of pressure or force responsive sensor elements can be used to acquire pressure or force measurements in response to an applied load. The control circuit can sample signals from the sensor elements to detect the pressure or force at one or more sensor elements of the sensor array. The circuit herein may provide for relatively faster scan rates. A user may define a subset or subsets of sensor elements of the sensor array to be scanned. Various methods and related circuitry for adjusting for sensor characteristics are also disclosed.

(73) Assignee: **Tekscan, Inc.**, South Boston, MA (US)

(21) Appl. No.: **11/392,210**

(22) Filed: **Mar. 29, 2006**



**(12) PATENT ABRIDGMENT (11) Document No. AU-B-71623/91**  
**(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 623578**

**(Modified Examination)**

- (54) Title  
**FLEXIBLE, TACTILE SENSOR FOR MEASURING FOOT PRESSURE DISTRIBUTIONS AND FOR GASKETS**
- International Patent Classification(s)  
(51)<sup>5</sup> **G01L 001/20**
- (21) Application No. : **71623/91** (22) Application Date : **11.12.90**
- (87) PCT Publication Number : **WO91/09289**
- (30) Priority Data
- (31) Number (32) Date (33) Country  
**448127 11.12.89 US UNITED STATES OF AMERICA**
- (43) Publication Date : **18.07.91**
- (44) Publication Date of Accepted Application : **14.05.92**
- (71) Applicant(s)  
**TEKSCAN, INC.**
- (72) Inventor(s)  
**ROBERT M. PODOLOFF; MICHAEL H. BENJAMIN; JAY WINTERS; ROBERT F. GOLDEN**
- (74) Attorney or Agent  
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- (56) Prior Art Documents  
**US 4856993**  
**US 4734034**  
**US 4503705**
- (57) Claim

1. A sensor for measuring external forces applied to opposite sides thereof, comprising:

a first plurality of flexible, conductive electrodes attached to and supported by a thin, flexible backing sheet made of an insulative material to provide a first set of electrodes;

a second plurality of flexible, conductive electrodes attached to and supported by a thin, flexible backing sheet made of an insulative material to provide a second set of electrodes;

the first and second electrode sets being positioned with the first and second electrodes facing one another and arranged so that the electrodes of the first set cross the electrodes of the second set at an angle to create a plurality of electrode intersections where electrodes in the first set cross electrodes in the second set, there being areas on said first and second electrode sets between electrode intersections;

a layer of pressure-sensitive resistive material applied to at least one of the electrode sets in a pattern such that the resistive material lies between the electrodes at each intersection;

an adhesive layer applied to at least one of the first and second electrode sets in said areas between the electrode intersections to

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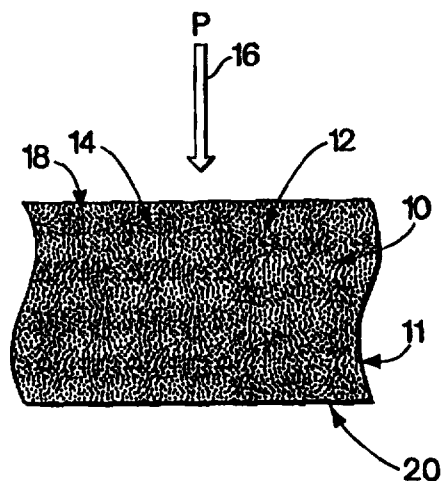
## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification<sup>6</sup> : C09D 4/00, G01L 1/20, H01C 10/20</p>	<p>A1</p>	<p>(11) International Publication Number: <b>WO 97/25379</b> (43) International Publication Date: 17 July 1997 (17.07.97)</p>
<p>(21) International Application Number: PCT/US96/19758 (22) International Filing Date: 11 December 1996 (11.12.96) (30) Priority Data: 08/583,444 5 January 1996 (05.01.96) US (71) Applicant: TEKSCAN, INC. [US/US]; 307 West First Street, South Boston, MA 02127 (US). (72) Inventor: KRIVOPAL, Boris; Apartment #202, 114 Strathmore Road, Brighton, MA 02146 (US). (74) Agent: SACKS, Stanley; Wolf, Greenfield &amp; Sacks, P.C., 600 Atlantic Avenue, Boston, MA 02210 (US).</p>	<p>(81) Designated States: AU, CA, DE, JP, KR, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).  <b>Published</b> <i>With international search report.</i></p>	

(54) Title: PRESSURE SENSITIVE INK MEANS, AND METHODS OF USE

(57) Abstract

Pressure sensitive inks have selected pressure sensitivity designed for use as a pressure sensitive component of a pressure sensitive device. The ink of the device is formed of an elastic polymer binder with a filler therefor of semiconductive nanoparticles preferably uniformly dispersed in the binder.



Document is not available for AU4280596A

Document is not available for AU2627988A

(12)

(21) 2 525 530

(22) 14.05.2004

(51) Int. Cl.:

G01L 1/20 (2006.01)

(85) 10.11.2005

(86) PCT/US04/015274

(87) WO04/102144

(30) 60/470,614 US 14.05.2003

(71) TEKSCAN, INC.,  
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(72) LIMA, JULIAN HOU (US).  
PAPAKOSTAS, THOMAS (US).

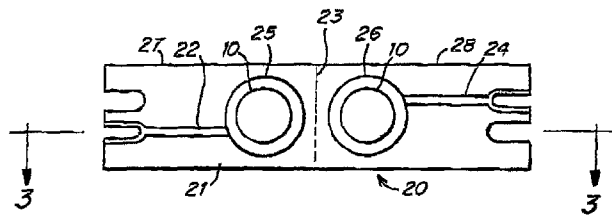
(74) OGILVY RENAULT LLP/S.E.N.C.R.L.,S.R.L.

(54) DISPOSITIFS SENSIBLES A LA PRESSION A HAUTE TEMPERATURE ET LEURS PROCÉDES

(54) HIGH TEMPERATURE PRESSURE SENSITIVE DEVICE AND METHOD THEREOF

(57)

A pressure sensitive device that provides a stable response to measure an applied force at temperatures greater than 150 °F (about 66 °C) is disclosed. The pressure sensitive device can have a conductivity of about 0.01 ~S to about 1300 ~S and a sensitivity of about 0.01 ~S/lb to about 300 ~S/lb (about 0.02 ~S/kg to about 660 ~S/kg) at about a temperature range of about -50 °F to over about 400 °F or 420 °F (about -45 °C to over about 205 °C or 216 °C). The pressure sensitive device can have a substrate of polyimide, conductive leads of silver dispersed in a polyhydroxy ether crosslinked with melamine formaldehyde, and a pressure sensitive layer of carbon nanoparticles dispersed in cured polyamic acid forming a polyimide.



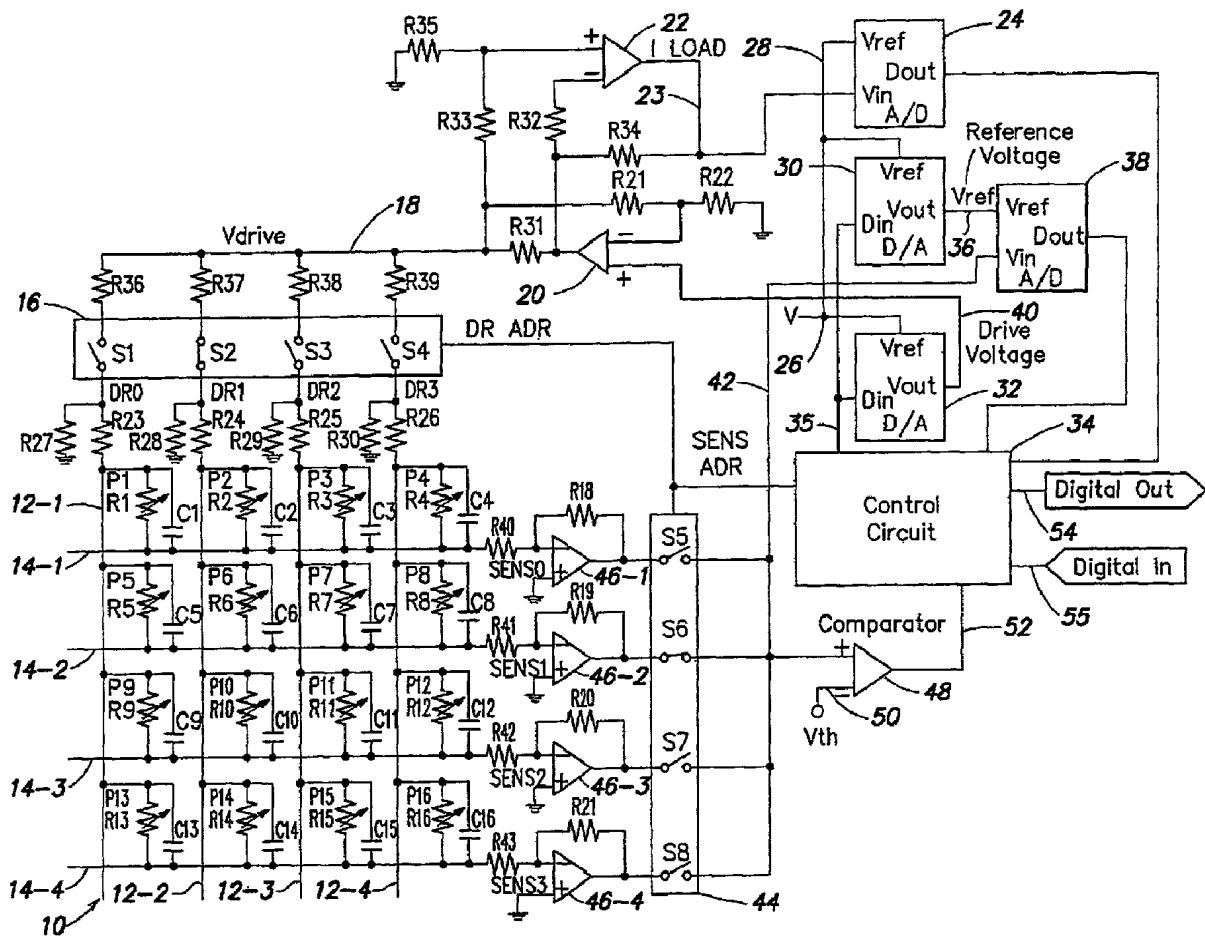
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(86) Date de dépôt PCT/PCT Filing Date: 2007/02/27  
 (87) Date publication PCT/PCT Publication Date: 2007/11/08  
 (85) Entrée phase nationale/National Entry: 2008/09/24  
 (86) N° demande PCT/PCT Application No.: US 2007/005120  
 (87) N° publication PCT/PCT Publication No.: 2007/126518  
 (30) Priorité/Priority: 2006/03/29 (US11/392,207)

(51) Cl.Int./Int.Cl. *G01L 1/20* (2006.01)  
 (71) Demandeur/Applicant:  
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 (72) Inventeurs/Inventors:  
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LEFKO, JANET, US;  
DUBINSKY, BORIS, US  
 (74) Agent: SMART & BIGGAR

(54) Titre : CIRCUIT DE COMMANDE DESTINE A UNE MOSAIQUE DE CAPTEURS ET PROCEDES ASSOCIES  
 (54) Title: CONTROL CIRCUIT FOR SENSOR ARRAY AND RELATED METHODS



(57) Abrégé/Abstract:

A control circuit for scanning a pressure or force responsive sensor array is disclosed. Pressure or force sensors formed of an array of pressure or force responsive sensor elements can be used to acquire pressure or force measurements in response to an





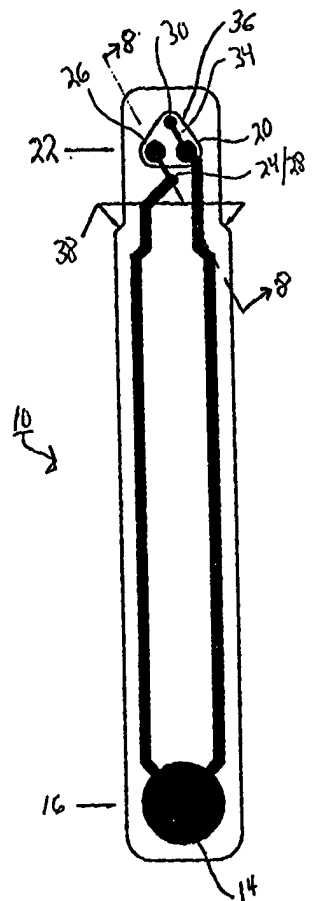
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification<sup>6</sup> : <b>G01L 1/20, A61B 5/22, A63B 23/16</b></p>	<p><b>A1</b></p>	<p>(11) International Publication Number: <b>WO 99/42798</b> (43) International Publication Date: 26 August 1999 (26.08.99)</p>
<p>(21) International Application Number: PCT/US99/02386 (22) International Filing Date: 3 February 1999 (03.02.99) (30) Priority Data: 09/027,129 20 February 1998 (20.02.98) US (71) Applicant: TEKSCAN, INC. [US/US]; 307 West First Street, South Boston, MA 02127 (US). (72) Inventors: OREPER, Boris; 19 Broadlawn Park, Newton, MA 02167 (US). BRENNEMAN, John; 120 Muron Avenue, Bellingham, MA 02019 (US). (74) Agent: KRANSDORF, Ronald, J.; Wolf, Greenfield &amp; Sacks, P.C., 600 Atlantic Avenue, Boston, MA 02210 (US).</p>		<p>(81) Designated States: JP, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). <b>Published</b> <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p>

(54) Title: GRIP FORCE MEASURING SENSOR

(57) Abstract

The pressure sensor assembly has at least one pressure sensor at its distal end, the pressure sensor having electrodes which are connected through spaced leads to output terminals at a proximal end of the assembly. The handle has a circuit board with a terminal corresponding to each output terminal on the sensor assembly, and a slot for receiving the proximal end of the sensor assembly and for aligning such assembly with each of its output terminals adjacent the corresponding terminal on the circuit board. The handle also includes a member for applying pressure to the sensor assembly and control means which operate in conjunction with the sensor-ok trace on a sensor assembly to detect when good electrical contact is being made between the terminals of the sensor assembly and the corresponding terminals of the handle circuit board, and for receiving and suitably outputting pressure measurements from the sensor.



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(12) 公開特許公報(A)

(11) 特許出願公開番号

特開2018-4640

(P2018-4640A)

(43) 公開日 平成30年1月11日(2018. 1. 11)

(51) Int. Cl. F I テーマコード (参考)  
 G O 1 L 5 / 0 0 ( 2 0 0 6 . 0 1 ) G O 1 L 5 / 0 0 1 O 1 Z 2 F O 5 1

審査請求 未請求 請求項の数 29 O L 外国語出願 (全 17 頁)

(21) 出願番号 特願2017-127558 (P2017-127558)  
 (22) 出願日 平成29年6月29日 (2017. 6. 29)  
 (31) 優先権主張番号 62/357, 039  
 (32) 優先日 平成28年6月30日 (2016. 6. 30)  
 (33) 優先権主張国 米国 (US)

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 弁理士 大貫 敏史

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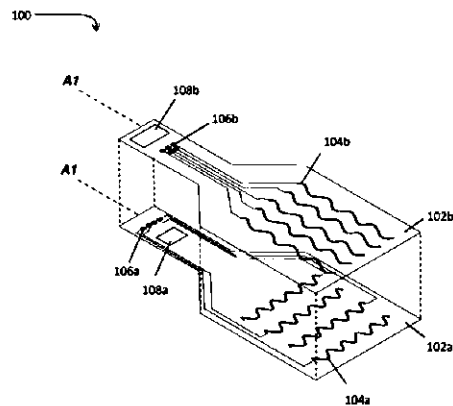
(54) 【発明の名称】 伸縮性力センサ

(57) 【要約】

【課題】電極の亀裂または破損なく、伸張できる、あるいは非平面の接触面に適合できるセンサを提供すること。

【解決手段】センサは、第1の層と第2の層とを含み、それぞれの層には、1つまたは複数の電極が繰り返しの波状パターンで配置されている。このような波状パターンは、蛇行状パターンまたは繰り返しのV字形パターンを含むことができる。配置されるとき、第1の層上の1つまたは複数の電極は、複数の電極交差点を形成するために、第2の層上の1つまたは複数の電極と対向する関係で設置され、かつ、第2の層上の1つまたは複数の電極を横断する。伸張されるとき、第1の層上の1つまたは複数の電極は、新しい電極交差点を生じさせながら、第2の層上の1つまたは複数の電極に対して移動する。

【選択図】 図2



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