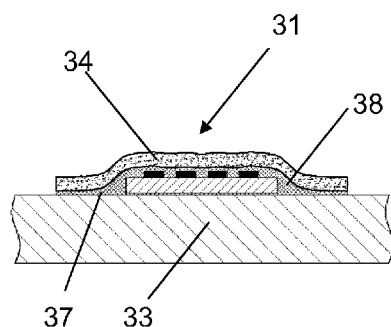




- (51) **International Patent Classification:**
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- (74) **Agent: METTLER-TOLEDO IP DEPARTMENT**; Im Langacher 44, 8606 Greifensee (CH).
- (81) **Designated States** (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.
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- Declarations under Rule 4.17:**
— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
- Published:**
— *with international search report (Art. 21(3))*
— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*
- (88) **Date of publication of the international search report:**
16 April 2020 (16.04.2020)

(54) **Title:** MOISTURE-INSULATED STRAIN GAUGE AND METHOD OF INSULATING A STRAIN GAUGE AGAINST MOISTURE PENETRATION

FIGURE 10



(57) **Abstract:** A strain gauge (12, 21A, 21B, 25A, 25B, 31, 35, 41, 45) and method of manufacturing a strain gauge (12, 21A, 21B, 25A, 25B, 31, 41, 35, 45) against moisture penetration comprises or includes the step of producing a coated base or cover layer (14, 34, 44) by forming a moisture barrier coating (17) on the surface the latter.



INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2019/073246

A. CLASSIFICATION OF SUBJECT MATTER
INV. G01L1/22 G01L1/26
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
G01L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 3 358 292 A1 (MINEBEA MITSUMI INC [JP]) 8 August 2018 (2018-08-08) abstract paragraphs [0013], [0023], [0056], [0060] figure 1	1-16
A	----- DE 299 22 560 U1 (FRAUNHOFER GES FORSCHUNG [DE]) 16 March 2000 (2000-03-16) abstract paragraph [0022]	1,4,7,11
A	----- EP 0 667 514 A2 (HOTTINGER MESSTECHNIK BALDWIN [DE]) 16 August 1995 (1995-08-16) figure 1 ----- -/--	2,8

Further documents are listed in the continuation of Box C.

See patent family annex.

- * Special categories of cited documents :
- | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> | <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&" document member of the same patent family</p> |
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Date of the actual completion of the international search 5 March 2020	Date of mailing of the international search report 16/03/2020
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Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Grewe, Clemens F.
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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2019/073246

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2016/019223 A1 (WESTERN MICHIGAN UNIVERSITY RES FOUNDATION [US]) 4 February 2016 (2016-02-04) paragraph [0056]	12-14
A	----- US 4 015 326 A (BREWER GIVEN A) 5 April 1977 (1977-04-05) abstract figures 1-3	12-14
A	----- US 3 599 139 A (LOW MALCOLM E) 10 August 1971 (1971-08-10) abstract; figures 1-4 -----	12-14

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2019/073246

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-11

Invention 1 according to claims 1-11 solves the problem of how to improve the mechanical protection of strain gauge,

2. claims: 12-16

Invention 2 according to claims 12-16 solves the problem of providing for a method of installing a strain gauge.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/EP2019/073246

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 3358292	A1	CN 108139196 A	08-06-2018
		EP 3358292 A1	08-08-2018
		JP 2017067764 A	06-04-2017
		JP 2019164161 A	26-09-2019
		US 2018217016 A1	02-08-2018

DE 29922560	U1	NONE	

EP 0667514	A2	DE 4404716 A1	17-08-1995
		EP 0667514 A2	16-08-1995
		JP H0835808 A	06-02-1996
		US 5631622 A	20-05-1997

WO 2016019223	A1	CA 2955373 A1	04-02-2016
		EP 3195337 A1	26-07-2017
		JP 2017531306 A	19-10-2017
		US 2017213648 A1	27-07-2017
		WO 2016019223 A1	04-02-2016

US 4015326	A	NONE	

US 3599139	A	NONE	
