# 

# (11) **EP 3 686 013 A3**

(12)

# **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3: 09.09.2020 Bulletin 2020/37

(51) Int Cl.: **B41J 2/045** (2006.01)

B41J 2/14 (2006.01)

(43) Date of publication A2: 29.07.2020 Bulletin 2020/31

(21) Application number: 19198472.3

(22) Date of filing: 19.09.2019

(84) Designated Contracting States:

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

Designated Extension States:

**BA ME** 

**Designated Validation States:** 

KH MA MD TN

(30) Priority: 19.09.2018 JP 2018174369

28.02.2019 JP 2019036737

(71) Applicant: Seiko Epson Corporation Tokyo 160-8801 (JP)

(72) Inventor: MATSUMOTO, Yusuke Suwa-shi, Nagano 392-8502 (JP)

(74) Representative: Miller Sturt Kenyon

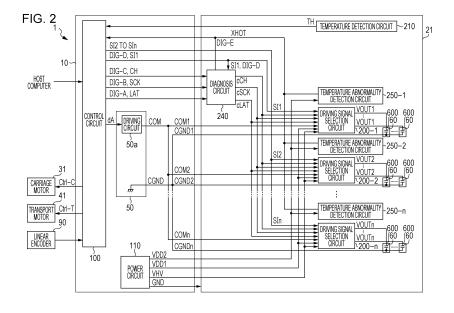
9 John Street

London WC1N 2ES (GB)

#### (54) PRINT HEAD CONTROL CIRCUIT, PRINT HEAD, AND LIQUID DISCHARGE APPARATUS

(57) A print head control circuit controls an operation of a print head including a diagnosis circuit that diagnoses whether or not normal discharge of a liquid is possible. The print head control circuit includes a first cable including a first diagnosis signal propagation wiring for propagating a first diagnosis signal, a second diagnosis signal propagation wiring for propagating a third diagnosis signal propagation wiring for propagating a third diagnosis signal, a fourth diagnosis signal propagation wiring for propagating a fourth diagnosis signal, and a first driving signal propagation wiring

for propagating a driving signal. A shortest distance between the first driving signal propagation wiring and the diagnosis circuit is longer than a shortest distance between the first diagnosis signal propagation wiring and the diagnosis circuit, longer than a shortest distance between the second diagnosis signal propagation wiring and the diagnosis circuit, longer than a shortest distance between the third diagnosis signal propagation wiring and the diagnosis circuit, and longer than a shortest distance between the fourth diagnosis signal propagation wiring and the diagnosis circuit.



EP 3 686 013 A3



# **PARTIAL EUROPEAN SEARCH REPORT**

Application Number

under Rule 62a and/or 63 of the European Patent Convention. This report shall be considered, for the purposes of subsequent proceedings, as the European search report

EP 19 19 8472

	DOCUMENTS CONSID	ERED TO BE RELEVANT		
Category	Citation of document with in of relevant pass	ndication, where appropriate, ages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	ET AL) 4 September	KAMEYAMA HIROAKI [JP] 2014 (2014-09-04) , [0024], [0027],	1-10	INV. B41J2/045 B41J2/14
(	US 2017/173950 A1 ( 22 June 2017 (2017- * figures 2,13-16 *		1-7,10	
<b>'</b>	WO 2017/111065 A1 ( 29 June 2017 (2017- * paragraph [0158];	SEIKO EPSON CORP [JP]) -06-29) - figures 7,8 *	1,8,9	
				TECHNICAL FIELDS SEARCHED (IPC)
INCOI	MPLETE SEARCH			
The Searc	ch Division considers that the present y with the EPC so that only a partial s			
Claims se	arched completely :			
Claims se	arched incompletely :			
Claims no	t searched :			
Reason fo	or the limitation of the search:			
see	sheet C			
	Place of search	Date of completion of the search		Examiner
	The Hague	27 July 2020	Özt	ürk, Serkan
X : part Y : part docu	ATEGORY OF CITED DOCUMENTS ioularly relevant if taken alone ioularly relevant if oombined with anot unent of the same category nological background	I underlying the istument, but publise the application of the reasons	L  Inderlying the invention Ident, but published on, or  e application	
O:non	-written disclosure rmediate document	, corresponding		



5

## INCOMPLETE SEARCH SHEET C

**Application Number** 

EP 19 19 8472

Claim(s) completely searchable: 10 Claim(s) not searched: 11, 12 Reason for the limitation of the search: 15 Independent apparatus claims 1, 11 and 12 do not comply with Rule 43(2) EPC. In reply to the invitation to indicate the claims on which the search is to be based, the applicant failed to supply the requested indication in due time. Thus, the search report has been drawn up on the basis of the first 20 independent claim of each category (Rule 62a(1) EPC), namely claim 1 and the claims dependent thereon. 25 30 35 40 45 50 55

## EP 3 686 013 A3

#### ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

EP 19 19 8472

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

27-07-2020

10	Patent document cited in search report	Publication date	Patent family member(s)	Publication date
15	US 2014247299 A	1 04-09-2014	CN 104015480 A JP 6027918 B2 JP 2014168874 A US 2014247299 A1	03-09-2014 16-11-2016 18-09-2014 04-09-2014
20	US 2017173950 A	1 22-06-2017	CN 106994828 A CN 109130506 A JP 6447828 B2 JP 2017113927 A KR 20170074808 A US 2017173950 A1 US 2018297361 A1	01-08-2017 04-01-2019 09-01-2019 29-06-2017 30-06-2017 22-06-2017 18-10-2018
25	WO 2017111065 A	1 29-06-2017	CN 108472949 A EP 3393809 A1 JP 6387955 B2 JP 2017114019 A SG 112018053280 A TW 201726432 A	31-08-2018 31-10-2018 12-09-2018 29-06-2017 30-07-2018 01-08-2017
30			TW 201825301 A US 2019009527 A1 WO 2017111065 A1	16-07-2018 10-01-2019 29-06-2017
35				
40				
45				
50 6900d WEGO				
55 g				

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82