



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 1 022 143 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
26.07.2000 Bulletin 2000/30

(51) Int. Cl.⁷: **B41J 2/175**

(21) Application number: **00100990.1**

(22) Date of filing: **19.01.2000**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **20.01.1999 JP 1188999**

(71) Applicant: **NEC Corporation**
Minato-ku, Tokyo 108-01 (JP)

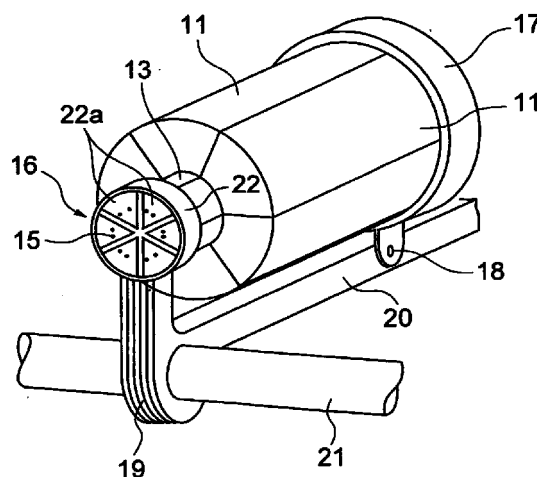
(72) Inventor:
Suzuki, Kiyoshi,
c/o NEC Corporation
Tokyo 108-01 (JP)

(74) Representative:
von Samson-Himmelstjerna, Friedrich R., Dipl.-
Phys. et al
SAMSON & PARTNER
Widenmayerstrasse 5
80538 München (DE)

(54) **Ink jet ink cartridges in the form of segments which may be combined into a compact generalised right cylindrical shape**

(57) An ink-jet printer comprising: a plurality of ink cartridges (11) formed as pillar-shaped ink tanks integrated with one another by a retention mechanism; and a recording head (16) ejecting color inks supplied from the ink cartridges (11). Since each of the ink tanks corresponding to each of colors can be individually replaced with a new ink tank, only the depleted ink tank can be replaced to improve the economical efficiency. Further, the incorporation of the plurality of the ink tanks enables the whole ink cartridge (11) more compact.

FIG. 1



EP 1 022 143 A1

Description

BACKGROUND OF THE INVENTION

(a) Field of the Invention

[0001] The present invention relates to an ink-jet printer, more in detail to an ink cartridge and a retention structure in the ink-jet printer.

(b) Description of the Related Art

[0002] Non-impact recording methods attracting a great deal of attention are excellent in that a noise generated during the recording is negligibly small. Among the non-impact recording methods, an ink-jet recording method has advantages that a rapid recording can be performed directly on a recording medium by employing a simple mechanism and the recording is convenient because ordinary paper may be employed as the recording medium.

[0003] Various procedures for conducting the ink-jet recording method have been proposed. One of the proposed recording procedures is conducted by adhering ink droplets ejected from a recording head on recording paper for recording letters and drawings. The recording procedure can advantageously perform the recording on the ordinary paper without a special fixing treatment in addition to the rapid recording. Accordingly, various ink-jet printers employing the ink-jet recording procedure are proposed and commercialized.

[0004] A color printer among the above ink jet printers includes an ink cartridge accommodating, for example, four color inks such as cyan, magenta, yellow and black, and the printing is conducted by ejecting the inks supplied from the ink cartridge through nozzles. The ink-jet printer, however, has a drawback in that the respective color inks are not simultaneously consumed and the cartridges are replaced with new cartridges when one of the inks most frequently consumed is depleted.

[0005] In order to improve the replacement efficiency, an ink-jet printer is proposed (a first conventional example) in which a plurality of colors are individually accommodated in the respective ink cartridges and only the depleted ink cartridge is replaced. In this ink-jet printer, the respective box-like ink tanks are arranged in a transverse direction to form a unified multiple-color cartridge, and thus supply lengths to the recording head from a central ink tank and from an outermost ink tank are different from each other.

[0006] A color ink-jet printing apparatus including a plurality of recording heads each corresponding to each of the respective ink cartridges is described in JP-A-8(1996)-90788 (a second conventional example). In this publication, the supply lengths to the recording head from a central ink tank and from an outermost ink tank are substantially the same.

[0007] The box-like ink cartridges arranged in the transverse direction to form the unified multiple-color cartridge, as in the first and the second conventional examples, have lesser external dimensions, which make the printer large-scaled. Further, in the first conventional example, a high accuracy of dimensions is required due to the different supply lengths from the ink tanks to the recording head when the respective ink supply paths are formed.

[0008] In the structure wherein the four recording heads arranged in the transverse direction move reciprocally in the direction perpendicular to the movement of recording paper, as in the second conventional example, one of the recording heads positioned at one outermost end must move a marginal space so that another of the recording head positioned at the other outermost end prints at the corresponding edge of the sheet. This necessitates a marginal space for one of the two outermost recording heads. Since the distance between the two outermost recording heads increases in the printer with the increase of the number of colors (four colors, six colors and eight colors), the space for the movement of the recording heads is further increased to make the apparatus larger-scaled.

[0009] In addition, because of the long distance between the two outermost recording heads in the second conventional example, there arise variations of positions where the recording heads eject the inks, although a high printing accuracy is required in the relative location for the succeeding dots.

SUMMARY OF THE INVENTION

[0010] In view of the foregoing, an object of the present invention is to provide an ink-jet printer wherein only a depleted ink cartridge is replaceable, the external dimensions of a unified multi-color ink cartridge being reduced and wherein ink-supply paths to a recording head of every ink cartridge are unified.

[0011] Another object of the present invention is to provide the ink-jet printer which can suppress the variations ejecting positions for every recording head by reducing a distance between outermost recording heads as much as possible without requesting a high accuracy of printing in addition to achieving the above purpose.

[0012] The present invention provides an ink-jet printer including a plurality of ink cartridges, a retention mechanism for retaining the ink cartridges and a recording head, mounted on a head carriage, for ejecting color inks supplied from the respective ink cartridges, the ink cartridges being retained by the retention mechanism to form a pillar shape as a whole.

[0013] In accordance with the ink-jet printer of the present invention, the plurality of the ink cartridges can be entirely retained in the nearly circular pillar or the nearly polygonal pillar shape while only a specified ink cartridge or only a depleted ink cartridge can be

replaced by means of a procedure using a specified retention mechanism. Thereby, the external dimensions of the incorporated ink cartridges can be reduced. Further, the ink-jet printer can be manufactured with a high dimensional accuracy because lengths of ink supply paths to the recording head and positions thereof can be unified in each of the ink cartridges by providing the recording head around the center of the incorporated ink cartridges retained in the nearly circular pillar or the nearly polygonal pillar shape.

[0014] The above and other objects, features and advantages of the present invention will be more apparent from the following description.

BRIEF DESCRIPTION OF DRAWINGS

[0015]

Fig. 1 is a perspective view seen from beneath showing a printing unit including ink cartridges of an ink-jet printer of a first embodiment of the present invention.

Fig. 2 is an elevational side view partly in section of the recording unit of Fig. 1.

Fig. 3 is a perspective view showing the single ink cartridge in the recording unit of Figs. 1 and 2.

Fig. 4 is a perspective view showing incorporated six ink cartridges.

Fig. 5 is an elevational front view showing a recording head.

Fig. 6 is a perspective view showing an end cap.

Fig. 7 is a schematic elevational view showing a modified example of the ink cartridges of the first embodiment.

Fig. 8 is a schematic elevational view showing another modified example thereof.

Fig. 9 is a perspective view showing the single ink cartridge of the second embodiment.

Fig. 10 is a front elevational view showing the retained ink cartridges of the second embodiment.

PREFERRED EMBODIMENTS OF THE INVENTION

[0016] Now, the present invention is more specifically described with reference to accompanying drawings.

First Embodiment

[0017] An ink-jet printer shown in Fig. 1 includes a guide shaft 21 horizontally supported along a printing apparatus (not shown) and a head carriage 20 making a reciprocating motion along the guide shaft 21 by means of the power of a motor (not shown). The head carriage 20 has a pair of arms coupled in letter "L" and the guide shaft 21 slidably penetrates a portion where the two arms of the head carriage 20 are coupled.

[0018] Power supply cables 19 are disposed along

the "L" shaped head carriage 20, and a recording head 16 is mounted on one end of the head carriage 20. An end cap (a second retention member) 17 is rotatably or pivotally supported at the other end of the head carriage 20. The recording head 16 includes a first retention member 22 engaged with front guides 13. Between the retention member 22 and the end cap 17 are disposed six color ink cartridges 11 which are supported and integrated to form a circular pillar as a whole.

[0019] Referring to Fig. 2, the first retention member 22 disposed on the recording head 16 has nozzles 15 penetrating therethrough. The end cap 17 pivotally rotates around a support axis 18 for detachable engagement with the ink cartridges 11.

[0020] A single element of the ink cartridges 11 is shown in Fig. 3. Since the present embodiment is directed to the six-color ink-jet printer, the main part of the ink cartridge 11 exhibits a sector in cross-section having a central angle of $\theta = 60^\circ$, which is obtained by equally dividing the pillar-like ink cartridge 11 around a central axis "A" (Fig. 4) by six. The divided angle θ of the ink cartridge 11 increases or decreases depending on the number of color inks employed.

[0021] The body of the ink cartridge 11 has the front guide 13 formed as a forward projection projecting from the central portion of the pillar cartridge and a rear guide 14 formed as a backward projection. The front guide 13 and the rear guide 14 determine the position when the ink cartridge 11 is mounted on the head carriage 20. An ink supply port 12 is formed for each of colors on the front end surface of the front guide 13. The ink supply port is positioned corresponding to the nozzle 15 of the recording head 16 when it is mounted on a printing unit.

[0022] The six ink cartridges 11 having the divided angle of 60° per one color shown in Fig. 3 are tightly incorporated around the central axis "A" to exhibit the pillar shape as a whole as shown in Fig. 4.

[0023] The recording head 16 shown in Fig. 5 includes the disc-like first retention member 22 and a plurality of the nozzles 15 circumferentially disposed for ejecting the inks supplied from the ink supply openings 12. The retention member 22 includes six sector members 22a each engaged with the respective front guide sectors 13 of the six ink cartridges 11 incorporated to make the pillar shape.

[0024] The disc-like end cap 17 shown in Fig. 6 includes six sectorial retention parts 23 each located in six parts around the central axis (Fig. 4). Each of the retention parts 23 corresponds to each of the rear guides 14 having the sector, and is engaged with each of the rear guides 14 of the respective ink cartridges 11 of which the incorporated front guides 13 are engaged with the first retention member 22 when the end cap 17 is rotated around the support axis 18.

[0025] Then, the operation of the ink-jet printer of the present embodiment will be described. When printing data are supplied from a computer, or a higher rank

apparatus, to the ink-jet printer, the ink cartridge 11 mounted on the printing unit (Fig. 1) ejects the ink from the nozzles 15 of the recording head 16 toward recording paper to conduct the printing in accordance with the printing data while the head carriage 20 reciprocally moves in a direction along the guide shaft 21.

[0026] If one of the six ink cartridges 11 is depleted, the ink cartridge is replaced with a new ink cartridge. In order to conduct the replacement, the end cap 17 is rotated clock-wise in Fig. 2 to release the rear guides 14 of each of the ink cartridges 11 from the corresponding retention parts 23 of the end cap 17. In this situation, only the depleted ink cartridge 11 is pulled out from the retention part 22a of the first retention member 22.

[0027] Then, the front guide of a fresh ink cartridge is pressed into the empty retention part 22a to determine and fix its position. The end cap 17 is rotated counterclockwise in Fig. 2 while the incorporated six ink cartridges 11 are secured to engage the retention parts 23 of the end cap 17 with the rear guides 14 of the corresponding ink cartridges 11. Upon the completion of the engagement, the printing can be similarly performed by employing the ink cartridge 11 having the newly mounted fresh ink cartridge.

[0028] As described, in the present embodiment, only the depleted ink cartridge 11 can be individually replaced with the fresh one because the ink cartridge is divided depending on the number of the colors. Thereby, a problem can be resolved that all the cartridges are replaced even when only one color ink is depleted, thereby to improve the economical efficiency. Since a plurality of the ink cartridges having the same or similar dimension are commonly employed for each of the colors, the management of the dimension of only one cartridge enables the management of all colors. Since all the six ink cartridges 11 may be incorporated and retained as the pillar-like shape, the external size of the multiple color unified cartridge formed by the respective ink cartridges 11 can be kept smaller. Since the recording head 16 is disposed around the center of the ink cartridge 11, the lengths of the ink supply paths and the positions thereof can be unified in each of the ink cartridges 11 and the ink cartridge 11 can be manufactured with a high dimensional accuracy.

[0029] The ink cartridge may be modified to have a variety of shapes. An ink cartridge 11a shown in Fig. 7 is formed as an ink tank including a square section having two joining surfaces at right angles to each other. The four ink tanks are joined among one another to make a four-sided pillar having a circular pillar formed by four front guides 13a on the center thereof.

[0030] An ink cartridge 11b shown in Fig. 8 is formed as an ink tank including an equilateral triangular section having two joining surfaces at an angle of 60° to each other. The six ink tanks are joined among one another to make a six-sided pillar having a circular pillar formed by six front guides 13b on the center thereof.

[0031] These four and six-sided pillars or even a pil-

lar having more sides, for example, an eight-sided pillar can produce similar effects to those obtained by the ink cartridge 11 having the circular pillar shape. The four, six and eight pillars can be employed corresponding to four colors, six colors and eight colors, respectively.

[0032] In the present embodiment, the external size remains unchanged with the increase of the number of colors, that is, four colors, six colors to eight colors because only the number of equal-angled division of the circular pillar or the polygonal pillar is changed. Accordingly, no marginal change is generated during the movement of the recording head to produce no disadvantages such that the apparatus becomes large-scaled with the increase of the number of colors.

[0033] Since, in a conventional nozzle head, an interconnect (a circuit pattern corresponding to a recording head) formed of an expensive material such as a polyimide film is integrally formed with the recording head and the circuit pattern is scrapped together with the recording head, no decrease of a running cost can be realized in this part. On the other hand, in the present embodiment, the nozzles 15 formed on the head carriage 20 side enable the replacement of only the ink tanks themselves not to scrap the circuit pattern further employable to decrease the running cost.

[0034] Further in the present embodiment, since the plurality of the ink cartridges 11 are retained to be the circular pillar shape or the polygonal pillar shape, the ink cartridges 11 can be made more compact by suitably reducing the size of the nozzles or the openings 12 concentrated on the central part. An amount of ink chargeable in the ink tank can be adjusted by elongating the shape of the ink tank in a direction of its axis. During the adjustment, the change of the ink tank shape can be dealt with by horizontally moving the support axis 18 in connection with the head carriage 20.

[0035] Further, the whole ink cartridge retained to be the circular pillar shape or the polygonal pillar shape can enlarge the size of the respective ink cartridges 11 by means of the minimum enlargement of the shape. The miniaturization of the head carriage 20 can be easily realized because only the small changes of the sizes of the first retention member 22 and the end cap 17 are sufficient to cope with the change.

Second Embodiment

[0036] An ink cartridge 11c of the present embodiment shown in Fig. 9 is substantially the same with the ink cartridge 11 of the first embodiment except that the shapes of the front parts of the front guides are different from each other. The ink cartridge 11c includes a plurality of nozzles 35 electrically driven for ejecting inks at the front part of the front guide 13a, and a circuit 24a for supplying signals from a control part not shown to the nozzles 35.

[0037] The six ink cartridges 11c shown in Fig. 9 are integrated to form a circular pillar shape as shown in

Fig. 10. Another circuit 24b at a printer side connected to the circuit 24a is positioned in a space formed at a central part surrounded by the six ink cartridges 11c.

[0038] In the present embodiment, the nozzles 35 having the different shape from that of the nozzles 15 of the first embodiment are mounted on the front parts of the front guides 13a of the respective ink cartridges 11c. Accordingly, the inks can be individually ejected from the recording heads of the ink cartridges 11c by forming the recording heads with the ink ejection nozzles 35 of the respective ink cartridges 11c and individually supplying power to the respective nozzles 35.

[0039] In the first embodiment, the nozzles 15 corresponding to all the ink cartridges 11 are collectively disposed at the recording head side. On the other hand, the present embodiment has an advantage that the printing control and the printing accuracy can be easily obtained because the recording heads are disposed on the respective ink cartridges 11c even though the assembling accuracy of the ink cartridges 11c for every color must be considered.

[0040] Further, in accordance with the present embodiment, since the nozzles 35 are incorporated with the ink cartridge 11c and a separate nozzle is unnecessary, the corresponding first retention member having a ring shape which simply retains the front guides 13a is sufficient, and the cost down thereof can be attained.

[0041] Since the above embodiments are described only for examples, the present invention is not limited to the above embodiments and various modifications or alternations can be easily made therefrom by those skilled in the art without departing from the scope of the present invention.

Claims

1. An ink-jet printer comprising a plurality of ink cartridges (11), a retention mechanism for retaining the ink cartridges (11) and a recording head (16), mounted on a head carriage (20), for ejecting color inks supplied from the respective ink cartridges (11) characterized in that the ink cartridges (11) are retained by the retention mechanism to form a pillar shape as a whole.
2. The ink-jet printer as defined in claim 1, wherein each of the ink cartridges (11) has a pillar shape having a sectorial cross-section, the ink cartridges (11) being retained to form a circular pillar shape as a whole.
3. The ink-jet printer as defined in claim 1, wherein each of the ink cartridges (11) comprises a front guide (13) and, a rear guide (14), and the retention member comprises a first retention member (22) for retaining the respective front guides (13) and a second retention member (17) for retaining the respective rear guides (14), the second retention member

(17) being rotatably connected to the head carriage (20).

4. The ink-jet printer as defined in claim 3, wherein the front guide (13) comprises an ink inlet port (12) at its end, and wherein the first retention member (22) is formed in a shape of a disc, disposed around the recording head (16) and includes a plurality of nozzles (15) circumferentially disposed for ejecting inks supplied from the ink inlet ports (12).
5. The ink-jet printer as defined in claim 3, wherein each of the front guides (13) comprises at least one ink nozzle (35) electrically driven for ejecting a corresponding one of the color inks.

FIG. 1

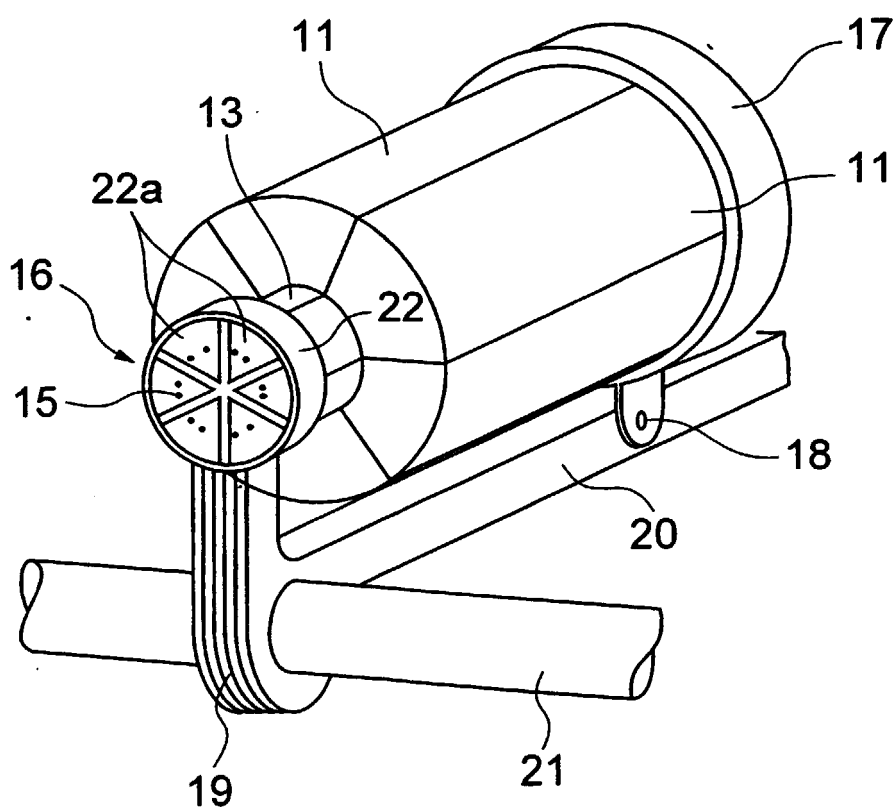


FIG. 2

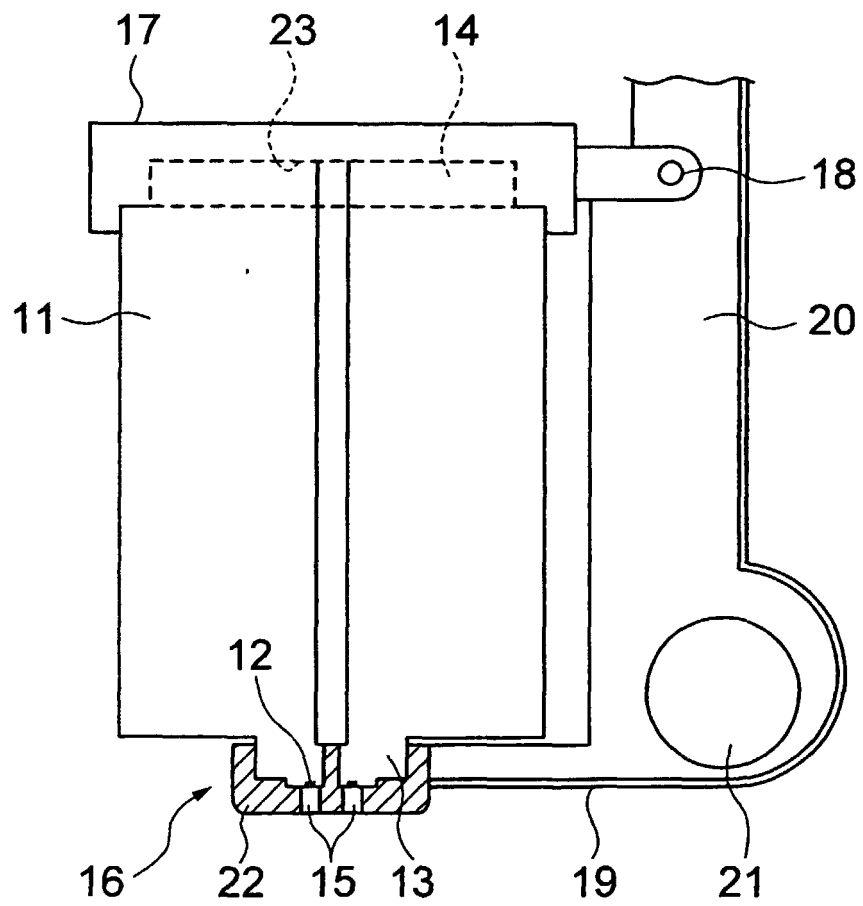


FIG. 3

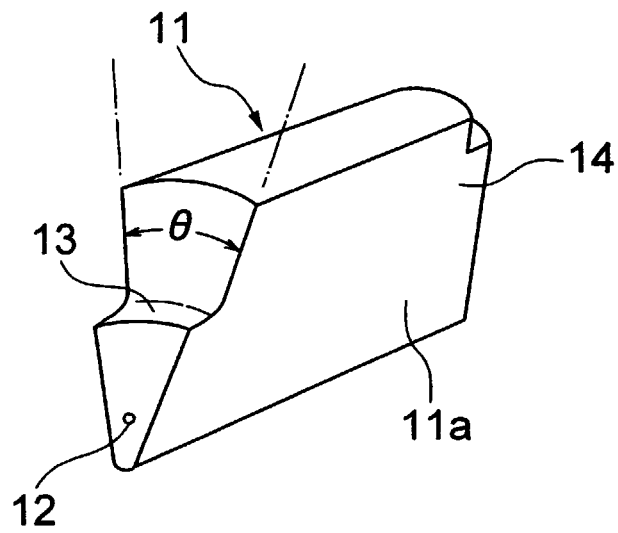


FIG. 4

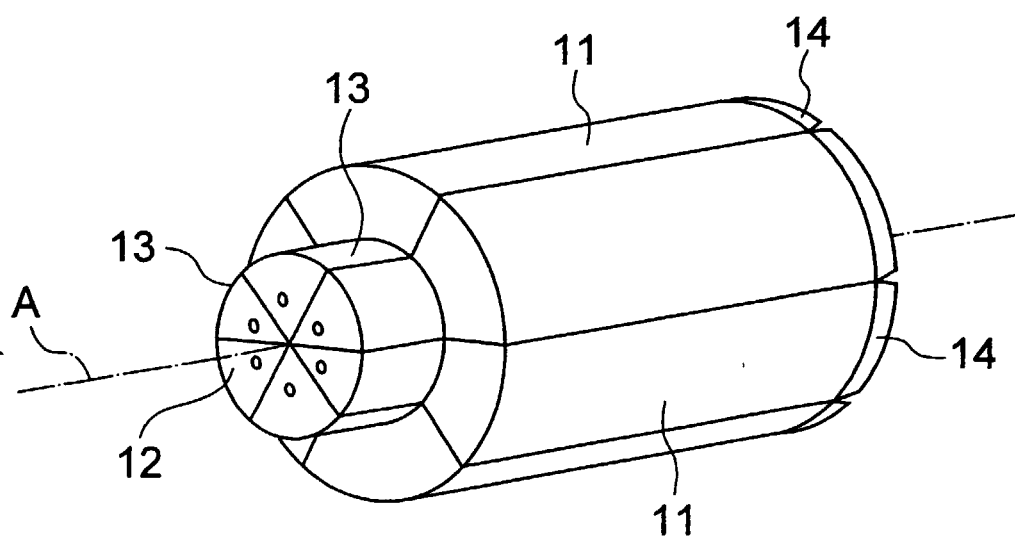


FIG. 5

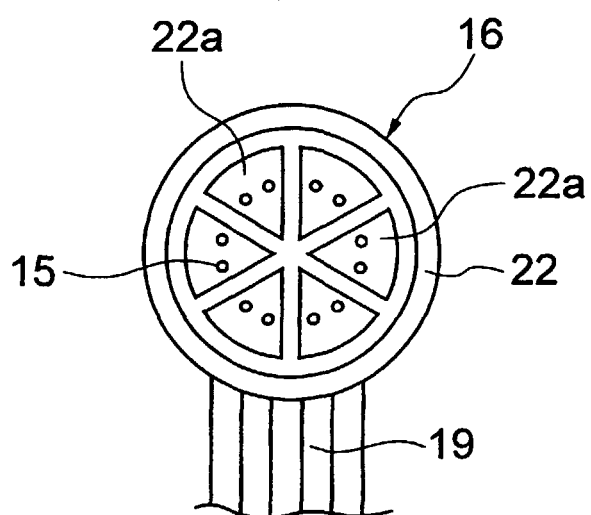


FIG. 6

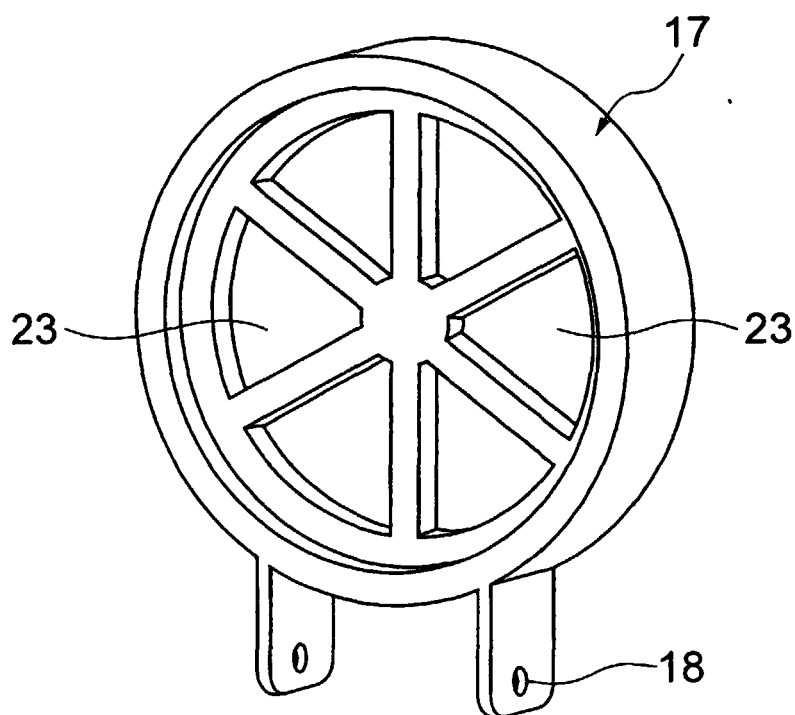


FIG. 7

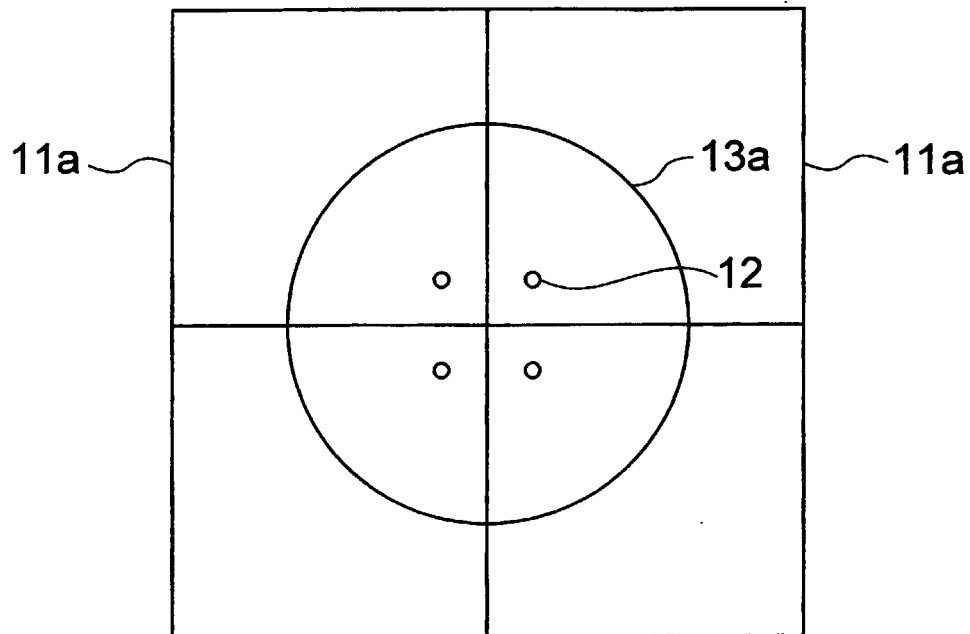


FIG. 8

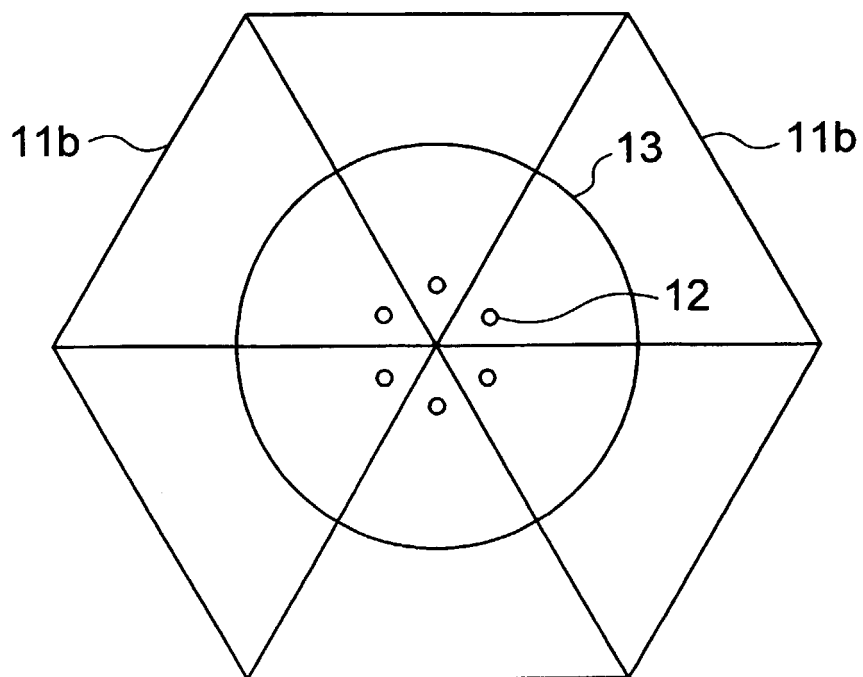


FIG. 9

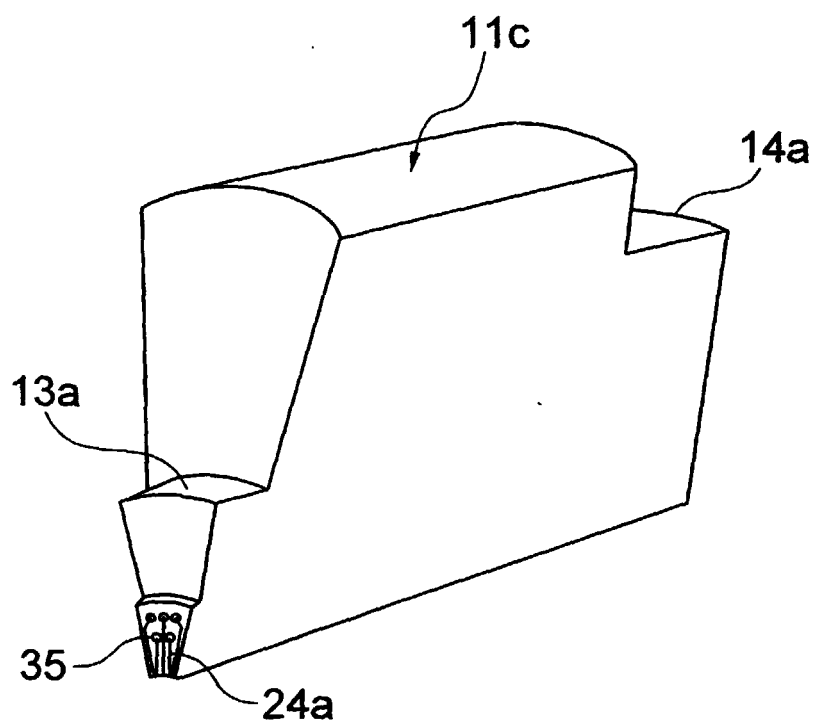
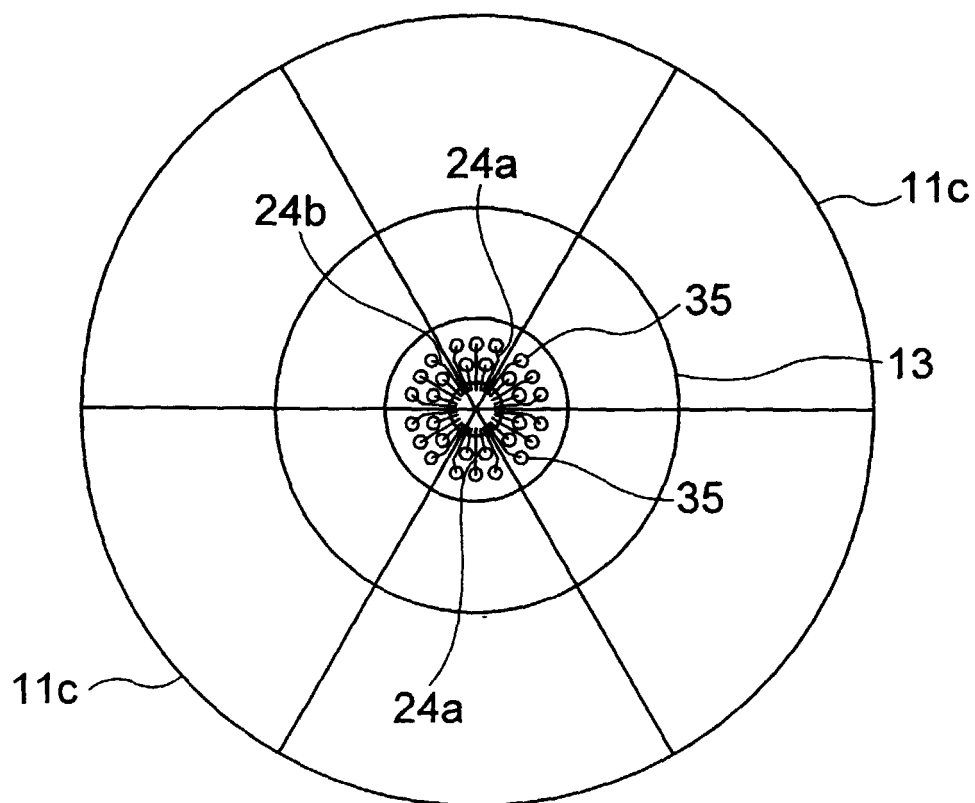


FIG. 10





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 10 0990

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	EP 0 604 940 A (CANON KK) 6 July 1994 (1994-07-06) * column 3, line 35 - column 4, line 25; figure 10 *	1-5	B41J2/175
X	EP 0 603 516 A (HEWLETT PACKARD CO) 29 June 1994 (1994-06-29) * figure 2 *	1-5	
X	EP 0 655 336 A (CANON KK) 31 May 1995 (1995-05-31) * figure 19 *	1-5	
X	EP 0 546 832 A (CANON KK) 16 June 1993 (1993-06-16) * figure 41 *	1-5	
X	DE 197 33 152 A (HEWLETT PACKARD CO) 13 August 1998 (1998-08-13) * figure 2 *	1-5	
X	PATENT ABSTRACTS OF JAPAN vol. 1997, no. 11, 28 November 1997 (1997-11-28) & JP 09 183233 A (BROTHER IND LTD), 15 July 1997 (1997-07-15) * abstract *	1-5	TECHNICAL FIELD SEARCHED (Int.Cl.7)
X	PATENT ABSTRACTS OF JAPAN vol. 1996, no. 02, 29 February 1996 (1996-02-29) & JP 07 276666 A (CANON INC), 24 October 1995 (1995-10-24) * abstract *	1-5	B41J
-/-			
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 31 March 2000	Examiner Bridge, S
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons</p> <p>& : member of the same patent family, corresponding document</p>			

EP 0 FORM 1503 03.92 (P44001)



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 10 0990

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	PATENT ABSTRACTS OF JAPAN vol. 1998, no. 06, 30 April 1998 (1998-04-30) & JP 10 044457 A (PENTEL KK), 17 February 1998 (1998-02-17) * abstract *	1-5	
X	PATENT ABSTRACTS OF JAPAN vol. 1998, no. 11, 30 September 1998 (1998-09-30) & JP 10 175310 A (OKI DATA:KK), 30 June 1998 (1998-06-30) * abstract *	1-5	
X	EP 0 699 533 A (CANON KK) 6 March 1996 (1996-03-06) * figure 6 *	1-5	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
Place of search MUNICH		Date of completion of the search 31 March 2000	Examiner Bridge, S
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons</p> <p>& : member of the same patent family, corresponding document</p>			

EPO FORM 1608 03/92 (P04001)

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

EP 00 10 0990

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.

31-03-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0604940 A	06-07-1994	AT 152967 T	15-05-1997
		DE 69310696 D	19-06-1997
		DE 69310696 T	25-09-1997
		JP 6246927 A	06-09-1994
		US 5512925 A	30-04-1996
		US 5896152 A	20-04-1999
EP 0603516 A	29-06-1994	US 5451995 A	19-09-1995
		DE 69323051 D	25-02-1999
		DE 69323051 T	05-08-1999
		JP 7001742 A	06-01-1995
EP 0655336 A	31-05-1995	JP 2887058 B	26-04-1999
		JP 7148936 A	13-06-1995
		JP 7148937 A	13-06-1995
		JP 8039826 A	13-02-1996
		JP 2801148 B	21-09-1998
		JP 8048044 A	20-02-1996
		AU 715891 B	10-02-2000
		AU 4523297 A	12-02-1998
		AU 685856 B	29-01-1998
		AU 7907494 A	08-06-1995
		CA 2136791 A	30-05-1995
		CN 1107103 A	23-08-1995
		DE 9421934 U	28-05-1997
		DE 69417353 D	29-04-1999
		DE 69417353 T	16-09-1999
		EP 0856405 A	05-08-1998
		EP 0850766 A	01-07-1998
		ES 2129099 T	01-06-1999
		KR 136964 B	29-04-1998
		US 5619239 A	08-04-1997
EP 0546832 A	16-06-1993	JP 5162297 A	29-06-1993
		JP 2795568 B	10-09-1998
		JP 5162299 A	29-06-1993
		JP 5162322 A	29-06-1993
		JP 5162323 A	29-06-1993
		JP 5162328 A	29-06-1993
		JP 5162329 A	29-06-1993
		JP 5162330 A	29-06-1993
		JP 5162331 A	29-06-1993
		JP 5169673 A	09-07-1993
		JP 5162300 A	29-06-1993
		JP 5162302 A	29-06-1993
		DE 9218960 U	08-08-1996

EPO FORM P448

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

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

EP 00 10 0990

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.

31-03-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0546832 A		DE 69224886 D	30-04-1998
		DE 69224886 T	20-08-1998
		DE 69229509 D	05-08-1999
		DE 69229509 T	25-11-1999
		EP 0715959 A	12-06-1996
		EP 0860285 A	26-08-1998
		KR 9707627 B	13-05-1997
		KR 127668 B	29-12-1997
		SG 59965 A	22-02-1999
		US 5512926 A	30-04-1996
		US 5534899 A	09-07-1996
		US 6003985 A	21-12-1999
DE 19733152 A	13-08-1998	CN 1191808 A	02-09-1998
		GB 2321621 A	05-08-1998
JP 09183233 A	15-07-1997	NONE	
JP 07276666 A	24-10-1995	NONE	
JP 10044457 A	17-02-1998	NONE	
JP 10175310 A	30-06-1998	NONE	
EP 0699533 A	06-03-1996	JP 8072232 A	19-03-1996
		JP 8072234 A	19-03-1996

EPO FORM P/0489

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