(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 777 602 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
17.02.2021 Bulletin 2021/07

(21) Application number: **18911460.6**

(22) Date of filing: **26.03.2018**

(51) Int Cl.:
A45D 2/14 *(2006.01)*

(86) International application number:
PCT/JP2018/011983

(87) International publication number:
WO 2019/186614 (03.10.2019 Gazette 2019/40)

(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

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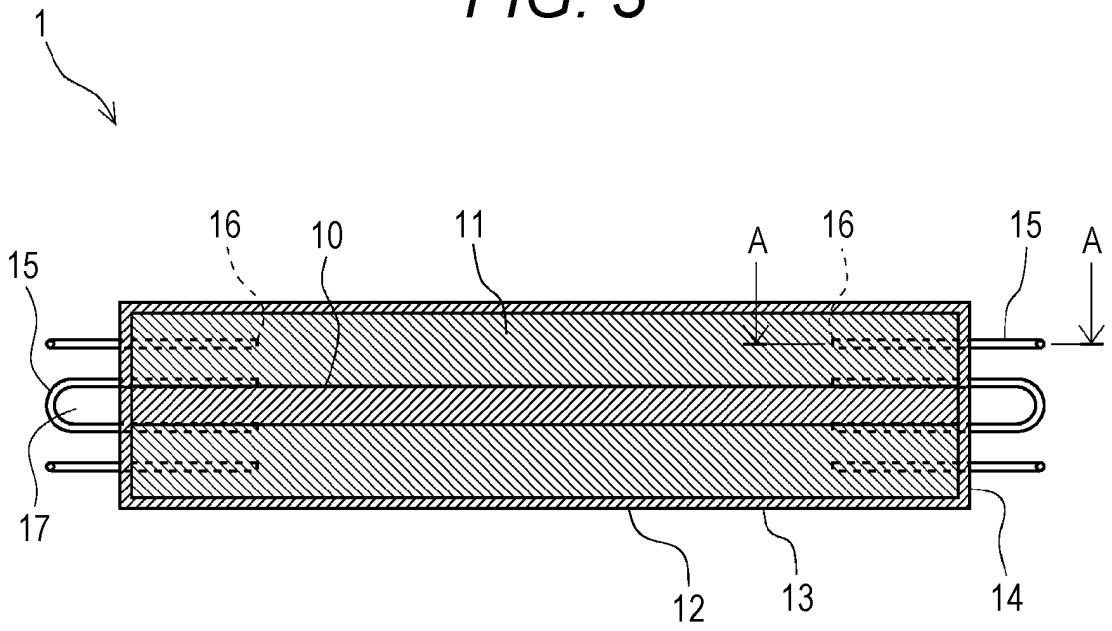
(54) **PERMANENT WAVE ROD**

(57) A perming rod (1) having an outer peripheral surface around which hairs are to be wound includes a columnar core, an elastic portion (11) covering an outer peripheral surface of the core (10) and formed of an elastic body, a waterproof surface portion (12) covering an outer peripheral surface of the elastic portion (11), and pins (15) attached to each end portion of the elastic portion (11). With this configuration, the hairs can be held with suitable tension by easy treatment. Thus, beautiful permanent waves can be obtained without providing uncomfortable pain to a customer.

FIG. 3



EP 3 777 602 A1

Description

TECHNICAL FIELD

[0001] The present invention relates to a perming rod utilized for permanent wave treatment at a hair salon etc.

BACKGROUND ART

[0002] Generally, in permanent wave treatment at a hair salon etc., a perming rod for winding hairs has been utilized. For example, a permanent hair rod disclosed in Patent Literature 1 has been known as a typical perming rod.

[0003] The permanent hair rod disclosed in Patent Literature 1 is made of synthetic resin in a cylindrical shape forming a drum shape in which the diameter of a center portion in an axial direction is slightly smaller. At both end portions of the permanent hair rod, cutout portions for retaining a rubber band are provided next to each other at required intervals in a circumferential direction. Hairs wound around the permanent hair rod are fixed by the rubber band hooked on the cutout portions.

[0004] Moreover, Patent Literature 2 discloses, as another typical technique example, a permanent rod including a rod portion. The rod portion has an elastic hollow body. The elastic hollow body has a skin layer on a surface, and is made of low-foaming hollow synthetic rubber, thermoplastic elastomer, or soft synthetic resin. The rod portion of this literature has a hollow or solid core member inserted and fixed into a hollow of the elastic hollow body. The core member is made of synthetic resin or a wood.

[0005] The permanent rod of this literature includes a cap. The cap is fixed to a joint portion arranged at an end portion of the core member of the rod portion. Moreover, a tubular body forming a cap body has, at one end thereof, an external fitting portion fitted onto an end portion of the rod portion. At the other end of the tubular body, a rubber retaining portion cut in a recessed-raised shape is formed.

CITATION LIST

PATENT LITERATURE

[0006]

PATENT LITERATURE 1: JP-A-9-37832
PATENT LITERATURE 2: JP-A-2001-78824

SUMMARY OF INVENTION

PROBLEMS TO BE SOLVED BY INVENTION

[0007] However, the perming rod of the typical technique needs to be improved for enhancing the efficiency of treatment by a beautician and obtaining beautiful permanent waves.

[0008] Specifically, when the rubber band is hooked on the drum-shaped perming rod configured such that the diameter of the vicinity of each end portion is greater and the diameter of the vicinity of the center is smaller as in the typical technique disclosed in Patent Literature 1, a clearance is formed between an outer peripheral surface of the perming rod and the rubber band in the vicinity of the center.

[0009] Moreover, in the configuration in which the recessed-raised rubber retaining portion is formed at the tubular body of the cap body attached to each end of the rod portion as in the typical technique disclosed in Patent Literature 2, a clearance is also formed between the attached rubber band and an outer peripheral surface of the rod portion as in the above-described technique.

[0010] In the above-described configuration in which the clearance is formed between the outer peripheral surface of the perming rod and the rubber band, there is a problem that a hair bundle is easily loosened as long as the rubber band is not firmly hooked. For preventing loosening of the hair bundle, the rubber band needs to be strongly hooked, and hairs are displaced when the rubber band is weakly hooked.

[0011] When the rubber band is hooked too strong for reducing displacement of the hair bundle, the hairs are strongly pulled, and a customer might feel pain. Moreover, when the rubber band is strongly hooked, the work of the beautician becomes difficult, and workability in permanent wave treatment is degraded.

[0012] Moreover, the synthetic resin perming rod formed in the cylindrical shape as in the typical technique disclosed in Patent Literature 1 has the hard outer peripheral surface, and the force of such a perming rod for holding the hairs is small. Thus, the hairs easily slip. Further, the perming rod is formed in a hollow shape, and therefore, there is a problem that heat transfer is poor and beautiful wave curl cannot be obtained within short time.

[0013] In the perming rod of the typical technique having the elastic hollow body as disclosed in Patent Literature 2, the outer peripheral surface is slightly elastically deformable in a radial direction. However, the amount of such deformation is insufficient, and it is difficult to reduce displacement of the hairs while reducing the pain felt by the customer. Moreover, when the perming rod is too soft, it is difficult to form wave curl of the hairs in a suitable shape.

[0014] Further, the perming rod formed, at both ends thereof, with the cutout portions (the rubber retaining portions) for hooking the rubber band as in the typical techniques disclosed in Patent Literature 1 and Patent Literature 2 has a problem that it is difficult to perform the process of hooking the rubber band on the cutout portions.

[0015] In addition, the position of the cutout portion is fixed with respect to the outer peripheral surface on which the hairs are wound, and the cutout portion cannot be moved in a rotation direction of the perming rod. For this

reason, the hairs wound around the perming rod are, by the rubber band hooked on the cutout portions, strongly fixed not to move in the circumferential direction. Thus, the hairs are kept pulled strongly from the head, and for this reason, the customer might feel pain.

[0016] The present invention has been made in view of the above-described situation, and an object of the present invention is to provide a perming rod allowing beautiful permanent waves by easy treatment.

SOLUTION TO PROBLEMS

[0017] A perming rod, according to the present invention, having an outer peripheral surface around which a hair is to be wound, includes a columnar core, an elastic portion covering an outer peripheral surface of the core and formed of an elastic body, a waterproof surface portion covering an outer peripheral surface of the elastic portion, and a pin attached to each end portion of the elastic portion.

EFFECTS OF INVENTION

[0018] A perming rod of the present invention includes a columnar core, an elastic portion covering an outer peripheral surface of the core and formed of an elastic body, a waterproof surface portion covering an outer peripheral surface of the elastic portion, and a pin attached to each end portion of the elastic portion. With this configuration, beautiful permanent wave can be obtained by easy treatment without providing uncomfortable pain to a customer.

[0019] Specifically, the columnar core is provided at a center portion of the perming rod so that strength of the entirety of the perming rod can be suitably ensured. The elastic portion and the surface portion are provided at the outer periphery of the core. Thus, the entirety of the perming rod is formed in a substantially columnar shape without forming a hollow in the vicinity of the center portion of the perming rod. Thus, heat transfer performance suitable for treatment for obtaining beautiful wave curl is obtained.

[0020] The elastic portion formed of the elastic body is provided at the outer periphery of the core so that hairs wound around the perming rod can be supported without suitable tension by deformation of the elastic portion.

[0021] The waterproof surface portion is formed at the outer periphery of the elastic portion so that the flow of a chemical solution into the perming rod can be prevented and treatment efficiency can be enhanced. Moreover, the surface portion is provided so that slippage of a wound hair bundle can be reduced. With excellent deformability of the elastic portion and suitable friction performance of the surface portion, the hair bundle can be firmly held even in a case where a rubber band is loosely hooked on the surface portion. Thus, beautiful permanent waves can be obtained without less damage.

[0022] The pin on which the rubber band is to be hooked is attached to each end portion of the elastic portion. With this configuration, the pin and the rubber band hooked on the pin can move together with the end portion of the elastic portion according to deformation of the elastic portion. Thus, the hairs can be supported with such tension that permanent waves can be easily obtained and suitable motion is allowed.

[0023] According to the perming rod of the present invention, the elastic portion may be elastically deformable in a radial direction and a circumferential direction. With this configuration, while the elastic portion is contracted in the radial direction and is slightly turned in the circumferential direction, the hairs can be wound. The hairs wound around the perming rod are held with suitable holding force obtained by repulsion of the elastic portion. Thus, loosing of the hairs can be prevented without providing strong tension leading to pain of the scalp, and beautiful permanent waves can be obtained.

[0024] According to the perming rod of the present invention, the surface portion may be formed continuously from an outer peripheral surface of the elastic body to cover end portions of the core and the elastic portion. With this configuration, the flow of the chemical solution etc. into the perming rod can be prevented, and treatment for obtaining beautiful permanent waves can be efficiently performed.

[0025] According to the perming rod of the present invention, the pin may be formed in a U-shape in such a manner that a rod-shaped body is bent, and both end portions of the pin may be inserted into the elastic portion. With this configuration, the process of hooking the rubber band can be easily performed. For example, the rubber band can be fixed through a hole of the pin formed by insertion of the substantially-U-shaped rod-shaped body into the elastic portion.

[0026] According to the perming rod of the present invention, the surface portion may be made of a rubber material. With this configuration, excellent waterproof performance for preventing the flow of the chemical solution etc. into the perming rod and excellent friction performance for preventing slippage of the wound hairs are provided.

[0027] According to the perming rod of the present invention, an electronic circuit configured to output information on the perming rod may be embedded in the elastic portion. Utilizing the information on the perming rod from the electronic circuit, a practitioner can accurately perform, with high efficiency, treatment suitable for each customer.

BRIEF DESCRIPTION OF DRAWINGS

[0028]

Fig. 1 is a perspective view schematically showing a perming rod according to an embodiment of the present invention.

Fig. 2 is a cross-sectional view schematically showing the perming rod according to the embodiment of

the present invention.

Fig. 3 is a longitudinal sectional view schematically showing the perming rod according to the embodiment of the present invention.

Fig. 4 is an A-A sectional view showing the vicinity of a pin of the perming rod according to the embodiment of the present invention.

Fig. 5 is a side view showing arrangement of the pins in the perming rod according to the embodiment of the present invention.

Fig. 6 is a side view showing another example of arrangement of the pins in the perming rod according to the embodiment of the present invention.

Fig. 7 is a perspective view showing an example of elastic deformation of the perming rod according to the embodiment of the present invention.

DESCRIPTION OF EMBODIMENTS

[0029] Hereinafter, a perming rod according to an embodiment of the present invention will be described in detail based on the drawings.

[0030] Fig. 1 is a perspective view schematically showing the perming rod 1 according to the embodiment of the present invention. The perming rod 1 is utilized for permanent wave treatment at a hair salon etc. As shown in Fig. 1, the perming rod 1 is in a substantially columnar form. In the permanent wave treatment, hairs are wound around an outer peripheral surface of the perming rod 1.

[0031] The substantially entire area of an outer surface of the perming rod 1 is covered with a waterproof surface portion 12. That is, an outer peripheral portion of the perming rod 1 is covered with a surface portion 13 as part of the surface portion 12. End portions of the perming rod 1 are covered with surface portions 14 formed continuously to the surface portion 13.

[0032] Multiple pins 15 are provided at both end portions of the perming rod 1. The pin 15 is a portion on which a rubber band is hooked in the permanent wave treatment. Specifically, for holding, from the outside, the hairs wound around the perming rod 1, the rubber band is hooked to connect one-end-side pin 15 and the other-end-side pin 15 of the perming rod 1.

[0033] Fig. 2 is a cross-sectional view schematically showing the perming rod 1, and Fig. 3 is a longitudinal sectional view schematically showing the perming rod 1. As shown in Figs. 2 and 3, the perming rod 1 has a columnar core 10, an elastic portion 11 covering an outer peripheral surface of the core 10, and the waterproof surface portion 12 covering an outer peripheral surface of the elastic portion 11.

[0034] The core 10 is a substantially columnar rod member made of a wood, metal, or resin, for example. The core 10 forms a center portion of the perming rod 1, and extends from one end portion to the other end portion of the perming rod 1. The substantially-columnar core 10 is provided as described above so that strength of the entirety of the perming rod 1 can be suitably ensured.

[0035] The substantially-columnar core 10 is provided at the center portion of the perming rod 1, and therefore, the perming rod 1 is formed in the substantially columnar shape as a whole as described above and no hollow is formed in the vicinity of the center portion. With this configuration, heat transfer performance suitable for cold permanent wave treatment for beautiful wave curl is obtained. Moreover, the medical agent concentration of a medical solution to be used can be decreased, and the amount of use of the medical solution can be decreased.

[0036] The elastic portion 11 in a substantially cylindrical form is provided at the outer periphery of the core 10. The elastic portion 11 is, for example, formed of an elastically-deformable synthetic resin elastic body formed in a substantially sponge shape.

[0037] The elastic body forming the elastic portion 11 may be, e.g., a synthetic resin member molded in a cylindrical shape in advance, and the core 10 may be inserted into a center hole of the elastic body. Alternatively, the elastic body forming the elastic portion 11 may be, e.g., a synthetic resin member formed in a substantially plate shape, and the elastic portion 11 may be formed in such a manner that the substantially-plate-shaped elastic body is wound around the outer peripheral surface of the core 10.

[0038] The elastic portion 11 formed of the elastic body is provided at the outer periphery of the core 10 so that the hairs wound around the perming rod 1 can be supported with suitable tension by deformation of the elastic portion 11.

[0039] Note that the core 10 and the elastic portion 11 are not necessarily completely bonded to each other with, e.g., an adhesive. The core 10 and the elastic portion 11 may be fixed to each other such that the core 10 is lightly pressed by the elastic portion 11 by means of elastic force of the elastic portion 11.

[0040] Although not shown in the figure, an electronic circuit configured to output information on the perming rod 1 may be embedded in the elastic portion 11. The electronic circuit is, for example, a microchip, and can output various types of information such as the type of the perming rod 1, the attachment location of the perming rod 1 on the head, the attachment orientation of the perming rod 1, the pressure and temperature of the perming rod 1, and the use hours of the perming rod 1.

[0041] The information on the perming rod 1 from the electronic circuit is received and utilized for, e.g., arithmetic processing or recording so that a practitioner can accurately perform, with a high efficiency, treatment suitable for each customer. For example, the record of use of the perming rod 1 typically written by the practitioner by hand can be automatically produced utilizing the output from the electronic circuit. Moreover, e.g., the time of treatment with the medical solution can be also accurately grasped, and therefore, beautiful permanent waves can be obtained in suitable treatment time.

[0042] The waterproof surface portion 12 is formed at the outer periphery of the elastic portion 11. As described

above, the surface portion 12 is formed such that the surface portion 13 covering the outer peripheral portion of the perming rod 1 and the surface portions 14 covering the end portions are continuous to each other. That is, the surface portions 14 are formed continuously from the surface portion 13 covering an outer peripheral surface of the elastic portion 11 to cover end portions of the core 10 and the elastic portion 11.

[0043] The core 10 and the elastic portion 11 are covered with the surface portion 12 so that the flow of the medical solution etc. into the perming rod 1 can be prevented and treatment for obtaining beautiful permanent waves can be efficiently performed.

[0044] The surface portion 12 is made of a rubber material. Thus, excellent waterproof performance for preventing the flow of the medical solution etc. into the perming rod 1 can be obtained, and excellent friction performance for preventing slippage of the wound hairs can be obtained. Moreover, the suitable type of rubber material is used so that oil resistance, solvent resistance, and chemical resistance of the perming rod 1 can be enhanced. Further, the strength of the perming rod 1 can be also enhanced.

[0045] With excellent deformability of the elastic portion 11 and suitable friction performance of the surface portion 12, a hair bundle can be firmly held even in a case where the rubber band is loosely hooked on the surface portion 12. Thus, beautiful wave curl can be obtained with less damage.

[0046] The pins 15 for hooking the rubber band are attached to both end portions of the elastic portion 11. The pins 15 are not fixed to the core 10 or the outer-peripheral-side surface portion 13, but are fixed only to the elastic portion 11 with the pins 15 being inserted into the elastic portion 11. Note that for waterproofing of the perming rod 1 and prevention of detachment of the pins 15, portions for insertion of the pins 15 may be bonded to the elastic portion 11 and the surface portion 12 with an adhesive.

[0047] The pins 15 are fixed to the elastic portion 11 so that the pins 15 and the rubber band hooked on these pins 15 can move together with the end portions of the elastic portion 11 according to deformation of the elastic portion 11. Thus, the perming rod 1 can support the hairs with such tension that the permanent waves can be easily obtained and suitable motion can be made.

[0048] Fig. 4 is a sectional view along an A-A line shown in Fig. 3, and shows the vicinity of the portion into which the pin 15 is inserted. As shown in Fig. 4, the pin 15 is formed in a substantially U-shape in such a manner that a metal or synthetic resin rod-shaped body is bent, and both end portions 16 thereof are inserted into the elastic portion 11. Of the pin 15, the portion inserted into the elastic portion 11 has a length of about 2 cm, and the portion protruding out of an end surface of the perming rod 1 has a length of about 1 cm.

[0049] The substantially-U-shaped pins 15 are attached to the end portions of the perming rod 1, and therefore, the process of hooking the rubber band can be easily performed. Specifically, the substantially-U-shaped bent portion is provided so that the rubber band can be easily hooked on the outside of such a bent portion. Moreover, the rubber band can be fixed through a hole 17 of the pin 15 formed by insertion of the substantially-U-shaped rod-shaped body into the elastic portion 11, for example.

[0050] Fig. 5 is a side view showing arrangement of the pins 15 in the perming rod 1. As shown in Fig. 5, distances from both end-portion-16 sides of the pin 15 to the center axis of the perming rod 1 are substantially the same. The pin 15 extends in a circumferential direction as viewed from the direction of the end portion of the perming rod 1.

[0051] Fig. 6 is a side view showing another example of arrangement of the pins 15 in the perming rod 1. As shown in Fig. 6, the pin 15 may be arranged to extend diagonally to a radial direction of the end surface as viewed from the direction of the end portion of the perming rod 1. That is, the pin 15 may be attached such that one end-portion-16 side is close to the center axis of the perming rod 1 and the other end-portion-16 side is close to the outer peripheral surface.

[0052] The pins 15 are provided in arrangement as shown in Fig. 5 or 6 so that the rubber band can be easily hooked on the pins 15. Note that the number of pins 15 is not limited to four, and may be three or less or five or more. The number of pins 15 can be suitably selected according to, e.g., the size of the perming rod 1.

[0053] Fig. 7 is a perspective view showing an example of elastic deformation of the perming rod 1. The elastic portion 11 is elastically deformable in the radial direction r and the circumferential direction θ. Thus, while the elastic portion 11 is contracted in the radial direction r and is slightly turned in the circumferential direction θ, the hairs can be wound around the outer peripheral surface of the perming rod 1. The wound hairs are held with suitable holding force obtained by repulsion of the elastic portion 11. Thus, loosing of the hairs can be prevented without providing strong tension leading to pain of the scalp, and beautiful permanent waves can be obtained.

[0054] Moreover, the elastic portion 11 is formed such that the vicinity of the center in an axial direction is softer and the vicinity of each end portion is harder than the vicinity of the center. Thus, when the hairs are wound around the perming rod 1, the amount of deformation of the elastic portion 11 in the radial direction r is greater in the vicinity of the center and is less in the vicinity of each end portion. That is, the diameter of the perming rod 1 is smaller in the vicinity of the center than in the vicinity of each end portion. With this configuration, the hair bundle wound around the vicinity of the end portion of the perming rod 1 is more likely to shift toward the direction of the center of the perming rod 1. Moreover, the wound hairs are less likely to stray off both end portions of the perming rod 1 to the outside.

[0055] Note that the above-described configuration in which the vicinity of each end portion of the elastic portion

11 is harder than the vicinity of the center is formed in such a manner that the rod-shaped bodies forming the pins 15 are inserted into both end portions of the elastic portion 11. Moreover, the elastic portion 11 is, in the vicinity of each end portion of the perming rod 1, strongly pressed in the radial direction r and is fixed by the surface portion 12 covering the elastic portion 11. In this manner, the vicinity of each end portion of the elastic portion 11 can be also hardened.

[0056] As described above, according to the perming rod 1 of the present invention, winding of the hair bundle can be easily performed, and beautiful permanent waves can be obtained without providing uncomfortable pain to the customer.

[0057] Moreover, the number of perming rods 1 can be reduced to about half to one-third of the typical number of perming rods, and therefore, the treatment time can be shortened. Further, even in a case where a chemical hair curl lotion with less damage to hairs is used as the perm chemical solution, wave curl with a size and a shape intended by the practitioner can be firmly and beautifully obtained.

[0058] Note that the present invention is not limited to the above-described embodiment, and various other changes and implementations can be made without departing from the gist of the present invention.

LIST OF REFERENCE NUMERALS

[0059]

1	Perming rod
10	Core
11	Elastic portion
12	Surface portion
13	Surface portion
14	Surface portion
15	Pin
16	End portion
17	Hole
r	Radial direction
θ	Circumferential direction

Claims

1. A perming rod having an outer peripheral surface around which a hair is to be wound, comprising:

a columnar core;
an elastic portion covering an outer peripheral surface of the core and formed of an elastic body;
a waterproof surface portion covering an outer peripheral surface of the elastic portion; and
a pin attached to each end portion of the elastic portion.

2. The perming rod according to claim 1, wherein
the elastic portion is elastically deformable in a radial direction and a circumferential direction.

3. The perming rod according to claim 1 or 2, wherein
the surface portion is formed continuously from an outer peripheral surface of the elastic body to cover end portions of the core and the elastic portion.

4. The perming rod according to any one of claims 1 to 3, wherein
the pin is formed in a U-shape in such a manner that a rod-shaped body is bent, and both end portions of the pin are inserted into the elastic portion.

5. The perming rod according to any one of claims 1 to 4, wherein
the surface portion is made of a rubber material.

6. The perming rod according to any one of claims 1 to 5, wherein
an electronic circuit configured to output information on the perming rod is embedded in the elastic portion.

FIG. 1

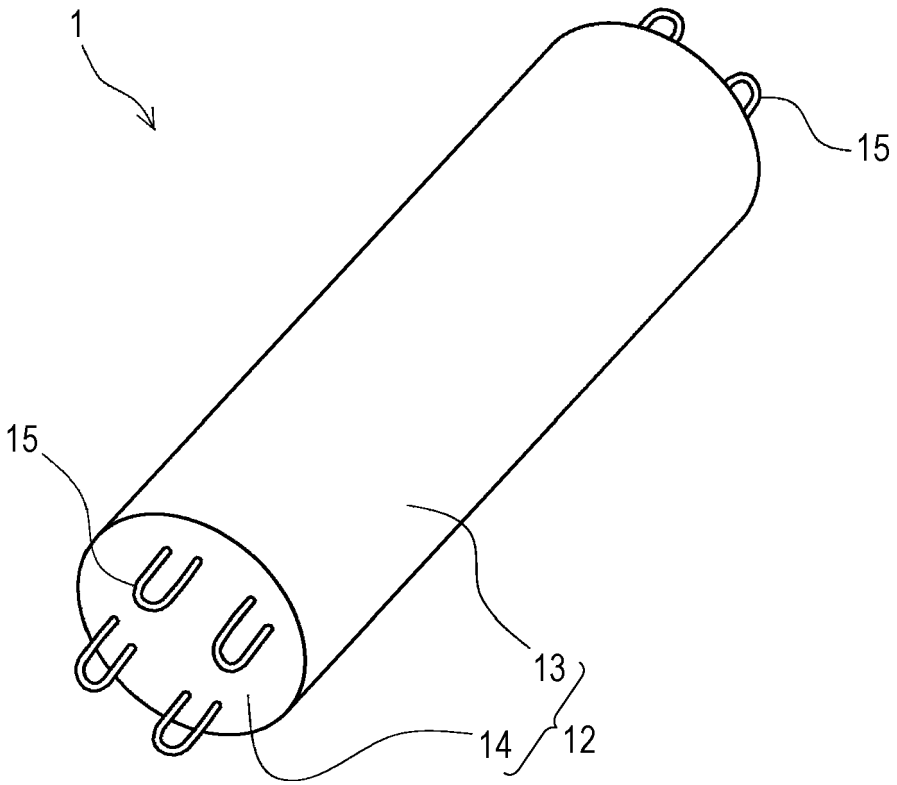


FIG. 2

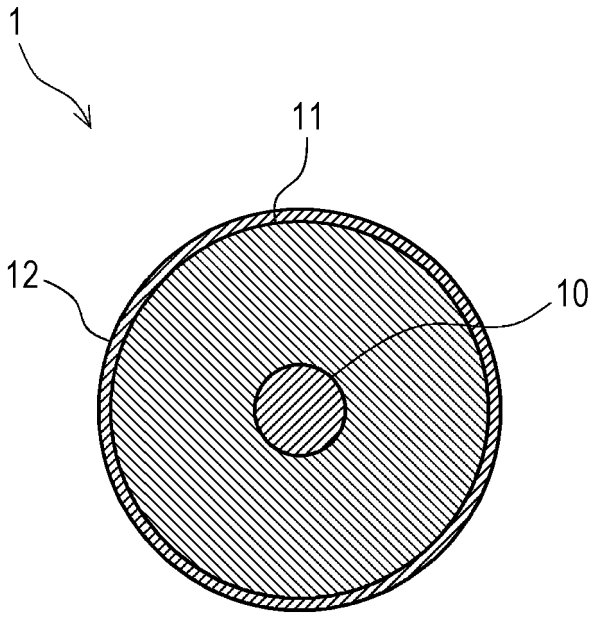


FIG. 3

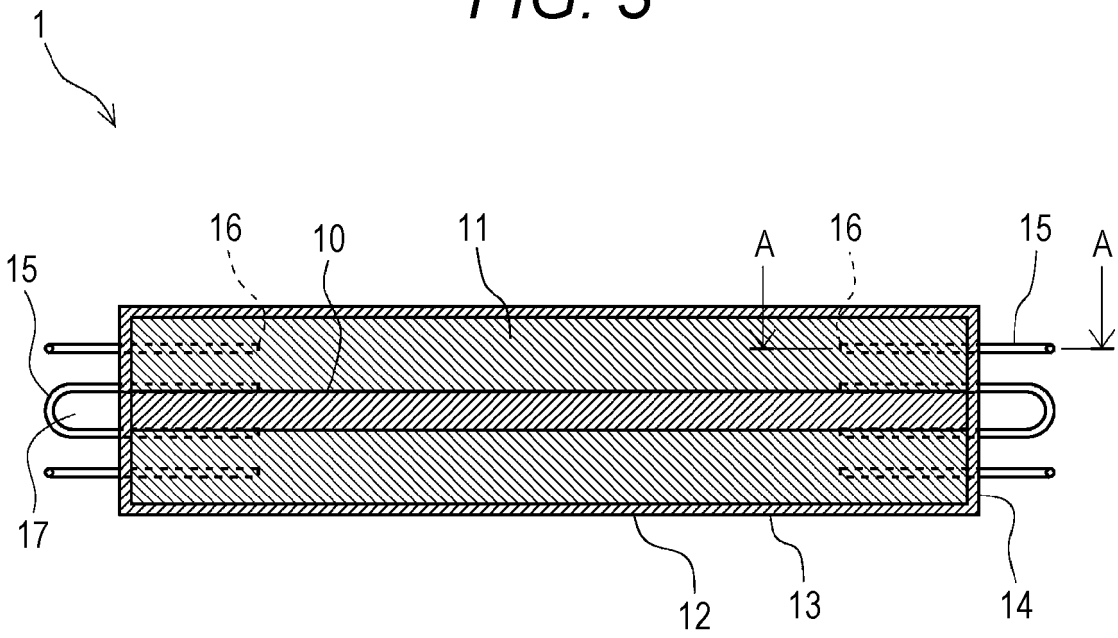


FIG. 4

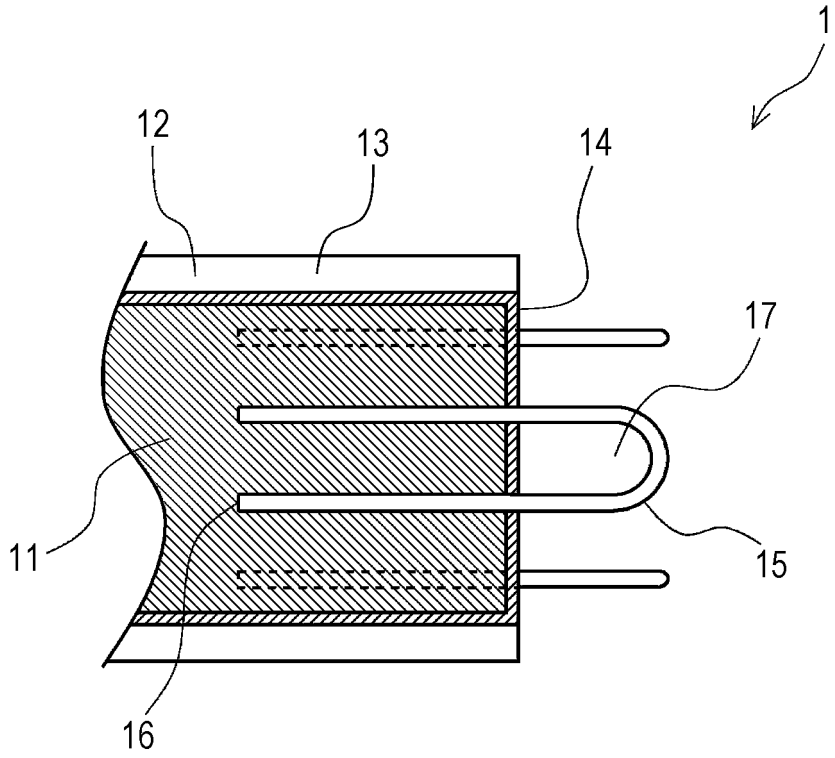


FIG. 5

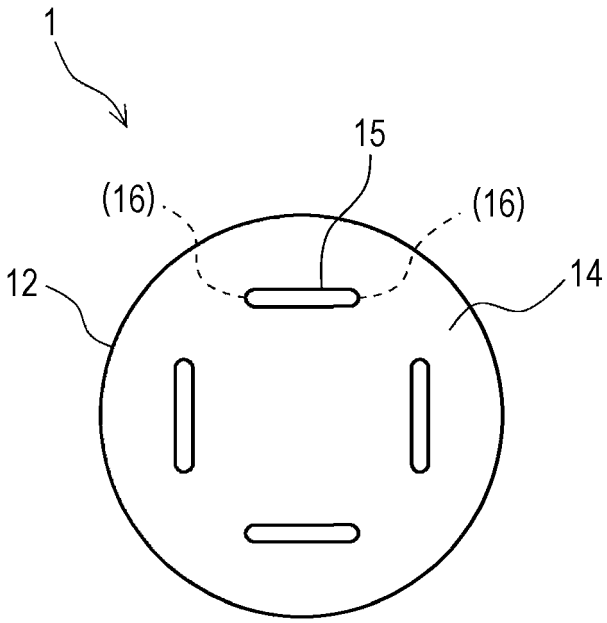


FIG. 6

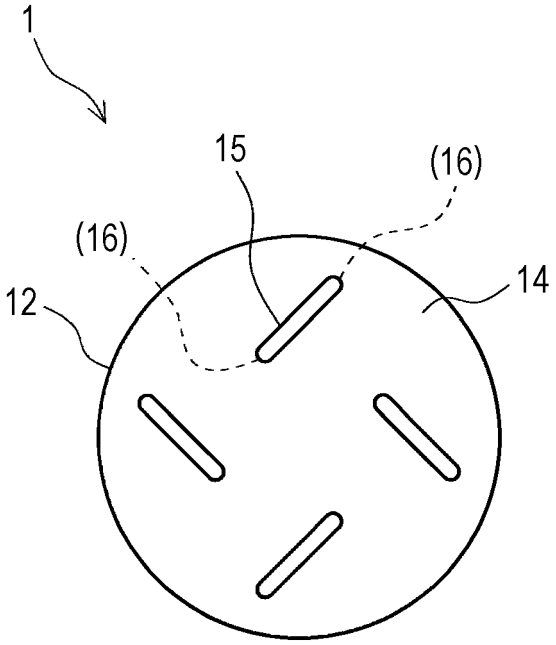
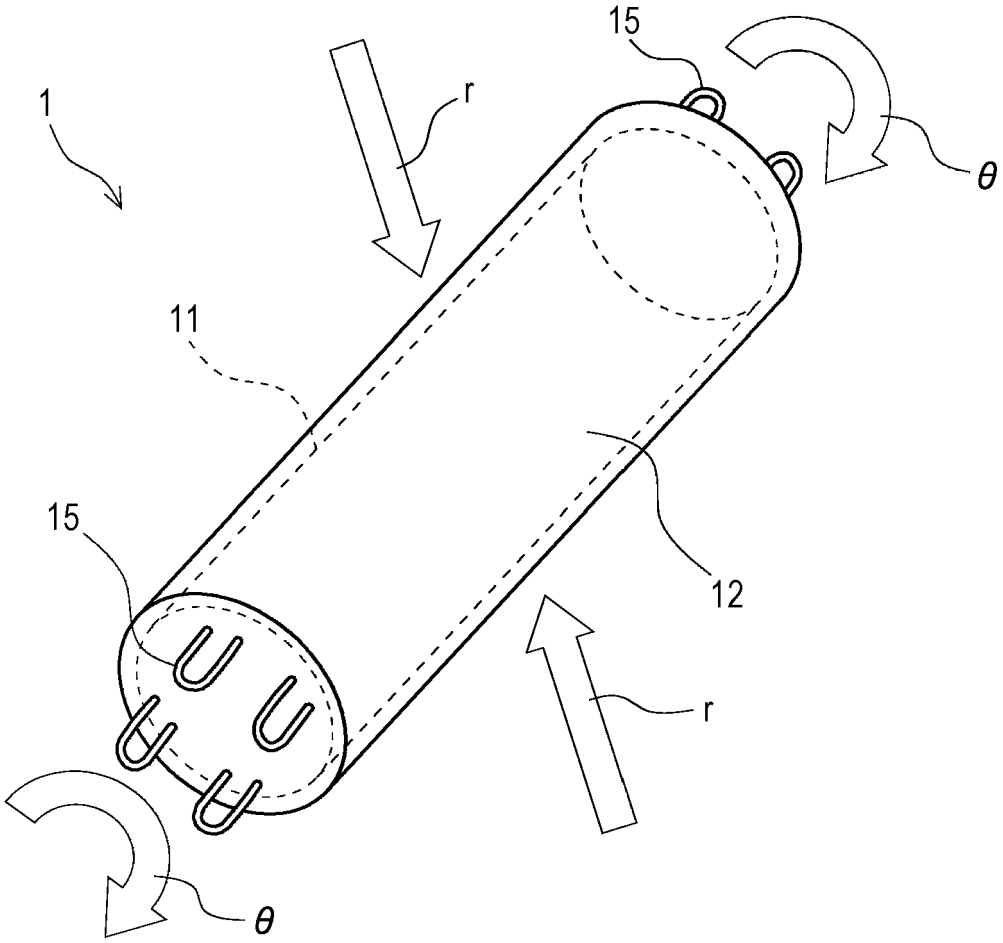


FIG. 7



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2018/011983

A. CLASSIFICATION OF SUBJECT MATTER
Int. Cl. A45D2/14(2006.01)i

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)
Int. Cl. A45D2/14, A45D2/10

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Published examined utility model applications of Japan 1922-1996
Published unexamined utility model applications of Japan 1971-2018
Registered utility model specifications of Japan 1996-2018
Published registered utility model applications of Japan 1994-2018

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2001-78824 A (BIYOSHITSU ZERO KK) 27 March 2001, paragraphs [0057], [0058], [0060], fig. 1-12 (Family: none)	1-6
A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 142672/1979 (Laid-open No. 60401/1981) (GAKKOUHOUJIN ZENKOKU RIYOU CYUOUGAKUEN) 22 May 1981, description, page 2, line 17 to page 3, line 15, fig. 3 (Family: none)	1-6
A	US 6283128 B1 (SAXTON, Roxanne) 04 September 2001, column 2, line 33 to column 3, line 50, fig. 1-4 (Family: none)	1-6

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
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"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
"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
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
08.05.2018	22.05.2018
Name and mailing address of the ISA/ Japan Patent Office 3-4-3, Kasumigaseki, Chiyoda-ku, Tokyo 100-8915, Japan	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2018/011983

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	FR 413012 A (FISHER) 29 July 1910, page 1, lines 21-48, fig. 1-3 (Family: none)	1-6
A	US 3216427 A (JEFFERSON, Ann M.) 09 November 1965, fig. 2, 4, 5 (Family: none)	1-6
A	JP 2007-312903 A (LIN, Ching-Yu) 06 December 2007, paragraph [0024], fig. 1 (Family: none)	1-6

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 9037832 A **[0006]**
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