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

(11) **EP 4 458 205 A1**

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

(43) Date of publication:
06.11.2024 Bulletin 2024/45

(21) Application number: **21969985.7**

(22) Date of filing: **28.12.2021**

(51) International Patent Classification (IPC):
A45D 24/00 *(2006.01)*

(52) Cooperative Patent Classification (CPC):
A45D 24/00; A45D 24/02

(86) International application number:
PCT/JP2021/048809

(87) International publication number:
WO 2023/127104 (06.07.2023 Gazette 2023/27)

(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

(71) Applicant: **YC Primarily Co., Ltd.**
Tokyo 150-0001 (JP)

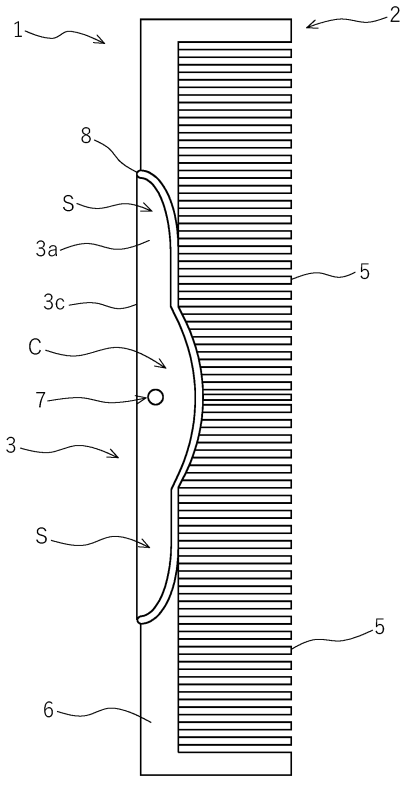
(72) Inventor: **SHIMOJIMA, Yutaka**
Tokyo 150-0001 (JP)

(74) Representative: **TBK**
Bavariaring 4-6
80336 München (DE)

(54) **COMB**

(57) A comb (1) according to the present invention comprises: a comb body (2) that has a through hole (4) for a plating treatment; a plurality of comb teeth (5) and a proximal end part (6) located at a proximal end from which the comb teeth (5) extend; and a cover (3) made of metal for covering front and reverse surfaces and side surfaces of the proximal end part (6) inclusive of the through hole (4) from a direction perpendicular to the longitudinal direction of the proximal end part (6), wherein the cover (3) comprises a front surface part (3a) and a reverse surface part (3b) for covering front and reverse surfaces of the proximal end part (6), as well as a side surface part (3c), the distance between the front surface part (3a) and the reverse surface part (3b) is gradually decreased toward the distal end, and, in a state where the cover (3) is separated from the comb body (2), the distance between the front surface part (3a) and the reverse surface part (3b) at the distal end is less than the thickness of the side surface of the proximal end part (6).

Fig.1



EP 4 458 205 A1

Description

Technical Field

[0001] The present invention relates to a comb having a surface that is applied with a plating treatment.

Background Art

[0002] When a surface of a comb is applied with a plating treatment, the surface becomes smooth and contact friction with hair is reduced. It has been found that such comb has an effect of discharging static electricity accumulated in the hair using the human body as a ground (see, for example, Patent Literature 1). As shown in Patent Literature 1, applying the plating treatment causes non-plated part at a contact part with an electrode part, so it is necessary to cover the non-plated part because of appearance problems. In Patent Literature 1, the non-plated part is covered by caps that are mated with each other.

Citation List

Patent Literature

[0003] Patent Literature 1: WO2017/126021A1

Summary of Invention

Technical Problem

[0004] However, the electrode part of the plating treatment may be formed near comb teeth. In such a case, the cap described in Patent Literature 1 is not very preferable in terms of usability because there is a high possibility that hair will be caught in the gap created when the cap is fitted. In addition, even if the non-plated part is covered, it is necessary to ensure that characteristics of the plating treatment are not impaired.

[0005] The present invention takes into account the above prior art and has an objective of providing a comb that prevents hair from being caught as much as possible and does not impair an effect of static electricity diffusion by the plating treatment.

Solution to Problem

[0006] In order to achieve the above object, the present invention provides a comb comprising a comb body applied with a plating treatment on its surface and having a through hole for the plating treatment, a plurality of comb teeth forming the comb body and a proximal end part located at a proximal end from which the plurality of comb teeth extends, and a cover made of metal for covering front and reverse surfaces and a side surface of the proximal end part inclusive of the through hole from a direction perpendicular to the longitudinal direction of the proximal end part, the cover including a front surface part and a reverse surface part for covering the front and reverse surfaces of the proximal end part, as well as a side surface part for covering the side surface of the proximal end part, the distance between the front surface part and the reverse surface part is gradually decreased toward their distal end, and in a state where the cover is separated from the comb body, the distance between the front surface part and the reverse surface part at their distal end is less than the thickness of the side surface of the proximal end part.

[0007] Preferably, the front surface part and the reverse surface part have both end side regions on both end sides along their longitudinal direction and a center region located between these two both end side regions, the center region covers the proximal end part inclusive of the through hole, and the distance between the front surface part and the reverse surface part in the both end side regions is the same as the thickness of the proximal end part.

[0008] Preferably, a through hole vicinity region located in the vicinity of the through hole at the proximal end part covered by the central region is gradually reduced in thickness from the side surface of the proximal end part in the comb teeth direction.

[0009] Preferably, the side surface part of the cover corresponding to the central region is formed narrower than the side surface part of the cover corresponding to the both end side regions, and the side surface of the proximal end part corresponding to the through hole vicinity region is formed narrower than other side surfaces.

[0010] Preferably, protrusions to be inserted into the through hole are formed inside the front surface part and the reverse surface part.

[0011] Preferably, a raised ridge protruding from the surface of the comb body is formed at the boundary between the cover and the proximal end part.

Advantageous Effects of Invention

[0012] According to the present invention, the distance between the front surface part and the reverse surface part constituting the cover is gradually decreased toward their distal end, and in a state where the cover is separated from the comb body, the distance between the front surface part and the reverse surface part at their distal end is less than the thickness of the side surface of the proximal end part. This causes the distal end side of the cover to have the strongest force to pinch the proximal end part in a state where the cover is attached to the comb body. Therefore, when the hair is combed with the comb, the gap between the cover and the comb body is brought into close contact as much as possible, so that the hair is prevented from being caught in the gap. Furthermore, since the cover is made of metal, even if the cover is attached to the comb body, the effect of static electricity diffusion by plating treatment applied to the comb body is

not impaired. Since the cover is made of metal, even if the distance between the front surface part and the reverse surface part is gradually decreased toward their distal end, the ductility of the cover allows the front surface part and the reverse surface part to be easily opened and attached to the comb body.

[0013] In addition, by providing the both end side regions to shorten the length of the central region, it is possible to reduce the area where the cover is attached by sliding while pressing the surface of the comb body as much as possible when the cover is attached to the comb body. This allows the area where the plating applied to the comb body is peeled off to be reduced. Since the distance at the distal end side between the front surface part and the reverse surface part in the both end side regions is the same as the thickness of the proximal end part, the cover is attached along the proximal end part and thus the plating does not peel off.

[0014] In addition, the through hole vicinity region at the proximal end part, which is the area covered by the central region, is also gradually reduced in thickness, thereby further preventing the distal ends of the front surface part and the reverse surface part in the central region from sliding while pressing the proximal end part. Therefore, the plating on the comb body is further prevented from being peeled off.

[0015] In addition, since the side surface part of the cover corresponding to the central region and the side surface of the proximal end part corresponding to the through hole vicinity region are narrow, the user can easily grip them, thereby increasing convenience. Furthermore, since the opening distance of the cover can be minimized when the cover is attached and detached, the cover can be reused as many times as possible.

[0016] In addition, the protrusions are formed inside the front surface part and the reverse surface part, and the protrusions are inserted into the through hole to allow for secure fixation of the cover to the comb body. Furthermore, in combination with the fact that the distance between the front surface part and the reverse surface part is gradually decreased toward their distal end, the protrusions exert a force in the direction of pressing in the side surface direction of the proximal end part, so that the cover is attached while being pressed in the comb teeth direction. This allows the gap between the cover and the comb body to be kept in close contact as much as possible, thereby preventing the hair from being caught.

[0017] In addition, by providing the raised ridge at the boundary between the cover and the proximal end part, the hair can be prevented from entering through the gap between the cover and the comb body, thereby preventing the hair from being caught during use. Furthermore, the position of the cover is securely fixed, preventing rattling of the cover.

Brief Description of Drawings

[0018]

FIG. 1 is a diagram of a comb according to the present invention.

FIG. 2 is a diagram of a comb body.

FIG. 3 is a diagram of the comb body viewed from a side surface side (the side to which a cover is attached).

FIG. 4 is a diagram of the cover.

FIG. 5 is a diagram of the cover viewed from the side surface side (opposite side to the side where the cover is attached to the comb body).

FIG. 6 is a diagram of the cover viewed from the side where the cover is attached to the comb body.

FIG. 7 is a diagrammatic cross-sectional view of the cover at the central region.

FIG. 8 is a diagrammatic cross-sectional view of the comb body.

FIG. 9 is a diagrammatic cross-sectional view of the comb according to the present invention.

Description of Embodiments

[0019] As shown in FIG. 1, a comb 1 according to the present invention is formed of a comb body 2 and a cover 3 attached to the comb body 2. The comb body 2 has a surface applied with a plating treatment. Specifically, the comb body 2 is a resin molded product (for example, an ABS resin molded product) that has been applied with the plating treatment, which makes the surface smooth and reduces contact friction with hair. The plating treatment has also been found to have an effect of discharging static electricity accumulated in the hair using a human body as a ground. During applying this plating treatment, an electrode and the comb body 2 are in contact with each other, and in order to hold the comb body 2 by the electrode, a through hole 4 for the plating treatment is formed in the comb body 2 (see FIGs. 2 and 3).

[0020] The comb body 2 has a plurality of comb teeth 5 for combing hair, and the plurality of comb teeth 5 are formed extending from a proximal end part 6. That is, the proximal end part 6 is located at the proximal end from which the comb teeth 5 extend. The cover 3 is made of metal and covers both surfaces (front and reverse) and the side surface (the side opposite to the side from which the comb teeth 5 extend) of the proximal end part 6. The cover 3 is attached to the comb body 2 by being inserted perpendicularly to the longitudinal direction of the proximal end part 6. In this case, the cover 3 covers the proximal end part 6 inclusive of the through hole 4. Since the cover 3 is made of metal it has high conductivity. Thus, the effect of the plating treatment, such as maintaining the static electricity diffusion function of the comb body 2 applied with the plating treatment, is maintained. In the example shown in the figure, the cover 3 is attached substantially at the center in the longitudinal direction

of the comb body 2, but may be attached at a position slightly off the center.

[0021] As is apparent by referring to FIGs. 4 to 6, the cover 3 covers the front and reverse surfaces and the side surface of the proximal end part 6 as described above, and the part covering the front surface of the proximal end part 6 is a front surface part 3a and the part covering the reverse surface of the proximal end part 6 is a reverse surface part 3b. The part covering the side surface of the proximal end part 6 is a side surface part 3c. As shown in FIG. 7, the distance between the front surface part 3a and the reverse surface part 3b is gradually decreased toward their distal ends. In other words, the thickness of the end part on the comb body 2 side in the cover 3 is reduced. In addition, in a state where the cover 3 is separated from the comb body 2, the distance between the front surface part 3a and the reverse surface part 3b at their distal end is less than the thickness of the side surface of the proximal end part 6. In other words, even if the cover 3 is attempted to slid as it is from the side surface side of the comb body 2, the distal end of the cover 3 bumps into the side surface of the comb body 2. Therefore, the cover 3 cannot be attached to the comb body 2 unless the distal end of the cover 3 is opened to some extent and inserted with the comb body 2 from the side surface of the comb body 2.

[0022] Thus, since the distance between the front surface part 3a and the reverse surface part 3b, which constitute the cover 3, is gradually decreased toward their distal end, and in the state where the cover 3 is separated from the comb body 2, the distance between the front surface part 3a and the reverse surface part 3b at their distal end is less than the thickness of the side surface of the proximal end part 6. This causes the distal end side of the cover 3 to have the strongest force to pinch the proximal end part 6 in a state where the cover 3 is attached to the comb body 2. Therefore, when the hair is combed with the comb 1, the gap between the cover 3 and the comb body 2 is brought into close contact as much as possible, so that the hair is prevented from being caught in the gap. Furthermore, as described above, since the cover 3 is made of metal, even if the cover 3 is attached to the comb body 2, the effect of static electricity diffusion by the plating treatment applied to the comb body 2 is not impaired. Since the cover 3 is made of metal, even if the distance between the front surface part 3a and the reverse surface part 3b is gradually decreased toward their distal end, the ductility of the cover 3 allows the front surface part 3a and the reverse surface part 3b to be easily opened and attached to the comb body 2.

[0023] Here, the cover 3, i.e., the front surface part 3a and the reverse surface part 3b, has both end side regions S and a central region C located between these two both end side regions S along their longitudinal direction. The central region C covers the proximal end part 6 inclusive of the through hole 4. In addition, the distance between the front surface part 3a and the reverse surface part 3b in the both end side regions S is the same as the thickness of the proximal end part 6. Considering only the pinching strength described above, the both end side regions S are unnecessary. However, by intentionally providing the both end side regions S to shorten the length of the central region C, which is thinner than the proximal end part 6, it is possible to reduce the area where the cover 3 is attached by sliding while pressing the surface of the comb body 2 as much as possible when the cover 3 is attached to the comb body 2. This allows the area where the plating applied to the comb body 2 is peeled off to be reduced. Since the distance at the distal end side of the front surface part 3a and the reverse surface part 3b in the both end side region S (the distance between the front surface part 3a and the reverse surface part 3b at the distal end side in the both end side regions S) is the same as the thickness of the proximal end part 6, the cover 3 is attached along the proximal end part 6, and the plating does not peel off. Therefore, as shown in FIG. 6, in the central region C, the thickness of its distal end side is thinner than that of the both end regions S.

[0024] On the other hand, as shown in FIG. 8, a through hole vicinity region T located in the vicinity of the through hole 4 at the proximal end part 6 covered by the central region C is gradually reduced in thickness (thinned) from the side surface of the proximal end part 6 toward the comb teeth 5. That is, the proximal end part 6 has the thickest side surface. In this way, the through hole vicinity region T at the proximal end part 6, which is the area covered by the central region C, is also gradually reduced in thickness (thinned), thereby further preventing the distal ends of the front surface part 3a and the reverse surface part 3b in the central region C from sliding while pressing the proximal end part 6. Therefore, the plating on the comb body 2 is further prevented from being peeled off. Thus, the widths (lengths in the longitudinal direction of the comb body 2) of the central region C and the through hole vicinity region T are the same.

[0025] In addition, the side surface part 3c of the cover 3 corresponding to the central region C is formed narrower than the side surface part 3c of the cover 3 corresponding to the both end side regions S. In other words, the side surface part 3c of the central region C is thinner than the side surface part 3c of the both end side regions S. Accordingly, the side surface of the proximal end part 6 corresponding to the through hole vicinity region T is formed narrower than the other side surfaces. In other words, also in the proximal end part 6, the side surface of the through hole vicinity region T is thinner than that of both its sides. Specifically, as shown in FIGs. 3 and 5, both the side surface part 3c of the central region C and the side surface of the through hole vicinity region T are formed by being rounded and concave. Thus, since the side surface part 3c of the cover 3 corresponding to the central region C and the side surface of the proximal end part 6 corresponding to the through hole vicinity part T are narrow, the user can easily grip them, thereby increasing convenience. Furthermore, since the opening distance of

the cover 3 can be minimized when the cover 3 is attached and detached, the cover 3 can be reused as many times as possible. This is intended to allow for repeated use of the cover 3, because the comb body 2 is made of resin and thus the comb teeth 5 sometimes break off, but even in such a case, the cover 3 can be applied to other comb body 2. For that purpose, even if the cover 3 is used repeatedly, the pinching strength of the cover 3 must be maintained, and therefore the cover 3 should be able to be attached to the comb body 2 without being opened too much. This is because if the cover 3 is made to be attached to open too widely, the pinching strength will be reduced due to plastic deformation.

[0026] As shown in FIGs. 7 and 9, protrusions 7 to be inserted into the through hole 4 are formed inside the front surface part 3a and the reverse surface part 3b. Thus, the protrusions 7 are formed inside the front surface part 3a and the reverse surface part 3b, and the protrusions 7 are inserted into the through hole 4 to allow for secure fixation of the cover 3 to the comb body 2. Furthermore, in combination with the fact that the distance between the front surface part 3a and the reverse surface part 3b decreases toward their distal end, the protrusions 7 exert a force in the direction of pressing in the side surface direction of the proximal end part 6 (in the direction of an arrow A in FIG. 9), so that the cover 3 is attached while being pressed in the comb teeth 5 direction (in the direction of an arrow B in FIG. 9). This allows the gap between the cover 3 and the comb body 2 to be kept in close contact as much as possible, thereby preventing the hair from being caught.

[0027] In addition, a raised ridge 8 protruding from the surface of the comb body 2 may be formed at the boundary between the cover 3 and the proximal end part 6. That is, the raised ridge 8 is formed on the proximal end part 6 along the edge of the cover 3. Thus, by providing the raised ridge 8 at the boundary between the cover 3 and the proximal end part 6, the hair can be prevented from entering through the gap between the cover 3 and the comb body 2, thereby preventing the hair from being caught during use. Furthermore, the position of the cover 3 is securely fixed, preventing rattling of the cover 3. It is preferred that the distal ends of the protrusions 7 are spherical in shape in order to prevent the plating from peeling off during attaching the cover 3 to the comb body 2.

[0028] The through hole 4 is formed in the center of the comb body 2, and the comb teeth 5 are formed in the whole area in the longitudinal direction of the comb body 2. As a result, the central region C is located near the center of the comb body 2. It has been found that the hair is likely to be caught in the area where the user grips the comb 1, and that the hair is most likely to be caught in the area near the center of the comb body 2. Such a structure is preferable because the user grips the central region C and thus the pinching strength is generated only in the area where the hair is likely to be caught.

Reference Signs List

[0029]

1: comb, 2: comb body, 3: cover, 3a: front surface part, 3b: reverse surface part, 3c: side surface part, 4: through hole, 5: comb teeth, 6: proximal end part, 7: protrusion, 8: raised ridge
C: central region, S: both end side region, T: through hole vicinity region

Claims

1. A comb comprising

a comb body applied with a plating treatment on its surface and having a through hole for the plating treatment,
a plurality of comb teeth forming the comb body and a proximal end part located at the proximal end from which the plurality of comb teeth extends, and
a cover made of metal for covering front and reverse surfaces and a side surface of the proximal end part inclusive of the through hole from a direction perpendicular to the longitudinal direction of the proximal end part, wherein
the cover comprises a front surface part and a reverse surface part for covering the front and reverse surfaces of the proximal end part, as well as a side surface part for covering a side surface of the proximal end part,
the distance between the front surface part and the reverse surface part is gradually decreased toward their distal end, and
in a state where the cover is separated from the comb body, the distance between the front surface part and the reverse surface part at their distal end is less than the thickness of the side surface of the proximal end part.

2. The comb according to claim 1, wherein

the front surface part and the reverse surface part have both end side regions on both end sides along their longitudinal direction and a center region located between these two both end side regions,
the center region covers the proximal end part inclusive of the through hole, and the distance between the front surface part and the reverse surface part in the both end side regions is the same as the thickness of the proximal end part.

3. The comb according to claim 2, wherein
a through hole vicinity region located in the vicinity of the through hole at the proximal end part covered by

the central region is gradually reduced in thickness from the side surface of the proximal end part in the comb teeth direction.

4. The comb according to claim 3, wherein

the side surface part of the cover corresponding to the central region is formed narrower than the side surface part of the cover corresponding to the both end side regions, and
the side surface of the proximal end part corresponding to the through hole vicinity region is formed narrower than the other side surfaces.

5. The comb according to claim 1, wherein
protrusions to be inserted into the through hole are formed inside the front surface part and the reverse surface part.

6. The comb according to claim 1, wherein
a raised ridge protruding from the surface of the comb body is formed at the boundary between the cover and the proximal end part.

Fig.1

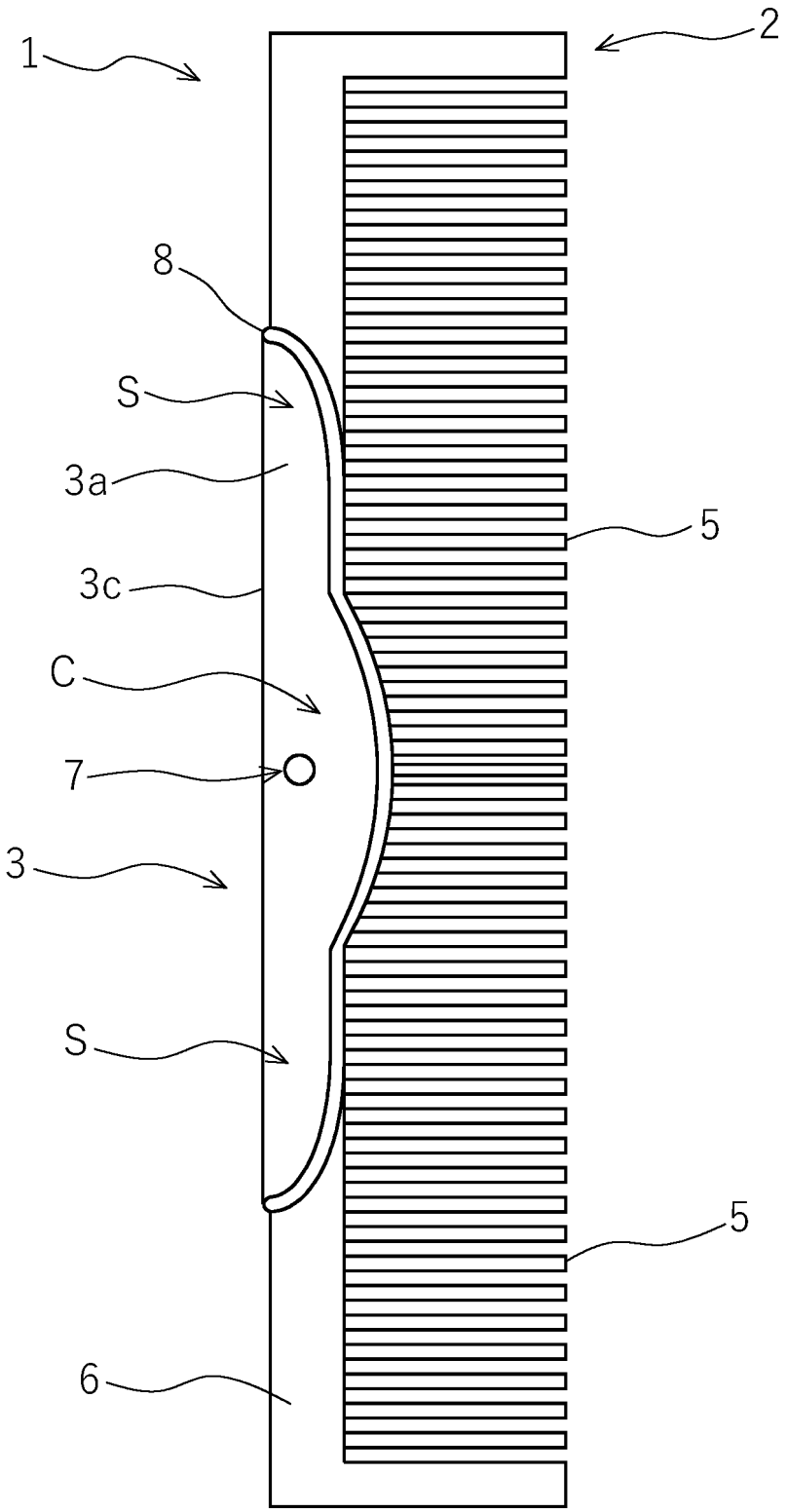


Fig.2

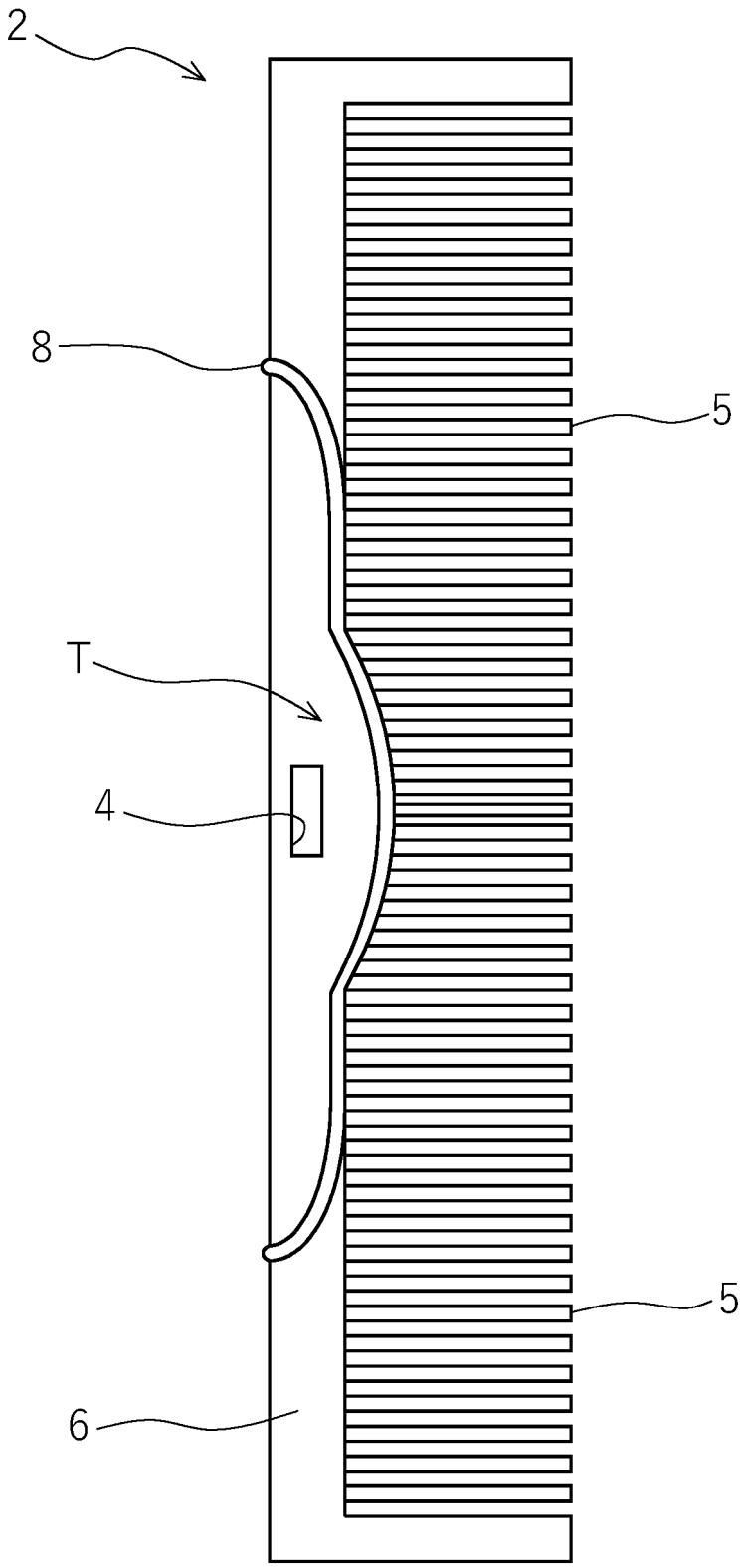


Fig.3

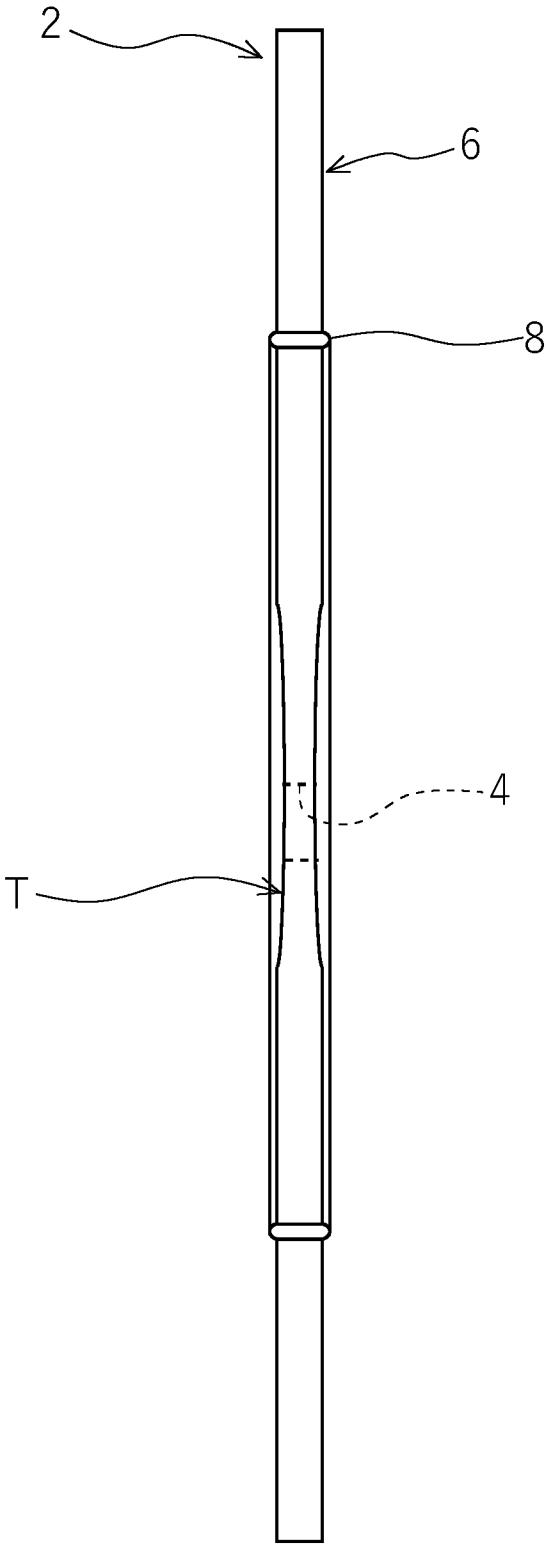


Fig.4

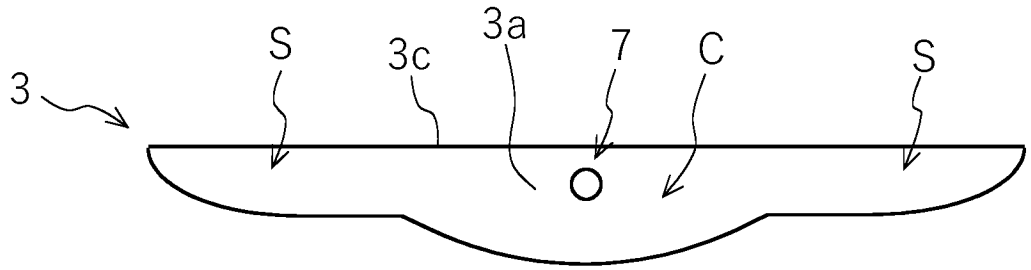


Fig.5

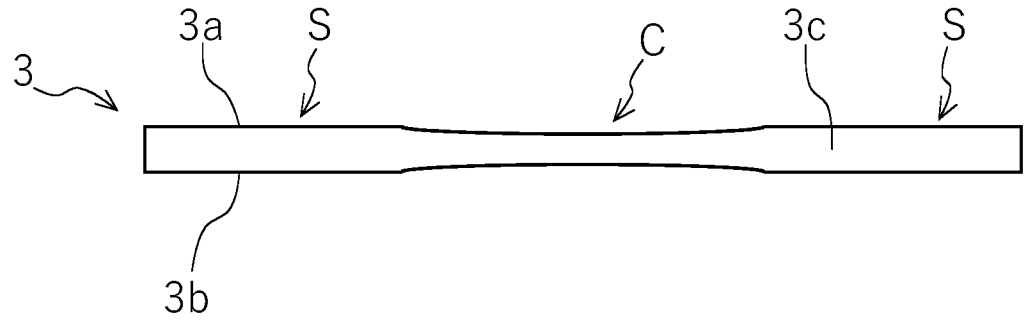


Fig.6

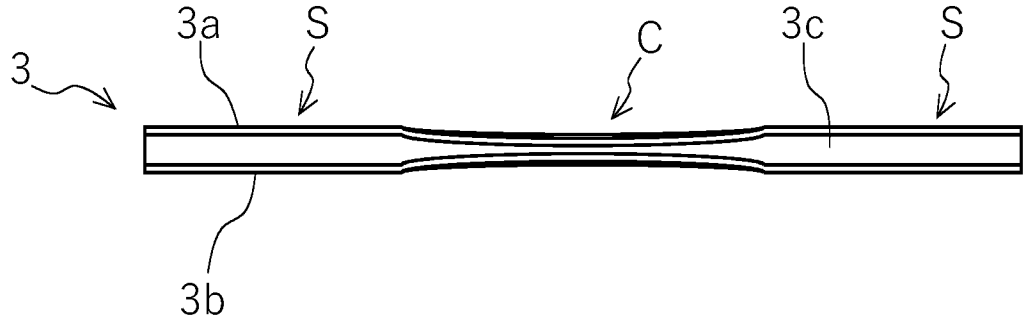


Fig.7

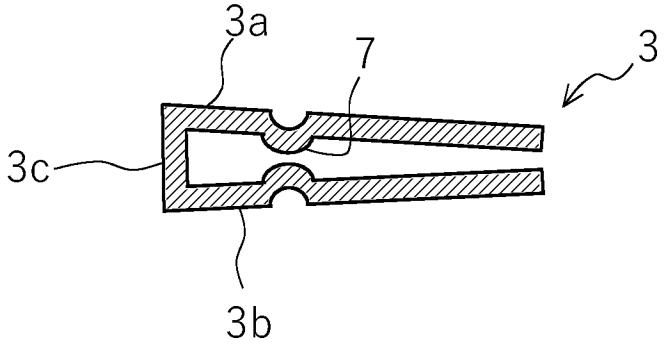


Fig.8

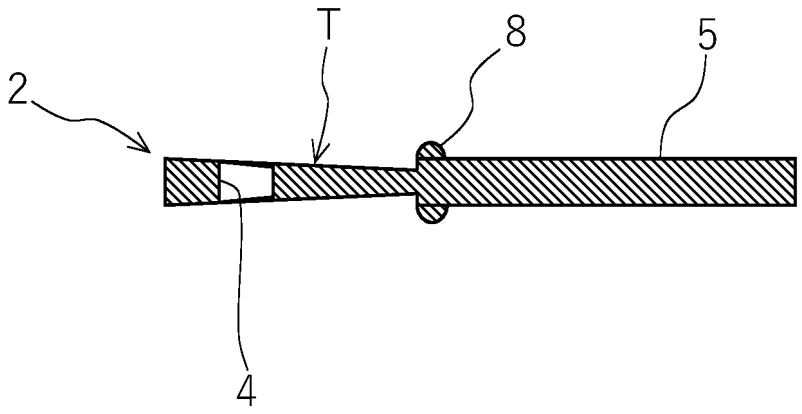
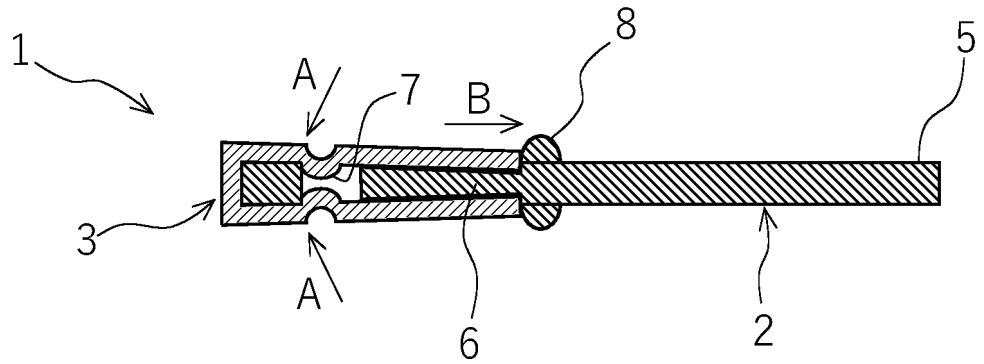


Fig.9



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2021/048809

A. CLASSIFICATION OF SUBJECT MATTER

A45D 24/00(2006.01)i
FI: A45D24/00 J

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)

A45D24/00

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 1971-2022
Registered utility model specifications of Japan 1996-2022
Published registered utility model applications of Japan 1994-2022

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	WO 2017/126021 A1 (YC PRIMARILY CO., LTD.) 27 July 2017 (2017-07-27) abstract, fig. 1	1-6
A	JP 31-3348 Y1 (KAMIYA, Asaichi) 05 March 1956 (1956-03-05) claims, fig. 1-3	1-6
A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 74930/1973 (Laid-open No. 19698/1975) (ISHIDA INDUSTRY CO., LTD.) 05 March 1975 (1975-03-05), claims, fig. 1-4	1-6
A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 115624/1980 (Laid-open No. 56803/1981) (WELLA AG) 16 May 1981 (1981-05-16), claims, fig. 1, 2	1-6
A	JP 2002-101944 A (OKUNO, Kazuo) 09 April 2002 (2002-04-09) abstract, fig. 1-3	1-6
A	US 2017/0013933 A1 (HEBA DESIGNS, LLC DBA GO-COMB) 19 January 2017 (2017-01-19) abstract, fig. 1	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
"E" earlier application or patent but published on or after the international filing date
"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)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed

"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
"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
22 February 2022	**08 March 2022**
Name and mailing address of the ISA/JP **Japan Patent Office (ISA/JP)** **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/JP2021/048809

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KR 20-0362141 Y1 (KOH, Gwang-Rok) 16 September 2004 (2004-09-16) abstract, fig. 1	1-6

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/JP2021/048809

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
WO 2017/126021 A1	27 July 2017	CN 108471857 A	
		KR 10-2018-0101712 A	
JP 31-3348 Y1	05 March 1956	(Family: none)	
JP 50-19698 U1	05 March 1975	(Family: none)	
JP 56-56803 U1	16 May 1981	DE 7928761 U1	
		BR 6001324 A1	
		ES 8201819 A1	
		FR 2466962 A3	
JP 2002-101944 A	09 April 2002	(Family: none)	
US 2017/0013933 A1	19 January 2017	(Family: none)	
KR 20-0362141 Y1	16 September 2004	(Family: none)	

Form PCT/ISA/210 (patent family annex) (January 2015)

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- WO 2017126021 A1 **[0003]**