



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

(43) Date of publication:
28.03.2012 Bulletin 2012/13

(51) Int Cl.:
A47L 13/20 (2006.01) A47L 13/10 (2006.01)

(21) Application number: **10777826.8**

(86) International application number:
PCT/JP2010/058621

(22) Date of filing: **21.05.2010**

(87) International publication number:
WO 2010/134594 (25.11.2010 Gazette 2010/47)

(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 SE SI SK SM TR
Designated Extension States:
BA ME RS

- **SUDA Tomokazu**
Shikokuchuo-shi
Ehime 799-0111 (JP)
- **URAGAMI Jun**
Fukuoka-shi
Fukuoka 815-0031 (JP)
- **UENISHI Toshihiko**
Fukuoka-shi
Fukuoka 815-0031 (JP)

(30) Priority: **21.05.2009 JP 2009123489**

(71) Applicant: **Unicharm Corporation**
Ehime 799-0111 (JP)

(74) Representative: **Murgatroyd, Susan Elizabeth et al**
Baron Warren Redfern
Cambridge House
100 Cambridge Grove
Hammersmith
London
W6 0LE (GB)

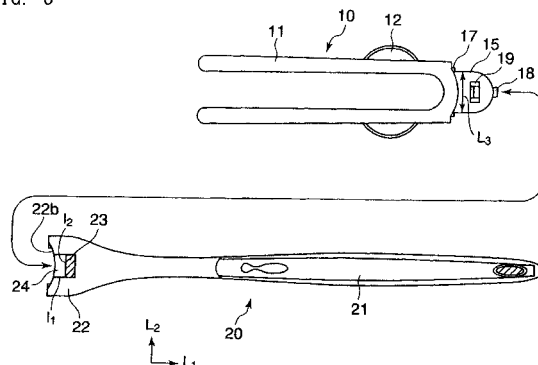
(72) Inventors:
• **TANAKA Yoshinori**
Kanonji-shi
Kagawa 769-1602 (JP)
• **FUKUZAWA Masumi**
Kanonji-shi
Kagawa 769-1602 (JP)

(54) **HANDY MOP**

(57) It is an object of the invention to provide a hand-held mop in which a grip connected to a mounting part for mounting and supporting a mop body is prevented from being detached from the mounting part during cleaning operation.

A hand-held mop 1 includes a mop body 2, a mounting part 10, and a grip 20. The mop body 2 has a pair of mop body portions 2a, and the mounting part 10 has a pair of mounting pieces 11 which are inserted into mounting spaces of the mop body portions 2a, and an insert 15. The grip 20 has a holding side 22 which defines an insert space 22a into which the insert 15 of the mounting part 10 is inserted. Further, a side opening 23 is formed in the holding side 22 of the grip 20, and a side projection 19 is formed on the insert 15 of the mounting part 10 and engaged in the side opening 23. A spring region 24 is formed in the holding side 22 of the grip 20, and when the insert 15 is inserted into the insert space 22a, the spring region 24 is pressed by the side projection 19 of the insert 15 and bent.

FIG. 3



Description

BACGROUND OF THE INVENTION

Field of the Invention

[0001] The invention relates to a hand-held mop which has a mop body and a grip and is used for cleaning inside or outside of a room or a vehicle, and more particularly to a hand-held mop in which the grip is prevented from becoming detached from a mounting part for mounting the mop body during cleaning operation.

Description of the related Art

[0002] Japanese non-examined laid-open Patent Publication No. 2007-167425 discloses a hand-held mop with a disposable mop body, a mounting part connected to the mop body to support the mop body and a grip connected to the mounting part. The known hand-held mop is used for a fine cleaning operation by inserting it into a relatively complicated and narrow structure inside a room or a vehicle

[0003] In order to insert the hand-held mop into a relatively complicated and narrow structure and smoothly perform a cleaning operation by lightly pressing the mop body against an object to be cleaned, the mounting part needs to bend when pressed by the user. Therefore, the mounting part for supporting the mop body must be made of a relatively soft material.

[0004] On the other hand, the grip connected to the mounting part needs to be securely held by the user, so that it is made of a relatively hard synthetic resin such as PP (polypropylene).

[0005] In a construction in which the soft mounting part and the hard grip are connected to each other, however, the soft mounting part and the hard grip may easily become disconnected from each other at the connection, which will interfere with the cleaning operation.

SUMMARY OF THE INVENTION

[0006] Accordingly, it is an object of the invention to provide a hand-held mop in which a hard grip connected to a soft mounting part for mounting the mop body is prevented from becoming detached from the mounting part, during cleaning operation.

[0007] The invention provides a hand-held mop including a mop body, a mounting part and a grip. The mop body includes a mop body portion having a mounting space. The mounting part has a mounting piece which is inserted into the mounting space of the mop body portion, and an insert. The grip has a holding side which defines an insert space into which the insert of the mounting part is inserted, and the grip has a higher hardness than the mounting part. Further, a side opening is formed in the holding side of the grip, and a side projection is formed on the insert of the mounting part and engaged

in the side opening of the grip. A spring region is formed in the holding side of the grip, and when the insert is inserted into the insert space, the spring region is pressed by the side projection of the insert and bent. The spring region is provided as an example of an elastic region to exert biasing force. For example, a leaf spring member can be utilized.

[0008] In the hand-held mop according to the invention, the mounting part and the grip are long and narrow, and the side opening formed in the holding side of the grip extends in a width direction of the grip, so that the spring region is formed between the side opening and a front end of the holding side in the holding side.

[0009] As one aspect of the invention, the width of the insert of the mounting part is shorter than the width of the insert space of the grip, and when the spring region is pressed by the side projection of the insert, the spring region can freely bend in its width direction without interference of the insert. Further, a contact projection is formed on a side of a front end of the insert of the mounting part and comes in contact with an inner wall of the insert space of the grip.

[0010] As one aspect of the invention, a proximal end projection is formed on a proximal end of the insert of the mounting part, and a positioning opening is formed in the insert space of the grip and receives the proximal end projection.

[0011] As one aspect of the invention, the grip is made of polypropylene (PP).

[0012] As one aspect of the invention, the spring region of the grip has a shorter extent in its longitudinal direction than in its width direction.

[0013] As one aspect of the invention, an engagement protruding piece is formed on each of the mounting pieces of the mounting part and extends outward and is engaged in the mounting space of the mop body portion.

[0014] As described above, according to the invention, during cleaning operation using a hand-held mop, a soft grip is prevented from becoming detached from a hard mounting part for mounting and supporting a mop body.

[0015] Other objects, features and advantages of the invention will be readily understood after reading the following detailed description together with the accompanying drawings and the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016]

FIG. 1 is a plan view showing an entire hand-held mop according to the invention.

FIG. 2(a) is an exploded plan view of a mounting part and a grip, and FIG. 2(b) is an enlarged view of a proximal end of the mounting part.

FIG. 3 is an exploded back view of the mounting part and the grip.

FIG. 4 is a side view of the mounting part.

FIG. 5 is a side view of the grip.

FIG. 6(a) is an enlarged view of a front end portion of the grip, and FIG. 6(b) is a view taken from a direction of arrow B in FIG. 6(a).

DETAILED DESCRIPTION OF THE INVENTION

[0017] Each of the additional features and method steps disclosed above and below may be utilized separately or in conjunction with other features and method steps to provide and manufacture improved hand-held mops and method for using such hand-held mops and devices utilized therein. Representative examples of the invention, which examples utilized many of these additional features and method steps in conjunction, will now be described in detail with reference to the drawings. This detailed description is merely intended to teach a person skilled in the art further details for practicing preferred aspects of the present teachings and is not intended to limit the scope of the invention. Only the claims define the scope of the claimed invention. Therefore, combinations of features and steps disclosed within the following detailed description may not be necessary to practice the invention in the broadest sense, and are instead taught merely to particularly describe some representative examples of the invention, which detailed description will now be given with reference to the accompanying drawings.

[0018] FIGS. 1 to 6 show a hand-held mop according to the embodiment of the invention.

[0019] As shown in FIGS. 1, 2(a) and 2(b), a hand-held mop 1 includes a mop body 2, an elongate mounting part 10 and an elongate grip 20. The mop body 2 includes a pair of mop body portions 2a each having a mounting space 3. The mounting part 10 is made of a soft synthetic resin material such as elastomer. The mounting part 10 includes a pair of mounting pieces 11 which are formed on its front end side and inserted into the mounting spaces 3 of the mop body portions 2a, and an insert 15 formed on its proximal end. The grip 20 is made of a harder synthetic resin material than the material of the mounting part 10, such as PP (polypropylene), and includes a holding side 22 and a grip body 21. The holding side 22 is formed on the front end of the grip 20 and defines an insert space 22a into which the insert 15 of the mounting part 10 is inserted.

[0020] In this case, in order to realize a smooth cleaning operation by lightly pressing the mop body 10 against an object to be cleaned, the mounting part 10 is made of a soft material which can bend when pressed by the user.

[0021] On the other hand, the grip 20 needs to be securely held by the user, so that it is made of a hard material.

[0022] The mop body 1 includes the pair of mop body portions 2a as described above, and each of the mop body portions 2a is formed by bonding nonwoven fabric sheets 4 together. The mounting space 3 is formed between the bonded nonwoven fabric sheets 4.

[0023] Further, each of the mop body portions 2a has

a mop part 5 formed on the front and back sides of the nonwoven fabric sheets 4 and formed of fine nonwoven fabric having a cleaning function. Cleaning is performed by the mop part 5.

[0024] The nonwoven fabric sheets 4 of the mop body portions 2a are bonded together on the proximal end of the mop body portions 2a. The nonwoven fabric sheets 4 are not bonded on the front end side of the mop body portions 2a and a cleaning space 7 is formed between the mop body portions 2a. The mop parts 5 of the mop body portions 2a are used to clean a structure inside a room or a vehicle. Further, by inserting the structure into the cleaning space 7, the structure can be reliably cleaned even if it is small.

[0025] As shown in FIGS. 1, 2(a), 2(b), 3, 4, 5, 6(a) and 6(b), the mounting part 10 includes the pair of mounting pieces 11 which are inserted into the mounting spaces 3 of the mop body portions 2a, and the insert 15 connected to the mounting pieces 11. The mounting pieces 11 are situated on the front end side of the mounting part 10, and the insert 15 is situated on the proximal end side. The mounting part 10 is formed of soft elastomer as a whole so that the mounting part 10 can hold the mop body 2 and deform the mop body 2 such that the mop body 2 conforms to the contour of the structure to be cleaned. Particularly, the mounting pieces 11 of the mounting part 10 have flexibility so that the mop body 2 can deform in such a manner as to conform to the contour of the structure. As the soft elastomer forming the mounting part 10, olefinic thermoplastic elastomer is used. Specifically, Zelas (registered trademark) of Mitsubishi Chemical Co., Ltd. can be used as the olefinic thermoplastic elastomer.

[0026] A semicircular plate-like engagement protruding piece 12 is formed on each of the mounting pieces 11 and protrudes outward so that it engages with the mounting space 3 of the mop body portion 2a.

[0027] The insert 15 formed on the proximal end of the mounting part 10 is inserted into an insert space 22a of the grip 20, so that the mounting part 10 is securely connected to the grip 20, which will be described below. A guide piece 16 is formed on one side of the insert 15 of the mounting part 10 and serves to guide the insert 15 in sliding contact with a side edge 25a of a cover 25 of the grip 20 when the insert 15 is inserted into the insert space 22a of the grip 20. The top of the guide piece 16 is substantially flush with the top of the mounting pieces.

[0028] The insert space 22a is formed on the front end of the grip 20 and the insert 15 of the mounting part 10 is inserted into the insert space 22a as described above. The insert space 22a is defined by a holding side 22 for holding the insert 15 and a pair of bent covers 25 formed on the both side edges of the holding side 22 (FIG. 6 (a) (b)).

[0029] As shown in FIG. 3, a side opening 23 is formed in the holding side 22 of the grip 20, and a side projection 19 is formed on the insert 15 of the mounting part 10 and engages with the side opening 23 of the grip 20. In this

case, the side opening 23 formed in the holding side 22 of the grip 20 extends along a width direction L_2 of the grip 20, and a spring region 24 is formed between the side opening 23 and a front end 22b of the holding side 22 in the holding side 22.

[0030] The grip 20 is a part to be held by a user when the user uses the hand-held mop 1 and formed of a harder material (polypropylene) than the mounting part 10. By provision of the spring region 24 between the side opening 23 and the front end 22b in the holding side 22, when the insert 15 of the mounting part 10 is inserted into the insert space 22a of the grip 20, the side projection 19 of the insert 15 comes in contact with an inner wall of the spring region 24 so that the spring region 24 can bend along the width direction L_2 of the grip 20.

[0031] In this case, the spring region 24 of the holding side 22 has an extent 1_1 extending from the side opening 23 to the front end 22b in a longitudinal direction L_1 and has an extent 1_2 in the width direction L_2 corresponding to the width of the side opening 23. The extent 1_1 of the spring region 24 in the longitudinal direction L_1 is shorter than the extent 1_2 in the width direction L_2 such that the spring region 24 can reliably bend along the width direction L_2 .

[0032] Further, a width L_3 of the insert 15 of the mounting part 10 is shorter than a width L_4 of the insert space 22a of the grip 20 (FIGS. 3, 6(a) and 6(b)). When the insert 15 of the mounting part 10 is inserted into the insert space 22a of the grip 20, the side projection 19 of the insert 15 comes in contact with the inner wall of the spring region 24. At this time, when the spring region 24 bends along the width direction L_2 , the insert 15 does not interfere with bending of the spring region 24 because the width L_3 of the insert 15 is shorter than the width L_4 of the insert space 22a.

[0033] With such a construction that, when the insert 15 of the mounting part 10 is inserted into the insert space 22a of the grip 20, the side projection 19 of the insert 15 comes in contact with the inner wall of the spring region 24 and the spring region 24 bends along the width direction L_2 , the protruding height of the side projection 19 of the insert 15 can be increased to the greatest extent practicable (for example, 0.1 to 1.0 mm higher than a conventional product). Therefore, the side projection 19 of the insert 15 can be securely engaged in the side opening 23 of the grip 20.

[0034] Further, as shown in FIGS. 2(a) and 2(b), a pair of contact projections 17 are formed on the both sides of the front end of the insert 15 of the mounting part 10 and come in contact with the inner wall of the insert space 22a of the grip 20. Specifically, as described above, the width L_3 of the insert 15 of the mounting part 10 is shorter than the width L_4 of the insert space 22a of the grip 20, so that a clearance is created between the insert 15 of the mounting part 10 and the insert space 22a of the grip 20 when the insert 15 is inserted into the insert space 22a. However, when the insert 15 is completely inserted into the insert space 22a, the contact projections 17 come

in contact with the inner wall of the insert space 22a of the grip 20. Therefore, the insert 15 can be securely mounted into the insert space 22a, so that the mounting part 10 and the grip 20 can be securely connected to each other.

[0035] Further, a proximal end projection 18 is formed on the proximal end of the insert 15 of the mounting part 10, and a positioning opening 26 is formed in the insert space 22a of the grip 20 and receives the proximal end projection 18 and particularly serves to position it in the width direction L_2 .

[0036] Operation of this embodiment having the above-described construction is now explained.

[0037] First, the mounting part 10 and the grip 20 are connected to each other. In this case, the insert 15 of the mounting part 10 is inserted into the insert space 22a of the grip 20. At this time, the side projection 19 of the insert 15 which protrudes to the greatest extent practicable comes in contact with the inner wall of the spring region 24 on the holding side 22 of the grip 20. The spring region 24, having the extent 1_2 in the width direction L_2 which is longer than the extent 1_1 in the longitudinal direction L_1 , can smoothly bend along the width direction L_2 when the side projection 19 of the insert 15 comes in contact with the inner wall of the spring region 24. Further, the insert 15, having the width L_3 shorter than the width L_4 of the insert space 22a, does not interfere with bending of the spring region 24.

[0038] Connection between the mounting part 10 and the grip 20 is now further explained. The relatively large side opening 23 is formed in the holding side 22 of the grip 20 and extends along the width direction L_2 of the grip 20, and the side opening 23 defines the spring region 24 between the side opening 23 and the front end 22b of the holding side 22 in the holding side 22. In this case, the side opening 23 largely extends along the width direction L_2 so that the spring region 24 has the extent 1_2 in the width direction L_2 which is longer than the extent 1_1 in the longitudinal direction L_1 . Therefore, the spring region 24 can easily deform in the width direction L_2 .

[0039] Further, as described above, the width L_3 of the insert 15 is shorter than the width L_4 of the insert space 22a. Therefore, when inserting the insert 15 of the mounting part 10 into the insert space 22a of the grip 20, first, the side projection 19 (protruding to a greater extent than a conventional product) of the insert 15 comes into contact with the spring region 24 of the holding side 22 and presses it. At this time, the spring region 24 bends along the width direction L_2 , so that the width L_4 of the insert space 22a is shortened. Even if the spring region 24 bends, however, the insert 15 does not interfere with bending of the spring region 24 because the width L_3 of the insert 15 is shorter than the width L_4 of the insert space 22a. With such a construction that the width L_3 of the insert 15 is shorter than the width L_4 of the insert space 22a and the insert 15 does not interfere with bending of the spring region 24, the insert 15 can be smoothly inserted into the insert space 22a.

[0040] When the insert 15 of the mounting part 10 is completely inserted into the insert space 22a of the grip 20, the contact projections 17 of the insert 15 come in contact with the inner wall of the insert space 22a. Therefore, the insert 15 can be reliably mounted into the insert space 22a, so that the mounting part 10 and the grip 20 can be securely connected to each other. At the same time, the proximal end projection 18 of the insert 15 is inserted into the positioning opening 26 of the insert space 22a and positions the insert 15 in the width direction L_2 .

[0041] When the insert 15 of the mounting part 10 is completely inserted into the insert space 22a of the grip 20, the side projection 19 of the insert 15 is engaged in the side opening 23 of the grip 20. In this case, the side projection 19 of the insert 15 does not easily become detached from the side opening 23 because the side projection 19 protrudes to a greater extent than a conventional product. Further, as described above, by provision of the contact projections 17 of the insert 15 which come in contact with the inner wall of the insert space 22a, the insert 15 does not rattle within the insert space 22a along the width direction L_2 . Further, the proximal end projection 18 of the insert 15 is inserted into the positioning opening 26 of the insert space 22a, so that the insert 15 can be properly positioned in the width direction L_2 within the insert space 22a as described above.

[0042] Next, the mounting pieces 11 of the mounting part 10 are inserted into the associated mounting spaces 3 formed in the mop body portions 2a, 2b of the mop body 2, so that the mop body 2 is connected to the mounting part 10. In this manner, the hand-held mop 1 can be obtained.

[0043] In use of the hand-held mop 1, the grip body 21 of the grip 20 is held by the user and a cleaning operation is performed on a structure inside a room or a vehicle with the mop body 2 held in contact with the structure.

[0044] Each of the mop body portions 2a of the mop body 2 has the mop part 5 formed on its front and back sides, so that the structure to be cleaned can be easily and reliably cleaned.

[0045] In the case of a narrow or thin structure, the structure can be reliably cleaned by inserting it into the cleaning space 7 of the mop body 2.

[0046] As described above, the side projection 19 of the insert 15 can be configured to protrude from the insert 15 to a greater extent, for example, 0.1 to 1.0 mm higher than a conventional product. Therefore, even if a great force is applied from the grip 20 to the mounting part 10 during cleaning operation using the hand-held mop 1, the side projection 19 of the insert 15 does not become detached from the side opening 23 of the holding side 22. Thus, the insert 15 of the mounting part 10 can be reliably mounted into the insert space 22a of the grip 20, so that the hard grip 20 does not become detached from the soft mounting part 10.

[0047] As described above, according to this embodiment, when the insert 15 is inserted into the insert space

22a in order to connect the grip 20 to the mounting part 10, the side projection 19 of the insert 15 comes in contact with the inner wall of the spring region 24 of the grip 20. In this case, the spring region 24 bends along the width direction L_2 , so that the insert 15 can be smoothly inserted into the insert space 22a. At the same time, the side projection 19 can be engaged in the side opening 23, so that the insert 15 can be securely held within the insert space 22a. Therefore, even if the user holds the grip 20 and applies a great force from the grip 20 to the mounting part 10 during cleaning operation using the hand-held mop 1, the hard grip 20 does not become detached from the soft mounting part 10.

[0048] Further, in the above-described embodiment, the mop body 2 is described as having a pair of the mop body portions 2a, but it may have only one mop body portion 2a.

[0049] Further, a pair of the contact projections 17 are described as being formed on the both sides of the insert 15, but a contact projection 17 which comes in contact with the inner wall of the insert space 22a may be formed only on one side of the insert 15.

Description of Numerals

[0050]

- 1 hand-held mop
- 2 mop body
- 2a, 2b mop body portion
- 3 mounting space
- 10 mounting part
- 11 mounting piece
- 12 engagement protruding piece
- 15 insert
- 16 guide piece
- 17 contact projection
- 18 proximal end projection
- 19 side projection
- 20 grip
- 21 grip body
- 22 holding side
- 22a insert space
- 23 side opening
- 24 spring region
- 25 cover
- 26 positioning opening

Claims

1. A hand-held mop comprising:

- a mop body including a mop body portion having a mounting space,
- a mounting part having an mounting piece and an insert, the mounting piece being inserted into the mounting space of the mop body portion and

a grip having a holding side which defines an insert space into which the insert of the mounting part is inserted, the grip having a higher hardness than the mounting part, wherein:

- a side opening is formed in the holding side of the grip, 5

a side projection is formed on the insert of the mounting part and engaged in the side opening of the grip, and 10

a spring region is formed in the holding side of the grip, and when the insert is inserted into the insert space, the spring region is pressed by the side projection of the insert and bent. 15
2. The hand-held mop as defined in claim 1, wherein the mounting part and the grip are long and narrow, and the side opening formed in the holding side of the grip extends in a width direction of the grip so that the spring region is formed between the side opening and a front end of the holding side in the holding side. 20
3. The hand-held mop as defined in claim 2, wherein the width of the insert of the mounting part is shorter than the width of the insert space of the grip, and when the spring region is pressed by the side projection of the insert, the spring region can freely bend in its width direction without interference of the insert, and wherein a contact projection is formed on a side of a front end of the insert of the mounting part and comes in contact with an inner wall of the insert space of the grip. 25 30 35
4. The hand-held mop as defined in any one of claims 1 to 3, wherein a proximal end projection is formed on a proximal end of the insert of the mounting part, and a positioning opening is formed in the insert space of the grip and receives the proximal end projection. 40
5. The hand-held mop as defined in any one of claims 1 to 4, wherein the grip is made of polypropylene. 45
6. The hand-held mop as defined in any one of claims 1 to 5, wherein the spring region of the grip has a shorter extent in its longitudinal direction than in its width direction. 50
7. The hand-held mop as defined in any one of claims 1 to 6, wherein an engagement protruding piece is formed on each of the mounting pieces of the mounting part and extends outward and is engaged in the mounting space of the mop body portion. 55

FIG. 1

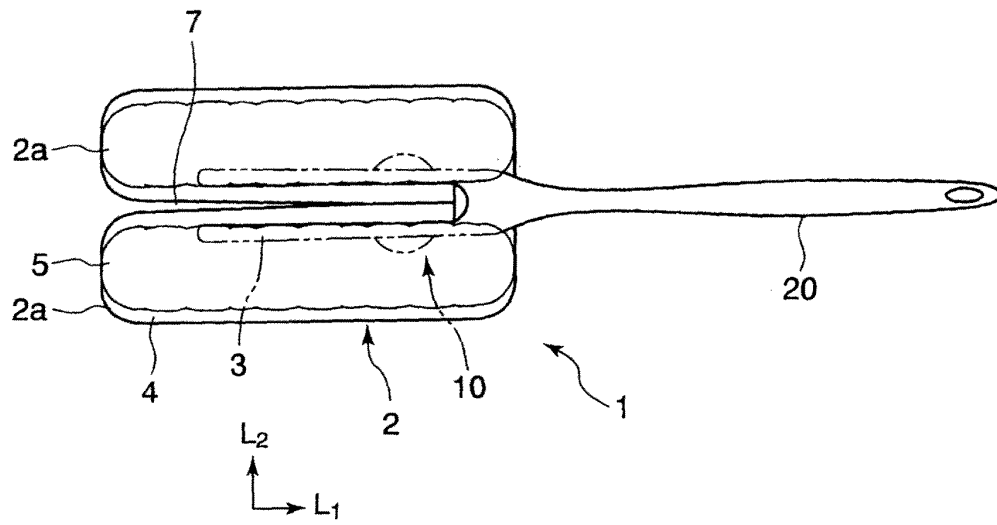


FIG. 2

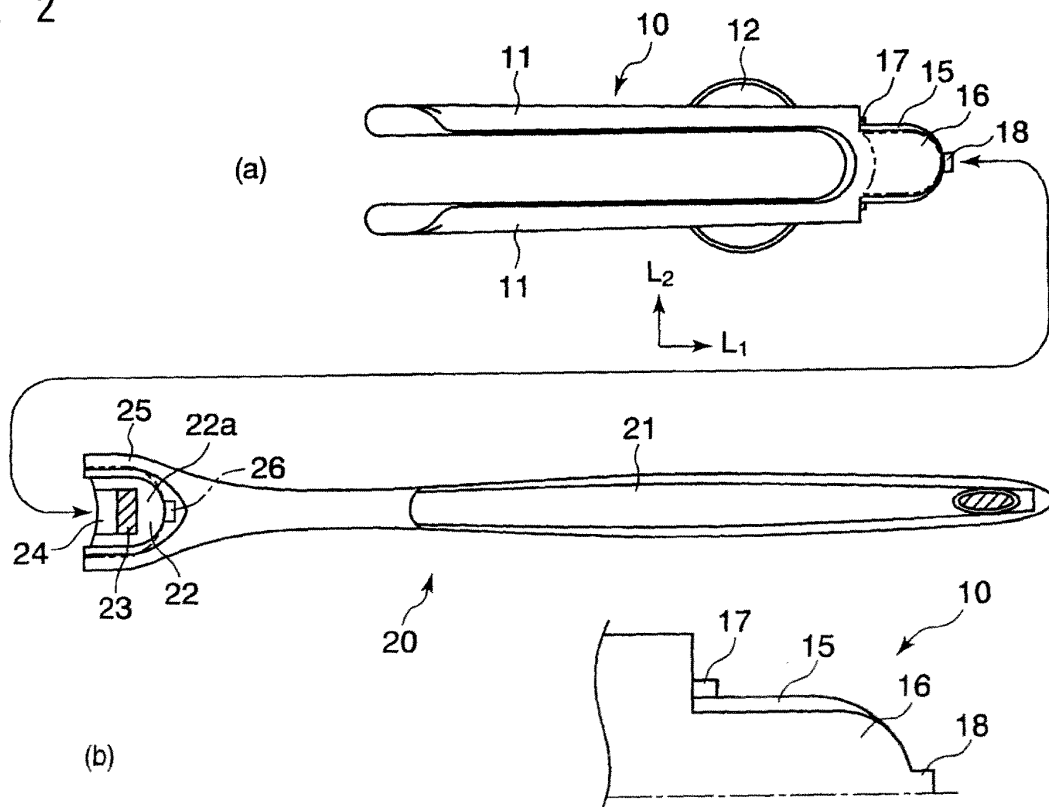


FIG. 3

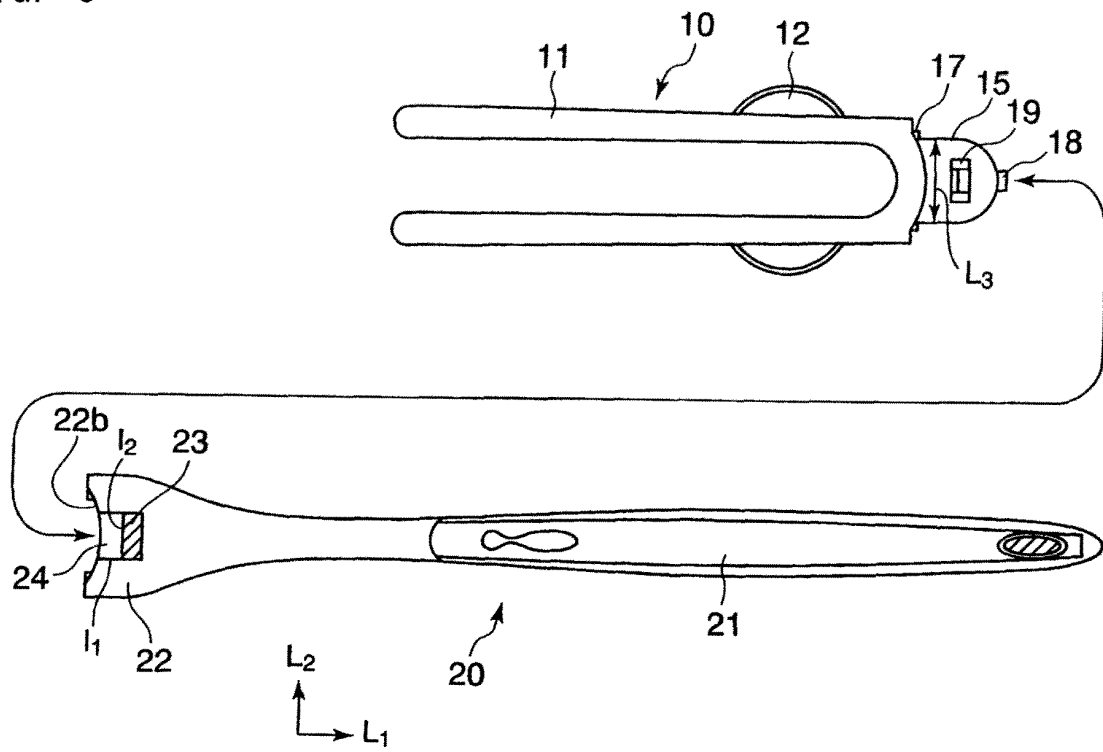


FIG. 4

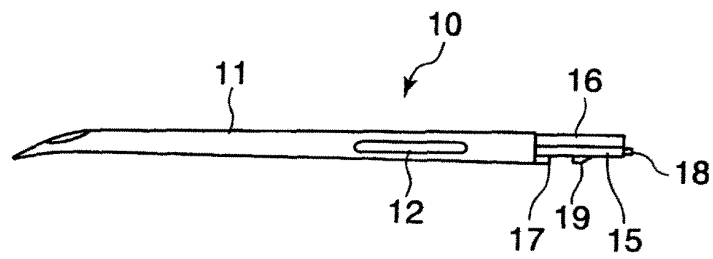


FIG. 5

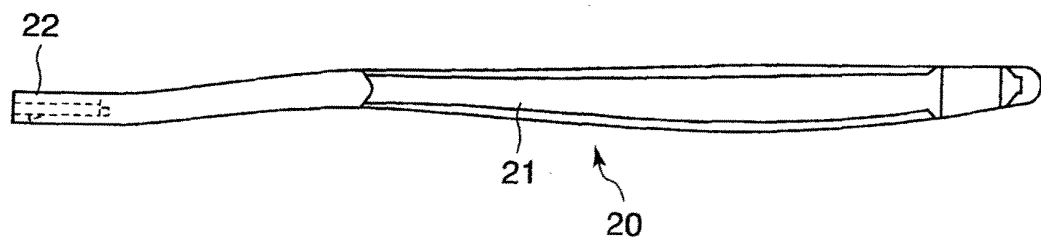
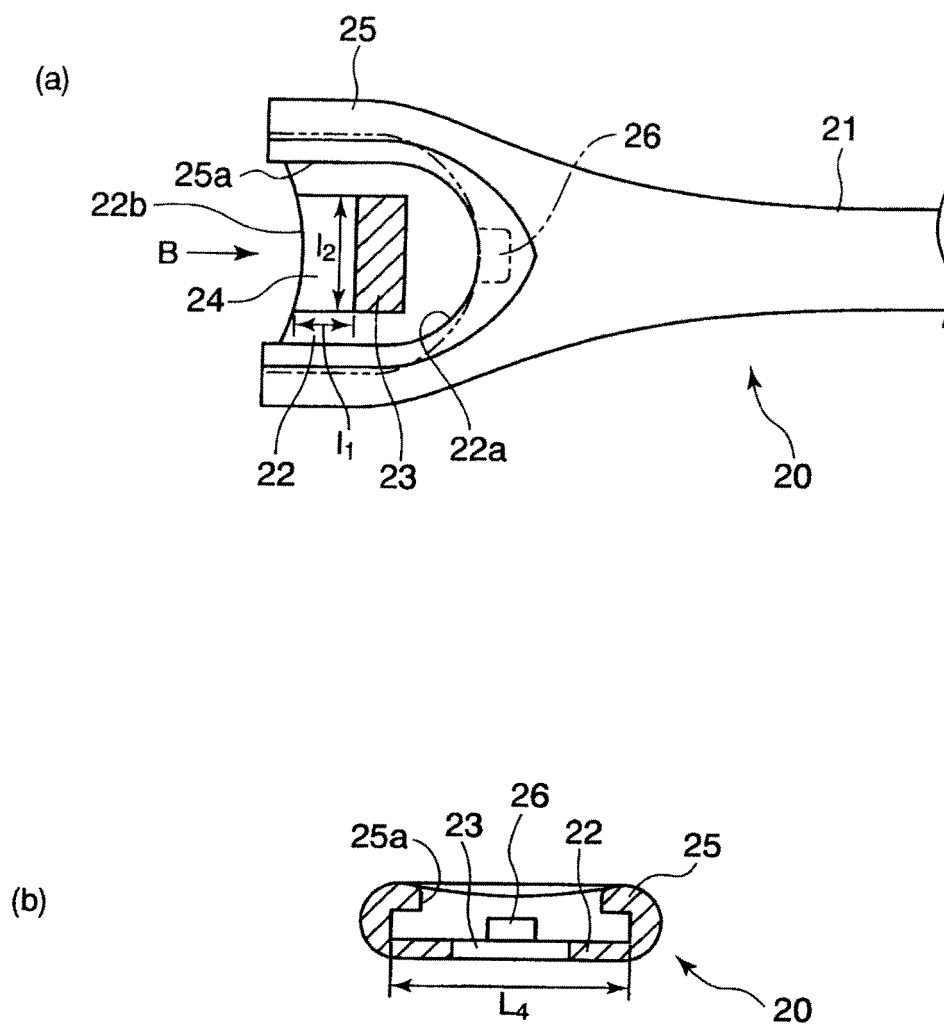


FIG. 6



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2010/058621

A. CLASSIFICATION OF SUBJECT MATTER A47L13/20(2006.01) i, A47L13/10(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) A47L13/20, A47L13/10 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2010 Kokai Jitsuyo Shinan Koho 1971-2010 Toroku Jitsuyo Shinan Koho 1994-2010 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.
Y	JP 2003-265390 A (Uni-Charm Corp.), 24 September 2003 (24.09.2003), entire text; all drawings & US 2005/0005381 A1 & EP 1395162 A & WO 2002/102221 A1 & DE 60230612 D	1-7
Y	JP 2007-044088 A (Azuma Co., Ltd.), 22 February 2007 (22.02.2007), entire text; all drawings (Family: none)	1-7
Y	JP 3044362 U (Kabushiki Kaisha Imotani), 01 October 1997 (01.10.1997), entire text; all drawings (Family: none)	1-7
☒ 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 "I" 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 12 July, 2010 (12.07.10)		Date of mailing of the international search report 27 July, 2010 (27.07.10)
Name and mailing address of the ISA/ Japanese Patent Office		Authorized officer
Facsimile No.		Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2010/058621

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 10-086660 A (Fuji Heavy Industries Ltd.), 07 April 1998 (07.04.1998), paragraphs [0023] to [0028]; fig. 4 (Family: none)	1-7

Form PCT/ISA/210 (continuation of second sheet) (July 2009)

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

- JP 2007167425 A [0002]