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(54) **BRUSH DEVICE WITH QUICK COUPLINGS FOR CLEANING ELEMENTS**

BÜRSTENVORRICHTUNG MIT SCHNELLKUPPLUNGEN FÜR REINIGUNGSELEMENTE

DISPOSITIF DE BROSSE AVEC RACCORDS RAPIDES POUR NETTOYER DES ÉLÉMENTS

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Description

[0001] The present invention relates to the technical field concerning the washing and/or cleaning of obj ects, such as vehicles, and refers to a brush device with quick couplings for cleaning elements.

[0002] There are known brush devices of the type rotating around a rotation shaft thereof, for example in use in vehicle washes or in industrial washing. Each of such brush devices is provided with one or more flexible support members fixed to the cylindrical or prismatic outer surface of the respective rotation shaft. Each flexible support is equipped with a plurality of concave seats open in the direction opposite to the shaft.

[0003] Each seat is delimited by a respective perimeter wall protruding perpendicularly from the support member and is intended to house a median transverse portion of at least one cleaning element generally in the form of a flexible ribbon-like flap made, for example, of non-woven fabric, felt, or closed-cell synthetic material sheet.

[0004] A transverse portion of each cleaning element, housed in the respective concave seat, is fixed to the bottom of the seat constituted by the flexible support for the member of fastenings, seams, staples and other types of connections.

[0005] Some types of brushes, for example those for the final drying of vehicles or for cleaning delicate surfaces or surfaces to be preserved, require the cleaning elements to be periodically and thoroughly washed. These washings of the cleaning elements cannot be carried out on site and require that an employee, after separating the support members from the rotation shaft, detaches, one by one, each cleaning element from its respective seat by cutting or detaching the fastenings or seams or staples.

[0006] This operation is complex, not free from risks for the operator and takes a very long time. After washing the cleaning elements, each of them must be repositioned and fixed into its respective seat.

[0007] Prior art document US 435304 A discloses a brush device that uses screws to releasable connect cleaning elements to the driven support.

[0008] Drawbacks of such known devices consist in the fact that it's very expensive to clean such kind of brushes, it takes a lot of time, it can be dangerous for the operator, for example he could get injured while cutting or detaching the fasteners, and also can lead a damage to the delicate cleaning elements or to other parts of the brush that can be excessively stressed by the detachment and fixing operations.

[0009] An object of the present invention is to propose a brush device with quick couplings for cleaning elements which allows to carry out the operations of detaching and fixing the cleaning elements from the respective support member, in a fast and safe way.

[0010] Another object is to allow the detachment and repositioning of the cleaning elements even without the need to separate the support members from the rotation shaft.

[0011] The characteristics of the invention are highlighted below with particular reference to the accompanying drawings in which:

- Figure 1 shows a schematic, axonometric, exploded and partial view of a quick coupling for connecting a cleaning element to a support member of the brush device with quick couplings for cleaning elements object of the present invention;
- Figure 2 shows a partial and axonometric view of the support member of Figure 1 provided with a plurality of concave seats;
- Figure 3 shows a partial and cross-section view of a variant of the elements of Figure 1 mutually assembled;
- Figure 4 shows an enlarged detail of Figure 3;
- Figure 5 shows a side view of a second connection element of a second variant of the brush device with quick couplings for cleaning elements of Figure 1;
- Figure 6 shows a section view along the plane VI-VI of the second connection element of Figure 5;
- Figure 7 shows a section view along the plane VII-VII of the second connection element of Figure 5;
- Figures 8, 9, 10 and 11 show respectively bottom, top, front and rear views of the second connection element of Figure 5;
- Figures 12 and 13 show respective axonometric views of the second connection element of Figure 5;
- Figures 14, 15 and 16 show respectively bottom, side and top views of a first connection element of the second variant of the brush device with quick couplings for cleaning elements of Figure 1;
- Figure 17 shows a section view along the XVII-XVII plane of the first connection element of Figure 15;
- Figures 18 and 19 show respective axonometric views of the first connection element of Figure 14;
- Figures 20 and 22 show respective top and side views of a support member of the second variant of the brush device with quick couplings for cleaning elements of Figure 1;
- Figure 21 shows a section view along the plane XXI-XXI of the support member of Figure 20;
- Figures 23 and 24 show respective rear and front views of the support member of Figure 20;
- Figure 25 shows an axonometric view of two support members of Figure 20;
- figure 26 shows a schematic, axonometric, exploded and partial view of the second variant of the brush device with quick couplings for cleaning elements, the parts of which are illustrated in Figures 5 and subsequent ones.

[0012] With reference to Figures 1 to 4, 1 indicates the brush device with quick couplings for cleaning elements object of the present invention. Such device 1 comprises at least one rotation shaft, for example of the metal tubular type and made by extrusion of aluminum or similar.

[0013] The rotation shaft, being of a known type and not illustrated, can be operated by respective motor elements and has a set of support members 3 carried out in the rotation shaft itself or fixed to it in an irremovable way or, preferably and as illustrated in the figures, in a removable way. The support members 3 are rigid and shaped like a portion of the external face of the shaft or, instead and preferably, they are rectangular and flexible. Once mounted onto the rotation shaft, the support members 3 reproduce the shape of the portion of the shaft to which they are removably fixed; for example, the rotation shaft can be cylindrical in shape and each support member 3 is fixed to it with two sides parallel to the longitudinal geometric axis of the rotation shaft assuming the shape of a cylinder portion.

[0014] Each support member 3 is assigned to connect a respective plurality of cleaning elements 5 to said shaft. Each cleaning element can consist of a sheet, patch, strip or flat of rectangular, ribbon-like or other elongated shape.

[0015] One or both ends of each cleaning element 5 can be frayed, as illustrated in Figure 1, or intact and this cleaning element 5 can be made of fabric, of a low density synthetic and/or closed-cell material, of non-woven fabric, of felt or of other flexible materials suitable for washing.

[0016] The device 1 comprises a plurality of first connection elements 7, each assigned to be fixed, for example by welding, gluing, rivets, by interference or by other fastening means, to the respective support member 3, and each provided with a housing 9, assigned to host a portion of at least one cleaning element 5, and with a respective second connection element 11, assigned to fix reversibly, or to lock and unlock, said portion of the at least one cleaning element 5 placed or clamped between said first 7 and second 11 connection elements.

[0017] The portion of the cleaning element 5 intended to be blocked between the first 7 and second 11 connection elements has an elongated rectangular cross section consisting of a layer of the cleaning element material or of multiple folded layers; for example, the ratio between the thickness and the width of the cleaning element, that is the ratio between the dimensions of the cross section of this unfolded element, can be approximately between 1 to 10 and 1 to 300.

[0018] The main dimension of the housing 9 has length equal to or greater than the largest dimension of said section.

[0019] The ends of the housing 9 are delimited by retaining elements first 15 and second 17 placed at the respective end portions of the first connection element 7. The ends of the second connection element 11 bear matching members, respectively first 21 and second 23.

[0020] The first 15 and second 17 retaining elements can be rigidly fixed to the ends of the main body of the first connection element 7, or preferably they 15, 17 are made in a single body with the first connection element 7.

[0021] The first 15 and second 17 retaining elements are assigned to house, by reversibly locking them, the first 21 and second 23 matching members of the second connection element 11 blocking it together with the at least one respective cleaning element.

[0022] The first 7 and second 11 connection elements can have an overall shape as a very elongated "C" and as an "I", respectively, and can be made of synthetic material; preferably at least the first connection element 7 is made of plastic material and has a sufficient degree of flexibility and elasticity as better specified below. The first 15 and second 17 retaining elements define respective cavities with a shape approximately complementary to that of the first 21 and second 23 matching members.

[0023] At least the second retaining element 17 has a tooth 27 for delimiting the corresponding cavity and intended to reversibly lock the corresponding matching member 21, 23.

[0024] The tooth 27 is cantilevered onto a flexible arm 29 which connects it to the respective end of the main body of the first connecting element 7.

[0025] The tooth or preferably the flexible arm is provided with a driving extension 33 which, in the fastening condition, moves away from the support member 3 protruding outwards.

[0026] The driving extension 33 is fit for the manual actuation of the flexible arm 29 to free the matching member 21, 23 from the tooth 27 allowing the detachment of the second connection element 11 and the cleaning element 5.

[0027] As seen, the material of the first connection element 7 has flexibility and elasticity such as to allow for the elastic deformation of the flexible arm 29 which can be provided with grooves or tapering for an easier bending or to obtain a hinged movement. Alternatively, the flexible arm 29 can be connected to the main body of the first connection element 7 by means of a hinge with a rotation pin; this hinge can be equipped with elastic elements or the arm 29 can be equipped with reversible joint interlocking retainers to keep the tooth 27 elastically and reversibly in its stop position of the matching member 21, 23.

[0028] A further alternative provides that the matching member 21, 23 and the tooth 23 can be shaped to ensure a certain force which tends to keep them removably coupled to each other until a sufficient detachment force is applied to the flexible arm 29.

[0029] The face of the tooth 27 opposite the corresponding cavity is provided with an inclined surface to facilitate the pressure insertion and the joint block of the connection element 11 and the cleaning element 5.

[0030] The first 21 and second 23 matching members of the second connection element 11 are approximately the same shape and size. Alternatively or additionally, the cavities of the first 15 and second retaining elements 17 of the first connecting element 7 are approximately the same shape and size. In the case of equal and corresponding shapes, the fixing of the cleaning element 5 can be carried out regardless of the mutual orientation

of the first 7 and second 11 connection elements, in fact it will be sufficient to align them and press them towards each other.

[0031] Preferably, where the second connection element 11 can be fixed by removable joint to the first connection element 7, said second connection element 11 is irremovably fixed to the portion of the at least one cleaning element 5 hosted in the housing 9 of the first connection element 7, for example to the face of the latter 5 opposite the first connection element 7. This irremovable fixing of the second connection element 11 to the cleaning element 5 speeds up and facilitates the operations of reassembling the cleaning elements to the brush.

[0032] The irremovable fixing can be achieved by gluing, by melting pins protruding from the second connection element 11 and engaged in respective holes of said portion of the at least one cleaning element 5, by means of seams, fastenings, stitches, clips, expansion elements, screws or similar fixings.

[0033] A further alternative of the invention provides that said first 7 and second 11 connection elements are respectively fixed to the cleaning element 5 and to the support member 3.

[0034] The invention optionally provides the adoption of a reinforcement element 37 assigned to be fixed to the second connection element 11 to block between them the portion of the at least one cleaning element 5; in this case the housing 9 and the cavities of the first 15 and second 17 retaining elements of the first connection element 7 are dimensioned to house the reinforcement element 37 and the second connection element 11 with said interposed portion of the cleaning element 5.

[0035] One among the reinforcement element 37 and the second connecting element 11 can be equipped with a set of protruding pins assigned to engage into holes carried out in said portion of the cleaning element 5 to insert into seats made in the other one and in which said pins are blocked for example by thermal welding or with an ultrasonic welder or other.

[0036] The faces of the reinforcement element 37 and of the first connection element 7 which are mutually facing in the fastening condition may possibly bear respective complementary projections and protrusions fit for at least one of:

- preventing incorrect coupling of the cleaning elements 5 with support members 3 or shafts;
- preventing, in the fastening condition, the sliding of the reinforcement element 37 with respect to the first connection element 7 to avoid unwanted detachment of the at least one cleaning element 5.

[0037] Each first connection element 7 is fixed to the respective support member 3 by fusion, with an ultrasonic welder or other, of pins protruding from the first connection element 7 and engaged into respective holes of the support member 3 itself or by gluing, stitches, clips, expansion elements, screws, seams, bonds or similar fixings.

[0038] The support member 3 is provided with a plurality of concave seats 41, for example of rectangular or oval elongated shape, open in the direction opposite to the shaft, each being delimited by a respective perimeter wall 43 protruding perpendicularly from the support member 3. Each first connection element 7 is fixed, inside a respective concave seat 41, to the bottom of said seat which is constituted by the main sheet-like body of the support member 3; in the operating condition of the brush, the longitudinal axes of the concave seats are preferably mutually parallel and oriented parallel to the longitudinal axis of the rotation shaft or inclined.

[0039] As an alternative to the equality of the shapes of the retaining elements and of the matching members, and where the second retaining element 17 is assigned to house the second matching member 23, the complementary shapes of the first retaining element 15 and of the first matching member 21 can be different from those of the second retaining element 17 and of the second matching member 23; in fact, it is sufficient that the complementary shapes of the first retaining element 15 and of the first matching member 21 are such as to prevent mutual distancing in the radial direction with respect to the rotation shaft when they are mutually engaged; for example, the variant of Figures 3 and 4 provides that the first matching member 21 of the second connection element 11 and the cavity of the first retaining element 15 of the first connection element 7 are of approximately cylindrical shape. Alternatively, the first matching member 21 and the cavity of the first retaining element 15 have rectangular or prismatic shape.

[0040] The mouth of the cavity of the first retaining element 15 of the first connection element 7 has a dimension smaller than the diameter of the cylindrical shape and the cylindrical first matching member 21 of the second connection element 11 has a flattening positioned and dimensioned such as to allow for the exit of the first matching member 21 from the cylindrical cavity of the first retaining element 15 only if the second connection element 11 is rotated by a certain angle with respect to the first connection element 7.

[0041] The second matching member 23 of the second connection element 11 and the cavity of the second retaining element 17 of the first connection element 7 can be approximately rectangular or prismatic in shape. Also the second variant of the brush device with quick couplings for cleaning elements, illustrated in Figures 5 to 26, provides that at least a portion of one or more cleaning elements 5 be clamped between the first 7 and second 11 connection elements.

[0042] Differently from the previous embodiments, in the operating condition the first connection element 7 is housed in the respective concave seat 41 of the support member 3 and is removably locked there by the second connection member 11 releasably fixed, that is detachable and re-attachable, to the support member 3, where the first 7 and second 11 connection elements irremov-

ably block the interposed portions of the respective cleaning elements or elements blocked therebetween. The first retaining element 15 and the second retaining element 17 are placed or carried out in a single body in the respective ends of the second connection element 11.

[0043] The first matching member 21 and the second matching member 23 are placed or carried out in a single body in the respective ends of the support member 3, and are assigned to be housed and reversibly locked in the first 15 and second 17 retaining elements, respectively, for the removable joint fixing of the second connection element 11 and of the first connection element 7 and of the at least one cleaning element 5 associated therewith.

[0044] Each end wall 44 of the perimeter wall 43 of the support member 3, as illustrated in Figures 20 to 25, has a passage delimited by the first 21 and second 23 matching members in proximity to the opening of the concave seat 41. Said matching members first 21 and second 23 extend transversely along the perimeter of said opening of the support member 3 and consist of transverse elements fit to be engaged in coupling and releasing by the first 15 and second 17 retaining elements. Obviously the first 21 and second matching members 23 and the first 15 and second 17 retaining elements can take other forms of reciprocal engagement and jointing, for example the matching members can be convex or one convex and the other concave and each retaining element can have a shape complementary to that of the respective matching member.

[0045] The first connection element 7 is rectangular and has two longitudinal walls forming the concave housing 9 assigned to host the portion of the cleaning element 5 assigned to be blocked between the same first connection element 7 and the second connection element 11. The ends of the housing 9 are open and flat or preferably delimited by a frame slightly raised with respect to the bottom of the housing itself, that is, less deep than said longitudinal walls, as shown for example in Figures 14 to 19. Said ends of the housing 9 are therefore partially or totally open to house respectively the first retaining element 15 and the second retaining element 17, abutting the edge of the housing 9.

[0046] The second connection element 11 has a prevalent longitudinal development and has a portion assigned to abut with the respective at least one cleaning element 5; said portion has length equal to or slightly greater than the length of the housing 9 and width lower than that of this housing 9.

[0047] The second connection element 11 has the first retaining element 15at one end, protruding longitudinally, and at its opposite end it has a flexible arm 29 which carries the second retaining element 17.

[0048] The second retaining element 17 comprises a tooth 27 cantilever fixed on the flexible arm 29 and assigned to reversibly lock the corresponding matching member 21, 23.

[0049] The flexible arm 29 ends in a driving extension 33 for the manual elastic operation of the flexible arm 29. The second connection element 11 has a longitudinal handle 34 which, in the fastening condition, is parallel to the support member 3 and to the first connection element 7.

[0050] The handle 34 ends in proximity to the driving extension 33 so as to allow an employee to grasp the handle of the connection element 11 with one hand and at the same time to exert, for example with the thumb of the hand, a force on the driving extension 33 to release the second connection element 11 from its fixed condition to the support member 3 to detach from the support member 3 the assembly of the first 7 and second connection elements 11 with the at least one cleaning element 5 blocked between of them.

[0051] Preferably, the first 15 and second 17 retaining elements, cooperating with respective projections or protrusions facing them, define respective cavities with a shape approximately complementary to that of the first 21 and second 23 matching members. The first 15 and second 17 retaining elements are dimensioned such as to be inserted into the respective passage of the end wall 44 of the support member 3, and are shaped to ensure a certain force which tends to keep them removably coupled to the respective first 21 and second 23 matching members as long as a sufficient release and detachment force is not applied to the flexible arm 29 and to the handle 34.

[0052] Preferably, the shape and/or position of each of the first 21 and second 23 matching members is compatible with the shape and size of only one among the first 15 and second 17 retaining elements and/or of the respective cavities to allow the connection of the second connection element 11 to the support member 3 in one direction only. In particular, the second matching member 23 is more distant from the bottom of the concave seat 41 than the first matching member 21, and the passage in the end wall 44 of the perimeter wall 43 of the support member 3 delimited by the second matching member 23 is wider than that delimited by the first matching member 21; the second matching member 23 is compatible with jointing only with the second retaining element 17, while the first matching member 21 is compatible only with the first retaining element 15.

[0053] The portion of the flexible arm 29 closest to the second connection element 11, i.e. the face of the tooth 27 opposite the respective cavity, is provided with an inclined surface which, in correspondence with the fastening of the second connection element 11 itself to the support member 3 , slides on the respective matching member 21, 23 to facilitate the pressure insertion and the joint block of the connection element 11, with the cleaning element 5 and the first connection element 7 associated therewith, to the support member 3.

[0054] Preferably, since the second connection element 11 can be fixed by removable interlocking joint to the respective support member 3, said second connection element 11 is irremovably fixed to the first connection

element 7, and said at least one portion of the at least one cleaning element 5 is inserted therebetween. This fixing simplifies and speeds up the fixing and removal of the cleaning elements 5 from the support member 3, for example in correspondence with the replacement of these cleaning elements 5. The irremovable fixing of the second connection element 11 to the first element connection 7 can be made by welding pins 12 protruding from the second connection element 11 and engaged, through suitable openings or perforations of the at least one cleaning element 5, in respective holes 14 of the first connection element 7, or this fixing can be obtained by means of seams, ties, stitches, clips, expansion elements, screws, rivets or similar fixings. The portion or portions of the cleaning element 5 or of the cleaning elements are thus irreversibly fixed in the housing 9 between the first 7 and second 11 connection elements.

Claims

1. Brush device with quick couplings for cleaning elements (5) comprising at least one rotation shaft that can be operated by respective motor elements, a set of support members (3) obtained in the rotation shaft or fixed to it and each one assigned to connect a respective plurality of cleaning elements (5) to said shaft; said device (1) comprises a plurality of first connection elements (7), each one assigned to be fixed to the respective support member (3) and provided with a housing (9) assigned to house a portion of at least one cleaning element (5) and with a respective second connection element (11) assigned to reversibly fix, i.e. to block and unblock, said at least one cleaning element (5); said device (1) also comprises first (15) and second (17) retaining elements which are placed at, or obtained in, respective ends of the first connection element (7) and assigned to house, by reversibly blocking them, matching members first (21) and second (23) placed at the ends of the second connection element (11), or said first (15) and second (17) retaining elements are placed or carried out in the respective ends of the second connection element (11) and are assigned to house, by reversibly blocking them, the first (21) and second (23) matching members which are placed or obtained in the ends of the respective support member (3); said device (1) is **characterized in that** said at least one cleaning element (5) is placed or clamped between said first (7) and second (11) connection elements; the first (15) and second (17) retaining elements define respective cavities with a shape approximately complementary to that of the first (21) and second (23) matching members and **in that** at least the second the retaining element (17) has a tooth (27) delimiting the corresponding cavity, cantilever fixed onto a flexible arm (29) which connects it to the respective end of the first connection element (7) or of the second connection element (11); said flexible arm (29) is provided with a driving extension (33) fit for the manual actuation of the flexible arm (29) itself to free the matching member (21, 23) from the tooth (27) allowing for the detachment of at least the second connection element (11) and of the cleaning element (5).

2. Device according to claim 1 **characterized in that** one face of the tooth (27) opposite the corresponding cavity is provided with an inclined surface to facilitate the pressure insertion and the joint block of the connection element (11) and of the cleaning element (5) to the first connection element (7) or to the respective support member (3).

3. Device according to claim 1 or 2 **characterized in that** the portion of the cleaning element (5) assigned to be blocked between the first (7) and second (11) connection elements has an elongated rectangular cross section and **in that** the main dimension of the housing (9) has length equal to or greater than the largest dimension of said section.

4. Device according to any of the preceding claims **characterized in that** the first (21) and second (23) matching members are of approximately equal shape and size and/or **in that** the cavities of the first (15) and second (17) retaining elements of the first connection element (7) are of approximately equal shape and size or the shape of one of the first (21) and second (23) matching members of the second connection element (11) is compatible with the shape and size of only one of the cavities of the first (15) and second (17) retaining elements to allow for the connection in one direction only.

5. Device according to any of the preceding claims **characterized in that** the first matching member (21) and the cavity of the first retaining element (15) are approximately cylindrical in shape or are approximately rectangular or prismatic in shape and/or **in that** the second matching member (23) and the cavity of the second retaining element (17) have approximately rectangular or prismatic shape.

6. Device according to any of the preceding claims **characterized in that**, where the second connection element (11) can be fixed by removable joint to the first connection element (7), said second connection element (11) is irremovably fixed to the face of said portion of the at least one cleaning element (5) opposite to the first connection element (7) by gluing, by fusion of pins protruding from the second connection element (11) and engaged in respective holes of said portion of the at least one cleaning element (5), by means of seams, ties, stitches, clips, expansion elements, screws or similar fasteners.

7. Device according to claim 6 **characterized in that** it comprises a reinforcement element (37) assigned to be fixed to the second connection element (11) to block therebetween said portion of the at least one cleaning element (5), where the housing (9) and the cavities of the first (15) and second (17) retaining elements of the first connection element (7) are dimensioned to house the reinforcement element (37) and the second connection element (11) with said interposed portion of the cleaning element (5).

8. Device according to claim 7 **characterized in that** the faces of the reinforcement element (37) and of the first connection element (7) which face each other in a fastening condition have respective complementary projections and protrusions fit for at least one of: preventing incorrect coupling of the cleaning elements (5) with support members (3) or shafts, and preventing, in the fastening condition, the sliding of the reinforcement element (37) with respect to the first connection element (7) to avoid unwanted detachment of the at least one cleaning element (5).

9. Device according to any of the preceding claims **characterized in that** each first connection element (7) is fixed to the respective support member (3) by fusion of pins protruding from the first connection element (7) and engaged in respective holes of the support member (3) itself or by means of gluing, stitches, clips, expansion elements, screws, seams, bonds or similar fastenings; where the support member (3) is equipped with a plurality of concave seats (41) open in the direction opposite to the shaft, each one being delimited by a respective perimeter wall (43) protruding perpendicularly from the support member (3), in which each first connection element (7) is fixed inside a respective concave seat (41).

10. Device according to any of claims 1 to 5 **characterized in that**, where the second connection element (11) can be fixed by removable joint to the respective support member (3), said second connection element (11) is irremovably fixed to the first connection element (7), with interposition and fixing of said portion of the at least one cleaning element (5), by fusion of pins (12) protruding from the second connection element (11) and engaged in respective holes (14) of the first connection element (7), or by means of seams, ties, stitches, clips, expansion elements, screws or similar fasteners.

Patentansprüche

1. Bürstenvorrichtung mit Schnellkopplungen für Reinigungselemente (5), umfassend mindestens einen Rotationsschaft, der über entsprechende Motorelemente betrieben werden kann, einen Satz Trägerbauteile (3), die in dem Rotationsschaft enthalten sind oder daran befestigt sind und jedes ist jeweils vorgesehen, um eine entsprechende Vielzahl von Reinigungselementen (5) mit diesem Schaft zu verbinden; die Vorrichtung (1) umfasst eine Vielzahl erster Verbindungselemente (7), wobei jedes vorgesehen ist, um an dem entsprechenden Trägerbauteil (3) befestigt zu werden und mit einem Gehäuse (9) versehen ist, um einen Bereich von mindestens einem Reinigungselement (5) aufzunehmen und mit einem entsprechenden zweiten Verbindungselement (11), das vorgesehen ist, um das mindestens eine Reinigungselement reversibel zu befestigen, d. h. zu blockieren und freizugeben; wobei die Vorrichtung (1) ebenfalls erste (15) und zweite (17) Halteelemente umfasst, die angeordnet sind an oder enthalten sind in entsprechenden Enden des ersten Verbindungselements (7) und vorgesehen sind, um passende erste (21) und zweite (23) Bauteile durch reversibles Blockieren aufzunehmen, die an den Enden des zweiten Verbindungselements (11) angeordnet sind, oder die ersten (15) und zweiten (17) Halteelemente sind angeordnet an oder ausgeführt in den entsprechenden Enden des zweiten Verbindungselements (11) und sind vorgesehen, um die ersten (21) und zweiten (23) passenden Elemente durch reversibles Blockieren aufzunehmen, die angeordnet sind an oder enthalten sind in den Enden des entsprechenden Trägerbauteils (3); und die Vorrichtung ist **dadurch gekennzeichnet, dass** mindestens ein Reinigungselement (5) zwischen den ersten (7) und den zweiten (11) Verbindungselementen angeordnet oder geklemmt ist; die ersten (15) und zweiten (17) Halteelemente definieren entsprechende Hohlräume mit einer Form, die in etwa komplementär zu der Form der ersten (21) und zweiten (23) passenden Elemente ist, und **dadurch gekennzeichnet, dass** mindestens das zweite Halteelement (17) einen Zahn (27) aufweist, der den entsprechenden Hohlraum begrenzt, einen Hebel, der an einem flexiblen Arm (29) befestigt ist, der ihn mit dem entsprechenden Ende des ersten Verbindungselements (7) oder des zweiten Verbindungselements (11) verbindet; wobei der flexible Arm (29) mit einer Antriebserweiterung (33) vorgesehen ist, die für die manuelle Betätigung des flexiblen Arms selbst geeignet ist, um das passende Element (21, 23) von dem Zahn (27) zu lösen, was das Lösen von mindestens des zweiten Verbindungselements (11) und des Reinigungselements (5) ermöglicht.

2. Vorrichtung gemäß Anspruch 1, **dadurch gekennzeichnet, dass** eine Fläche des Zahns (27) gegenüber dem entsprechenden Hohlraum mit einer geneigten Oberfläche versehen ist, um das Presseinsetzen und das gemeinsame Blockieren des Verbindungselements (11) und des Reinigungselements (5) auf das erste Verbindungselement (7) oder das

entsprechende Trägerbauteil (3) zu erleichtern.

3. Vorrichtung gemäß Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** der Bereich des Reinigungselements (5), das vorgesehen ist, um zwischen dem ersten (7) und dem zweiten (11) Verbindungselement blockiert zu werden, einen längsgestreckten rechteckigen Querschnitt aufweist, und dadurch, dass die Hauptabmessung des Gehäuses (9) eine Länge aufweist, die der größten Abmessung dieses Bereichs entspricht oder größer ist.

4. Vorrichtung gemäß einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das erste (21) und das zweite (23) passende Bauteil in etwa die gleiche Form und Größe aufweisen und/oder dadurch, dass die Hohlräume des ersten (15) und zweiten (17) Halteelements des ersten Verbindungselements (7) in etwa die gleiche Form und Größe aufweisen oder die Form des entweder ersten (21) oder zweiten (23) passenden Bauteils des zweiten Elements (11) ist kompatibel mit der Form und Größe von nur einem der Hohlräume des ersten (15) und zweiten (17) Halteelements, um die Verbindung in nur eine Richtung zuzulassen.

5. Vorrichtung gemäß einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das erste passende Bauteil (21) und der Hohlraum des ersten Halteelements (15) eine ungefähr zylindrische Form aufweisen oder in etwa rechteckig oder prismatisch geformt sind und/oder dadurch, dass das zweite passende Bauteil (23) und der Hohlraum des zweiten Haltelements (17) eine in etwa rechteckige oder prismatische Form aufweisen.

6. Vorrichtung gemäß einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** dort, wo das zweite Verbindungselement (11) durch eine entfernbare Verbindung zu dem ersten Verbindungselement (7) befestigt werden kann, das zweite Verbindungselement (11) untrennbar mit der Oberfläche des Bereichs des mindestens einen Reinigungselements (5) gegenüber des ersten Verbindungselements (7) mittels Kleben, mittels Ineinandergreifen von Stiften, die von dem zweiten Verbindungselement (11) vorstehen und in entsprechenden Löchern in dem Bereichs des mindestens einen Reinigungselements (5) eingesetzt sind, mittels Nähte, Bänder, Maschen, Klammern, Erweiterungselementen, Schrauben oder ähnlichen Befestigungsmitteln befestigt ist.

7. Vorrichtung gemäß Anspruch 6, **dadurch gekennzeichnet, dass** sie ein Verstärkungselement (37) umfasst, das dafür vorgesehen ist, um an dem zweiten Verbindungselement (11) befestigt zu werden, um dazwischen den Bereich des mindestens einen Reinigungselements (5) zu blockieren, bei dem das Gehäuse (9) und die Hohlräume des ersten (15) und zweiten (17) Halteelements des ersten Verbindungselements (7) so dimensioniert sind, dass sie das Verstärkungselement (37) und das zweite Verbindungselement (11) mit dem dazwischenliegenden Bereich des Reinigungselements (5) aufnehmen.

8. Vorrichtung gemäß Anspruch 7, **dadurch gekennzeichnet, dass** die Oberflächen des Verstärkungselements (37) und des ersten Verbindungselements (7) die in einem Befestigungszustand einander zugewandt sind, entsprechende komplementäre Vorsprünge und Vorwölbungen aufweisen, die geeignet sind für mindestens eines der Folgenden: Verhindern eines inkorrekten Koppelns der Reinigungselemente (5) mit Trägerbauteilen (3) oder Schäften, und Verhindern, im Befestigungszustand, des Gleitens des Verstärkungselements (37) bezogen auf das erste Verbindungselement (7), um eine ungewünschte Trennung des mindestens einen Reinigungselements (5) zu vermeiden.

9. Vorrichtung nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** jedes Verbindungselement (7) an dem entsprechenden Trägerbauteil (3) durch Ineinandergreifen von Stiften befestigt ist, die von dem ersten Verbindungselement (7) vorstehen und in entsprechende Löcher des Trägerbauteils (3) selbst eingesetzt sind, durch Kleben, Maschen, Klammern, Erweiterungselemente, Schrauben, Säume, Verbindungen oder ähnliche Befestigungen; dort, wo das das Trägerbauteil (3) mit einer Vielzahl konkaver Sitze (41) ausgestattet ist, die in die gegenüberliegende Richtung des Schafts geöffnet sind, ist jedes davon durch eine entsprechende Umfassungswand (43) begrenzt, die senkrecht von dem Trägerbauteil (3) vorsteht, bei dem jedes erste Verbindungselement (7) innerhalb eines entsprechenden konkaven Sitzes (41) befestigt ist.

10. Vorrichtung nach einem der Ansprüche 1 bis 5, **dadurch gekennzeichnet, dass** dort, wo das zweite Verbindungselement (11) durch ein entfernbares Gelenk an dem entsprechenden Trägerelement (3) befestigt werden kann, das zweite Verbindungselement (11) untrennbar an dem ersten Verbindungselement (7) befestigt ist, durch Zwischenschalten und Befestigen des Bereichs des mindestens einen Reinigungselements (5) durch Ineinandergreifen von Stiften (12), die von dem zweiten Verbindungselement (11) vorstehen und in entsprechende Löcher (14) des ersten Verbindungselements (7) eingesetzt sind, oder durch Säume, Bänder, Maschen, Klammern, Erweiterungselemente, Schrauben oder ähnliche Befestigungsmittel.

Revendications

1. - Dispositif de brosse avec raccords rapides pour des éléments de nettoyage (5) comprenant au moins un arbre de rotation qui peut être actionné par des éléments moteurs respectifs, un ensemble d'éléments de support (3) obtenus dans l'arbre de rotation ou fixés à celui-ci et destinés chacun à la liaison d'une pluralité respective d'éléments de nettoyage (5) audit arbre ; ledit dispositif (1) comprend une pluralité de premiers éléments de liaison (7), chacun étant destiné à être fixé à l'élément de support (3) respectif et comportant un logement (9) destiné à recevoir une partie d'au moins un élément de nettoyage (5) et un second élément de liaison (11) respectif destiné à fixer de manière réversible, c'est-à-dire à bloquer et débloquer, ledit au moins un élément de nettoyage (5) ; ledit dispositif (1) comprend également des premier (15) et second (17) éléments de retenue qui sont placés à des extrémités respectives du premier élément de liaison (7), ou obtenus dans celles-ci, et destinés à recevoir, en les bloquant de manière réversible, des premier (21) et second (23) éléments de mise en correspondance placés aux extrémités du second élément de liaison (11), ou lesdits premier (15) et second (17) éléments de retenue sont placés ou réalisés dans les extrémités respectives du second élément de liaison (11) et sont destinés à recevoir, en les bloquant de manière réversible, les premier (21) et second (23) éléments de mise en correspondance qui sont placés ou obtenus dans les extrémités de l'élément de support (3) respectif ; ledit dispositif (1) est **caractérisé par le fait que** ledit au moins un élément de nettoyage (5) est placé ou serré entre lesdits premier (7) et second (11) éléments de liaison ; les premier (15) et second (17) éléments de retenue définissent des cavités respectives d'une forme approximativement complémentaire à celle des premier (21) et second (23) éléments de mise en correspondance, et **par le fait qu'**au moins le second élément de retenue (17) a une dent (27) délimitant la cavité correspondante, fixée en porte-à-faux sur un bras flexible (29) qui la relie à l'extrémité respective du premier élément de liaison (7) ou du second élément de liaison (11) ; ledit bras flexible (29) comporte une extension d'entraînement (33) adaptée à l'actionnement manuel du bras flexible (29) lui-même pour libérer l'élément de mise en correspondance (21, 23) de la dent (27), permettant de détacher au moins le second élément de liaison (11) et l'élément de nettoyage (5).

2. - Dispositif selon la revendication 1, **caractérisé par le fait qu'**une face de la dent (27) opposée à la cavité correspondante comporte une surface inclinée pour faciliter l'insertion par pression et le blocage conjoint de l'élément de liaison (11) et de l'élément de nettoyage (5) au premier élément de liaison (7) ou à l'élément de support (3) respectif.

3. - Dispositif selon la revendication 1 ou 2, **caractérisé par le fait que** la partie de l'élément de nettoyage (5) destinée à être bloquée entre les premier (7) et second (11) éléments de liaison a une section rectangulaire allongée et **par le fait que** la dimension principale du logement (9) a une longueur supérieure ou égale à la plus grande dimension de ladite section.

4. - Dispositif selon l'une quelconque des revendications précédentes, **caractérisé par le fait que** les premier (21) et second (23) éléments de mise en correspondance sont de forme et de taille approximativement égales et/ou **par le fait que** les cavités des premier (15) et second (17) éléments de retenue du premier élément de liaison (7) sont de forme et de taille approximativement égales ou la forme de l'un des premier (21) et second (23) éléments de mise en correspondance du second élément de liaison (11) est compatible avec la forme et la taille d'une seule des cavités des premier (15) et second (17) éléments de retenue pour permettre la liaison dans une seule direction.

5. - Dispositif selon l'une quelconque des revendications précédentes, **caractérisé par le fait que** le premier élément de mise en correspondance (21) et la cavité du premier élément de retenue (15) sont de forme approximativement cylindrique ou sont de forme approximativement rectangulaire ou prismatique et/ou **par le fait que** le second élément de mise en correspondance (23) et la cavité du second élément de retenue (17) ont une forme approximativement rectangulaire ou prismatique.

6. - Dispositif selon l'une quelconque des revendications précédentes, **caractérisé par le fait que**, lorsque le second élément de liaison (11) peut être fixé par assemblage amovible au premier élément de liaison (7), ledit second élément de liaison (11) est fixé de manière inamovible à la face de ladite partie de l'au moins un élément de nettoyage (5) opposée au premier élément de liaison (7) par collage, par fusion de pions faisant saillie à partir du second élément de liaison (11) et engagés dans des trous respectifs de ladite partie de l'au moins un élément de nettoyage (5), au moyen de coutures, d'agrafes, de points, d'agrafes, d'éléments d'expansion, de vis ou d'organes de fixation analogues.

7. - Dispositif selon la revendication 6, **caractérisé par le fait qu'**il comprend un élément de renfort (37) destiné à être fixé au second élément de liaison (11) pour bloquer entre eux ladite partie de l'au moins un élément de nettoyage (5), le logement (9) et les cavités des premier (15) et second (17) éléments de

retenue du premier élément de liaison (7) étant dimensionnés pour recevoir l'élément de renfort (37) et le second élément de liaison (11) avec ladite partie interposée de l'élément de nettoyage (5).

8. - Dispositif selon la revendication 7, **caractérisé par le fait que** les faces de l'élément de renfort (37) et du premier élément de liaison (7) qui se font mutuellement face en condition de fixation ont des saillies et projections complémentaires respectives aptes au moins à : empêcher un mauvais couplage des éléments de nettoyage (5) avec des éléments de support (3) ou des arbres, et empêcher, en condition de fixation, le glissement de l'élément de renfort (37) par rapport au premier élément de liaison (7) pour éviter un détachement non désiré de l'au moins un élément de nettoyage (5).

9. - Dispositif selon l'une quelconque des revendications précédentes, **caractérisé par le fait que** chaque premier élément de liaison (7) est fixé à l'élément de support (3) respectif par fusion de pions faisant saillie à partir du premier élément de liaison (7) et engagés dans des trous respectifs de l'élément de support (3) lui-même ou par collage, points, agrafes, éléments d'expansion, vis, coutures, liaisons ou organes de fixation analogues ; l'élément de support (3) étant équipé d'une pluralité de sièges concaves (41) ouverts dans la direction opposée à l'arbre, chacun étant délimité par une paroi périphérique (43) respective faisant saillie perpendiculairement à l'élément de support (3), chaque premier élément de liaison (7) étant fixé à l'intérieur d'un siège concave (41) respectif.

10. - Dispositif selon l'une quelconque des revendications 1 à 5, **caractérisé par le fait que**, lorsque le second élément de liaison (11) peut être fixé par assemblage amovible à l'élément de support (3) respectif, ledit second élément de liaison (11) est fixé de manière inamovible au premier élément de liaison (7), avec interposition et fixation de ladite partie de l'au moins un élément de nettoyage (5), par fusion de pions (12) faisant saillie à partir du second élément de liaison (11) et engagés dans des trous (14) respectifs du premier élément de liaison (7), ou au moyen de coutures, d'attaches, de points, d'agrafes, d'éléments d'expansion, de vis ou d'organes de fixation analogues.

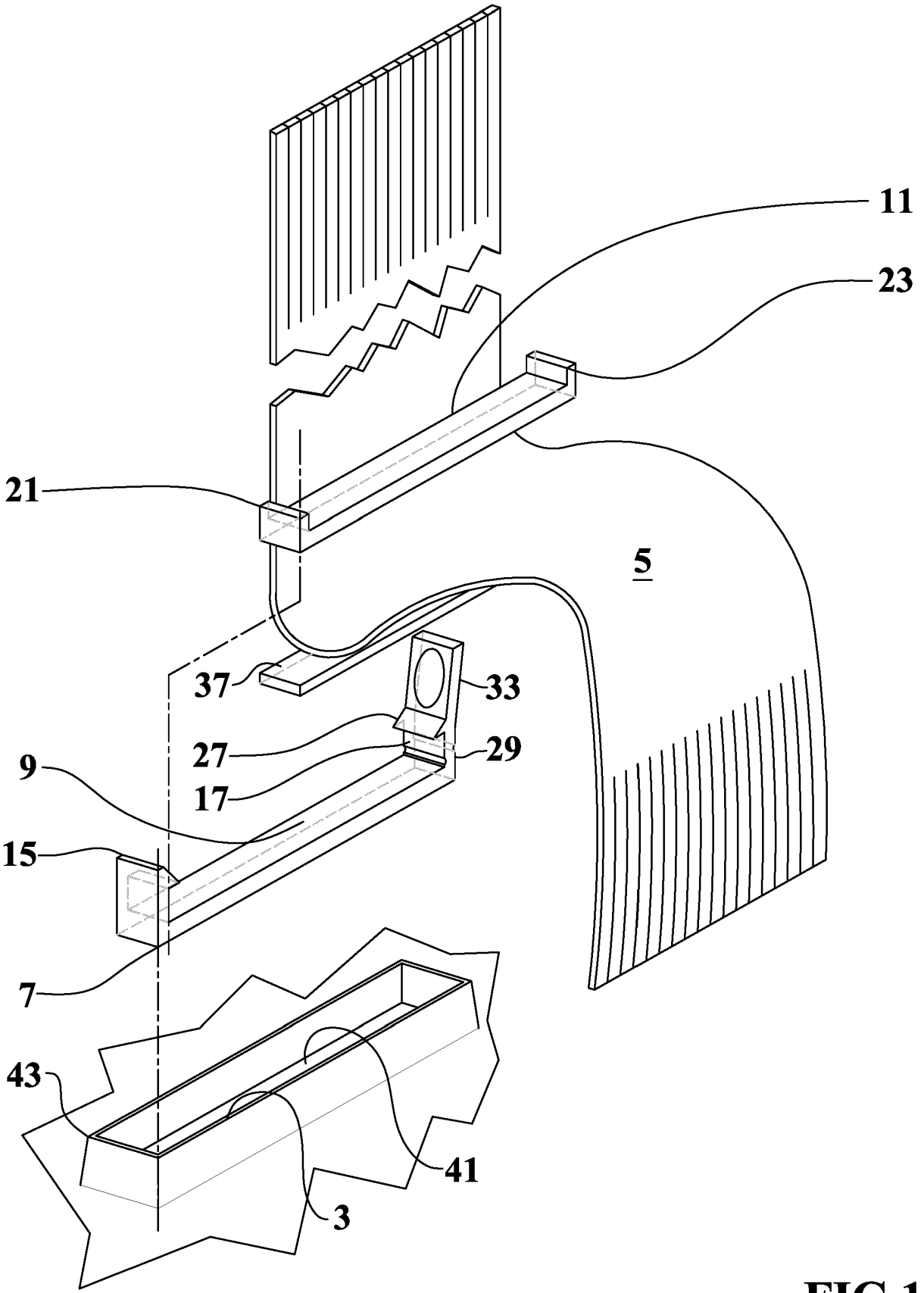

FIG.1

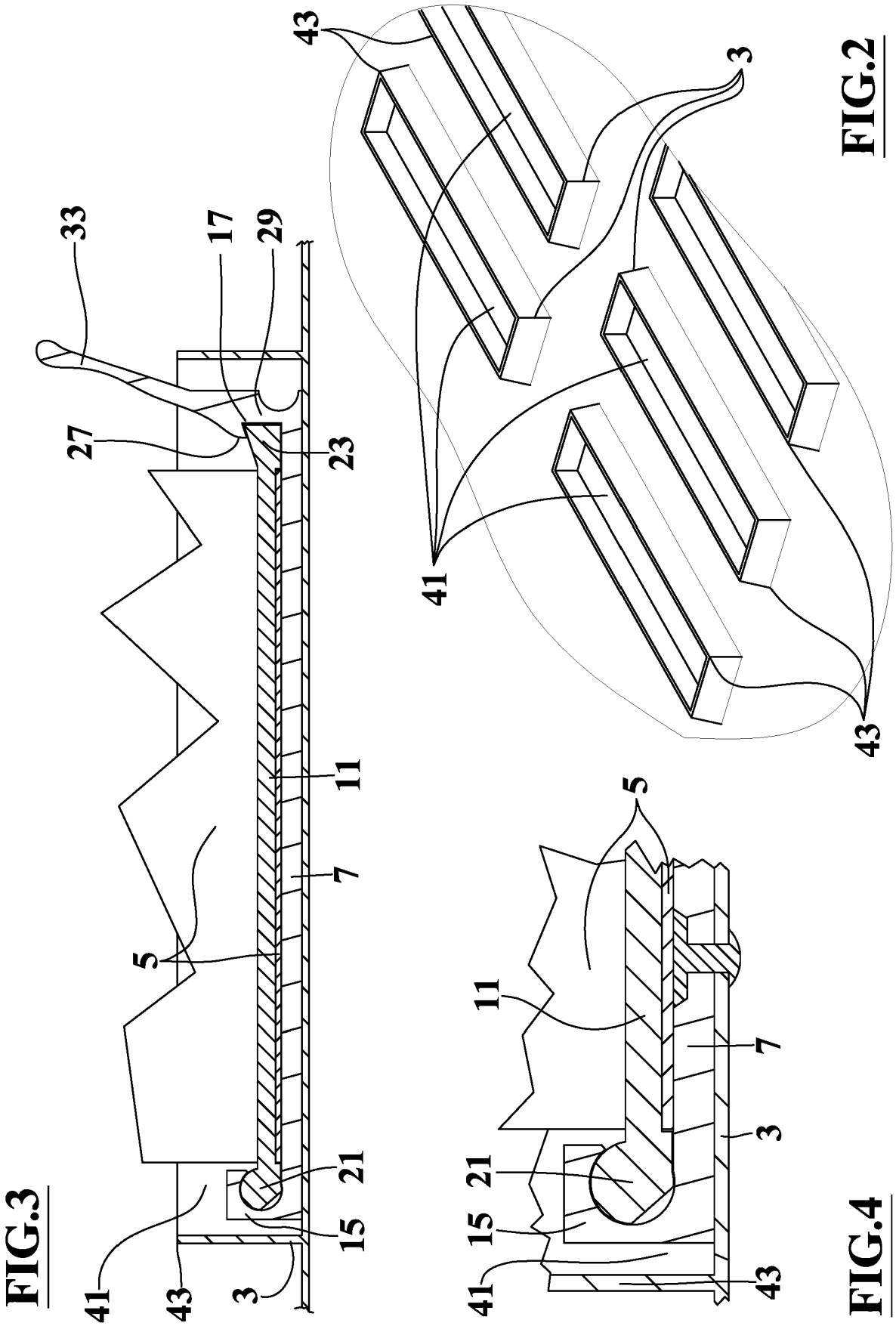

FIG.2

FIG.3

FIG.4

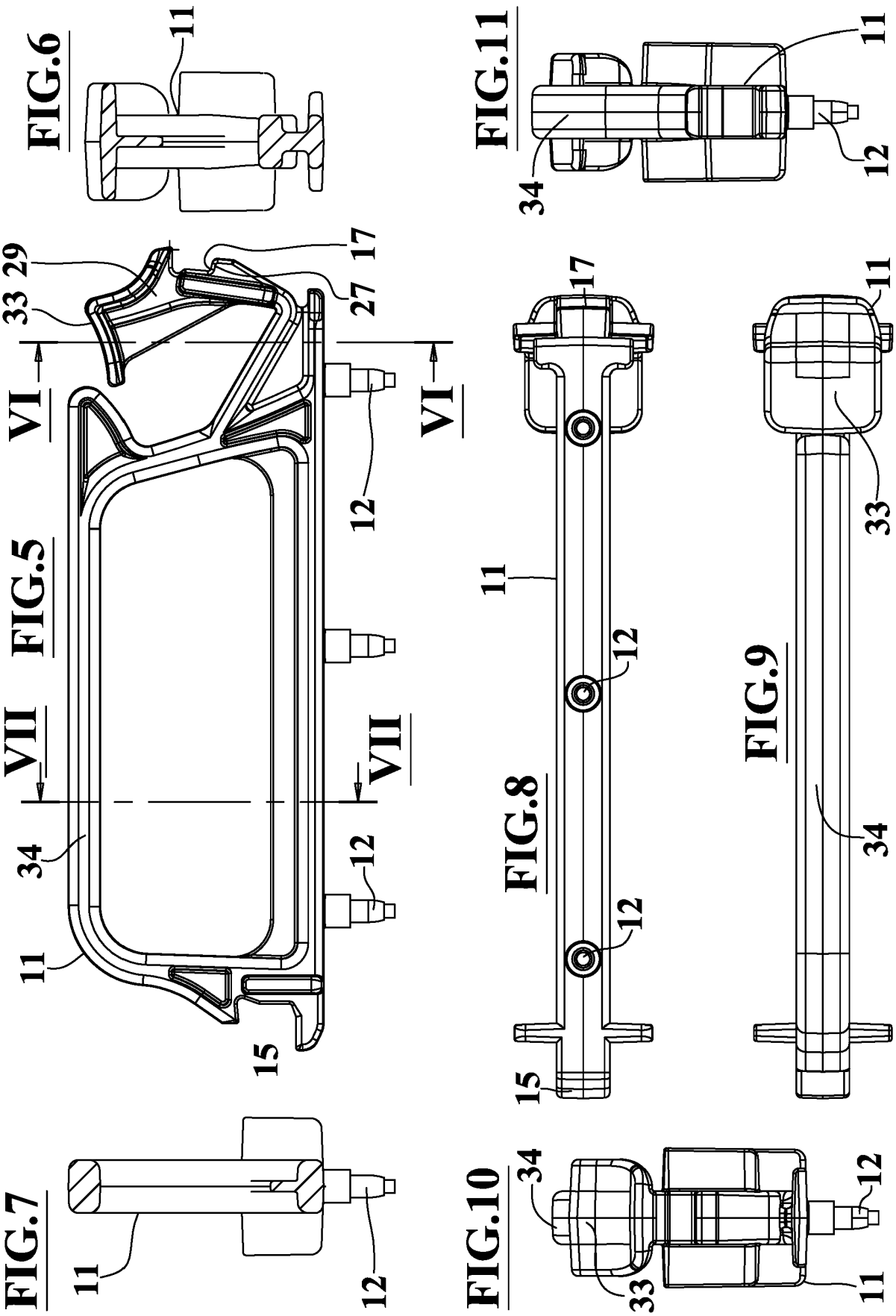
FIG.6
11
FIG.5
33 29
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VI
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VII
VII
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FIG.7
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FIG.8
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FIG.9
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FIG.10
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FIG.11
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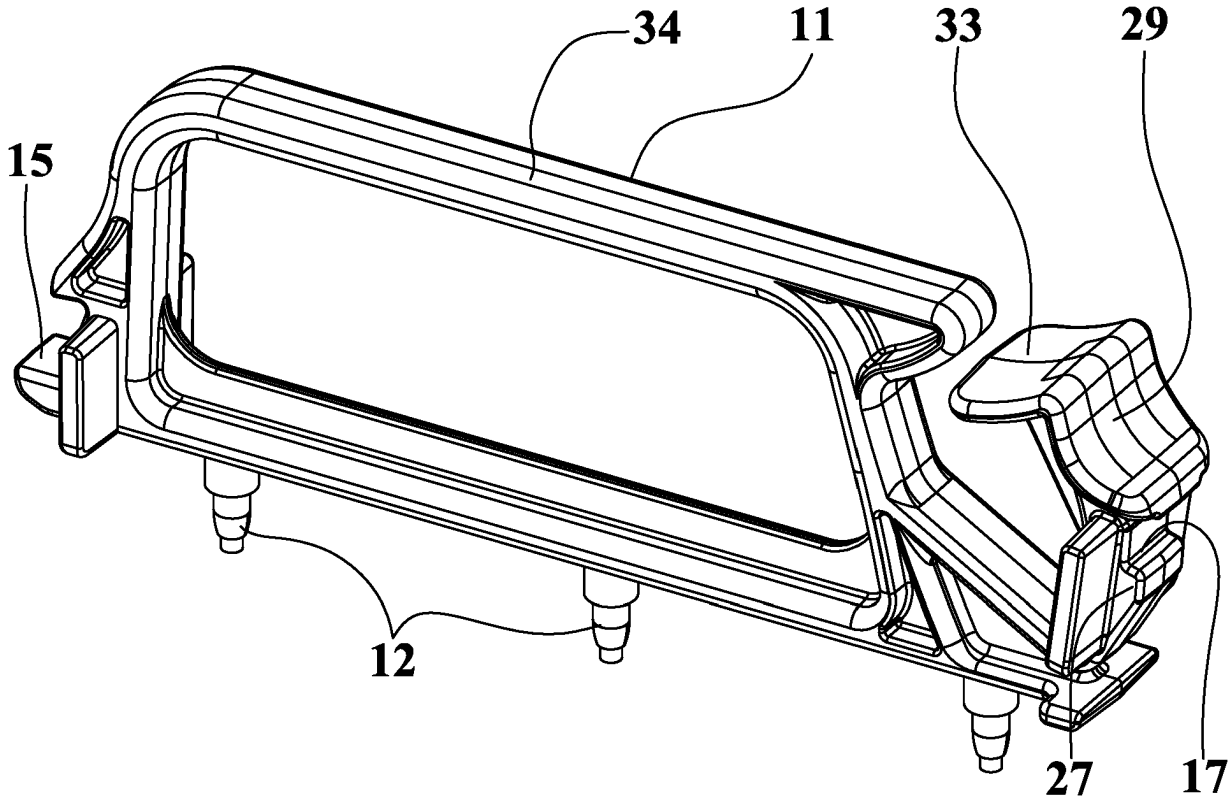
FIG.12



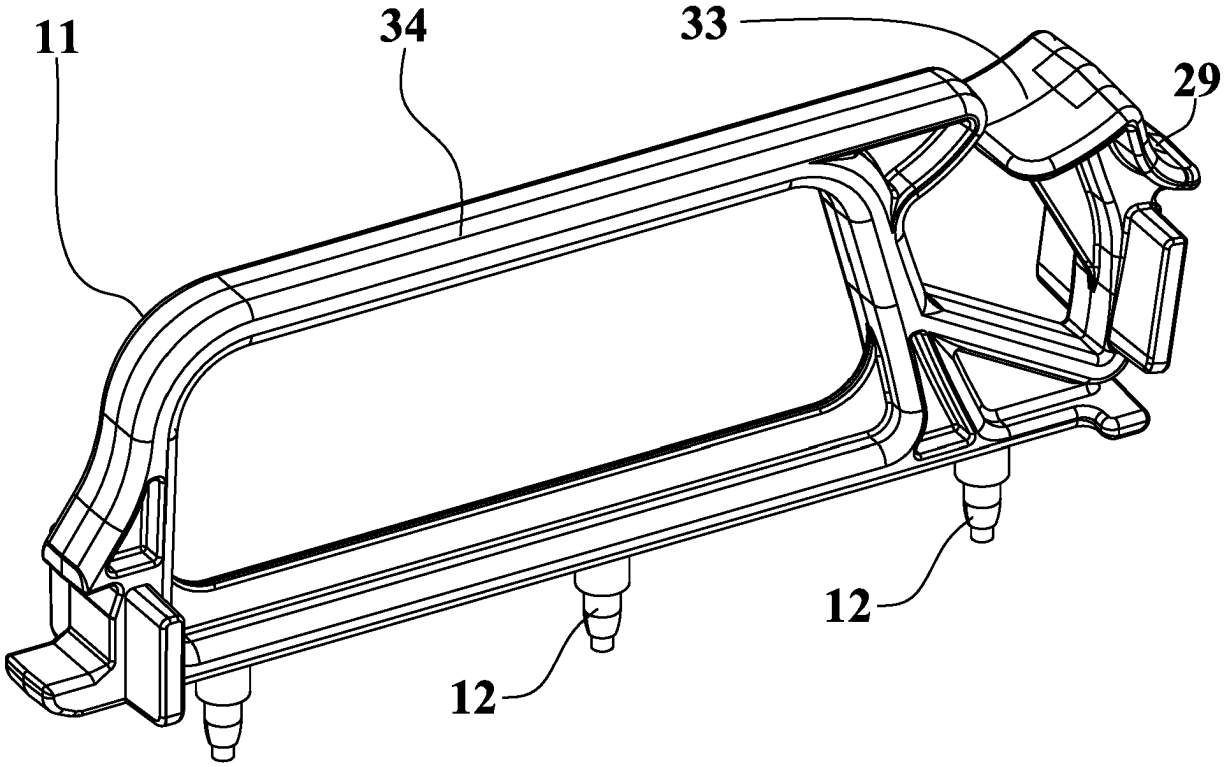


FIG.13

FIG.14

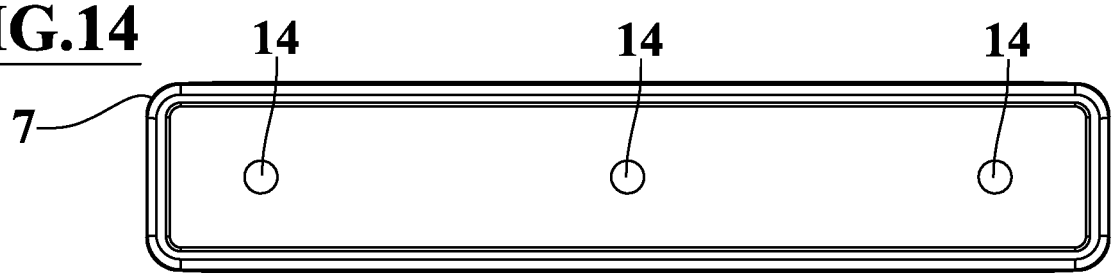


FIG.15

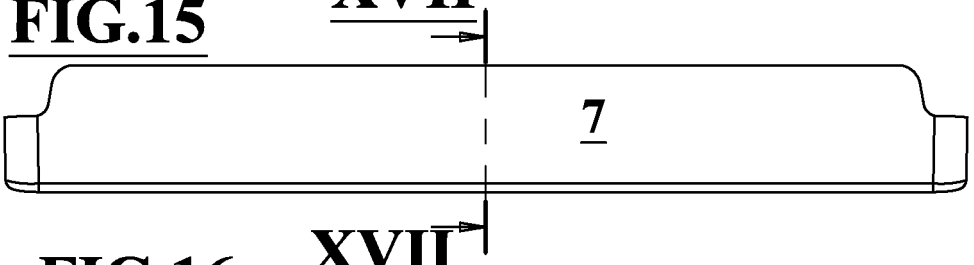
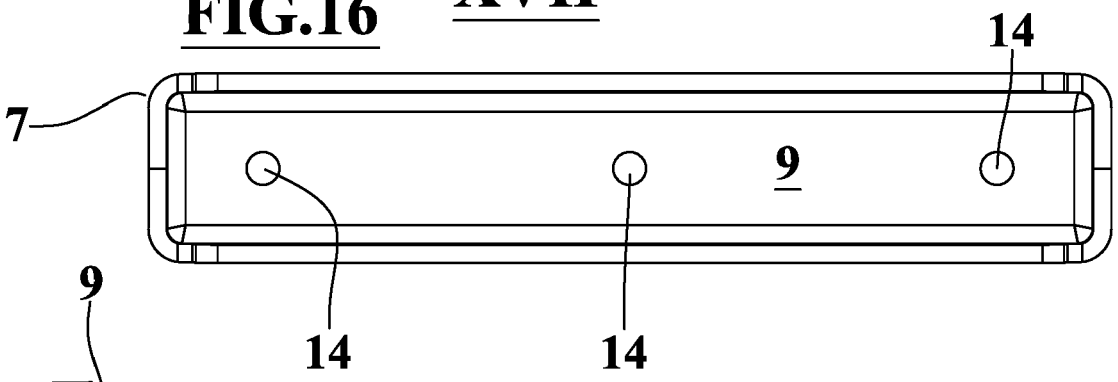


FIG.16



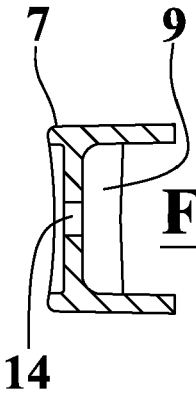


FIG.17

FIG.18

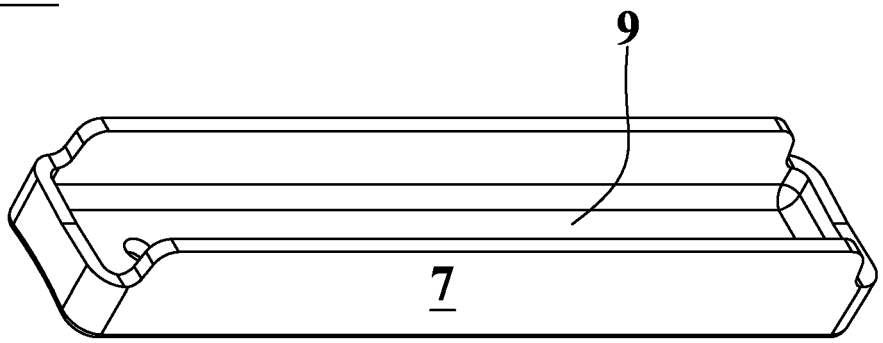


FIG.19

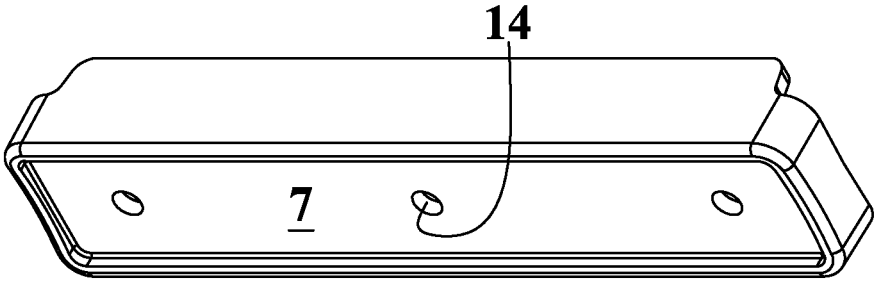


FIG.22

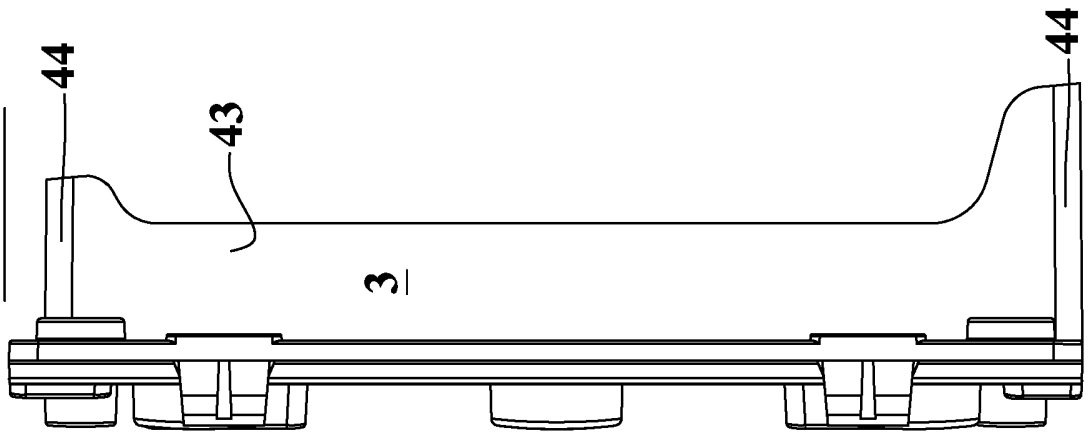


FIG.21

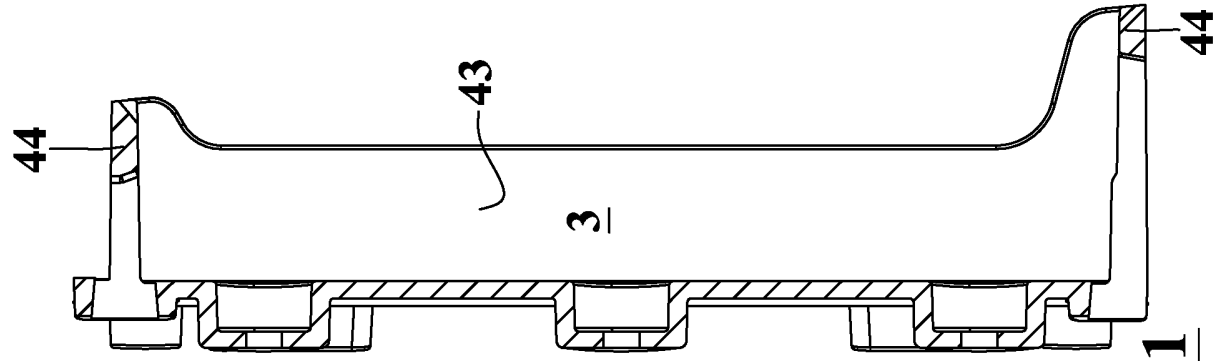


FIG.20

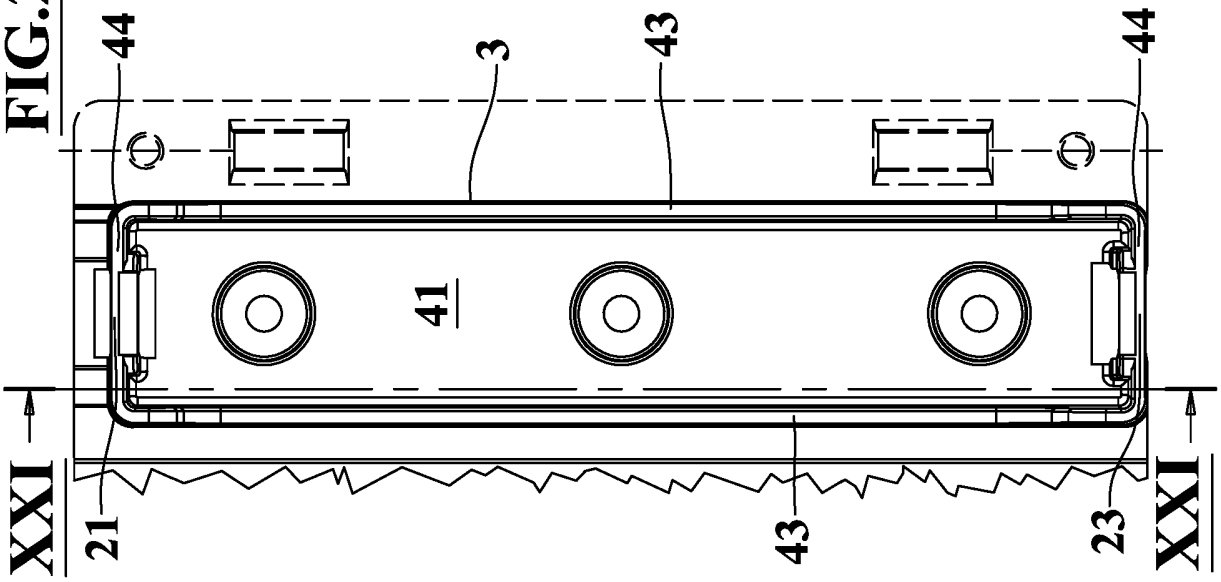
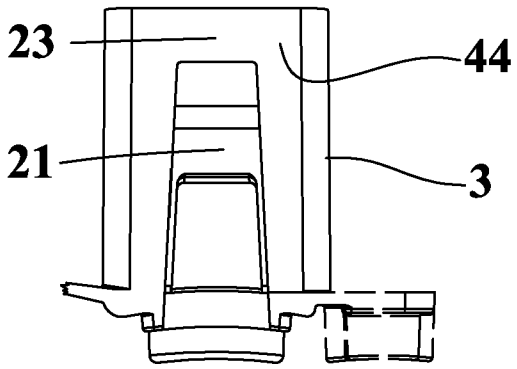


FIG.23



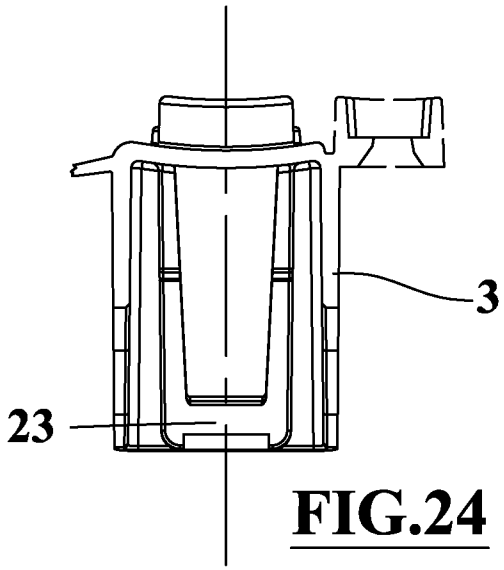


FIG.24

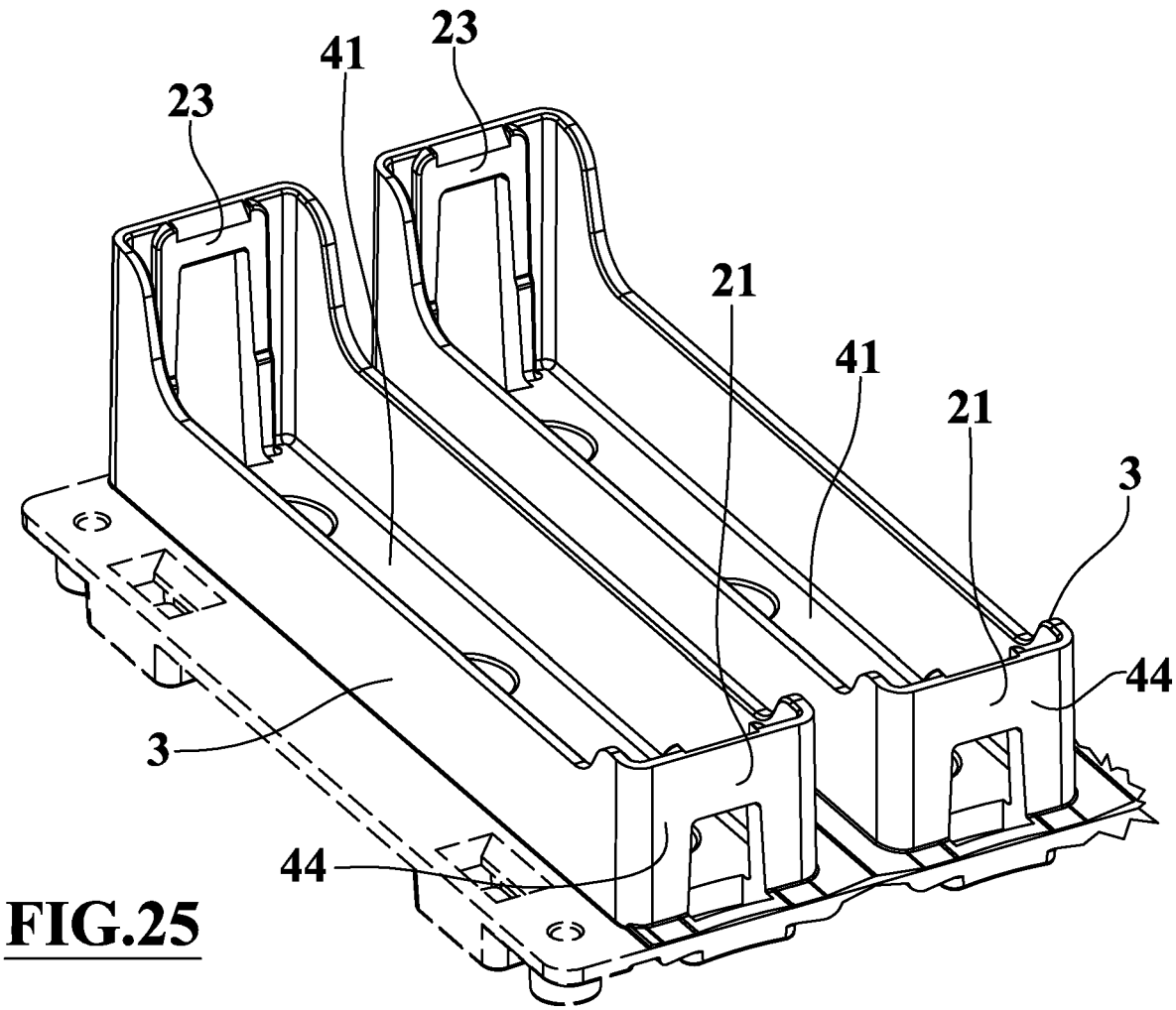
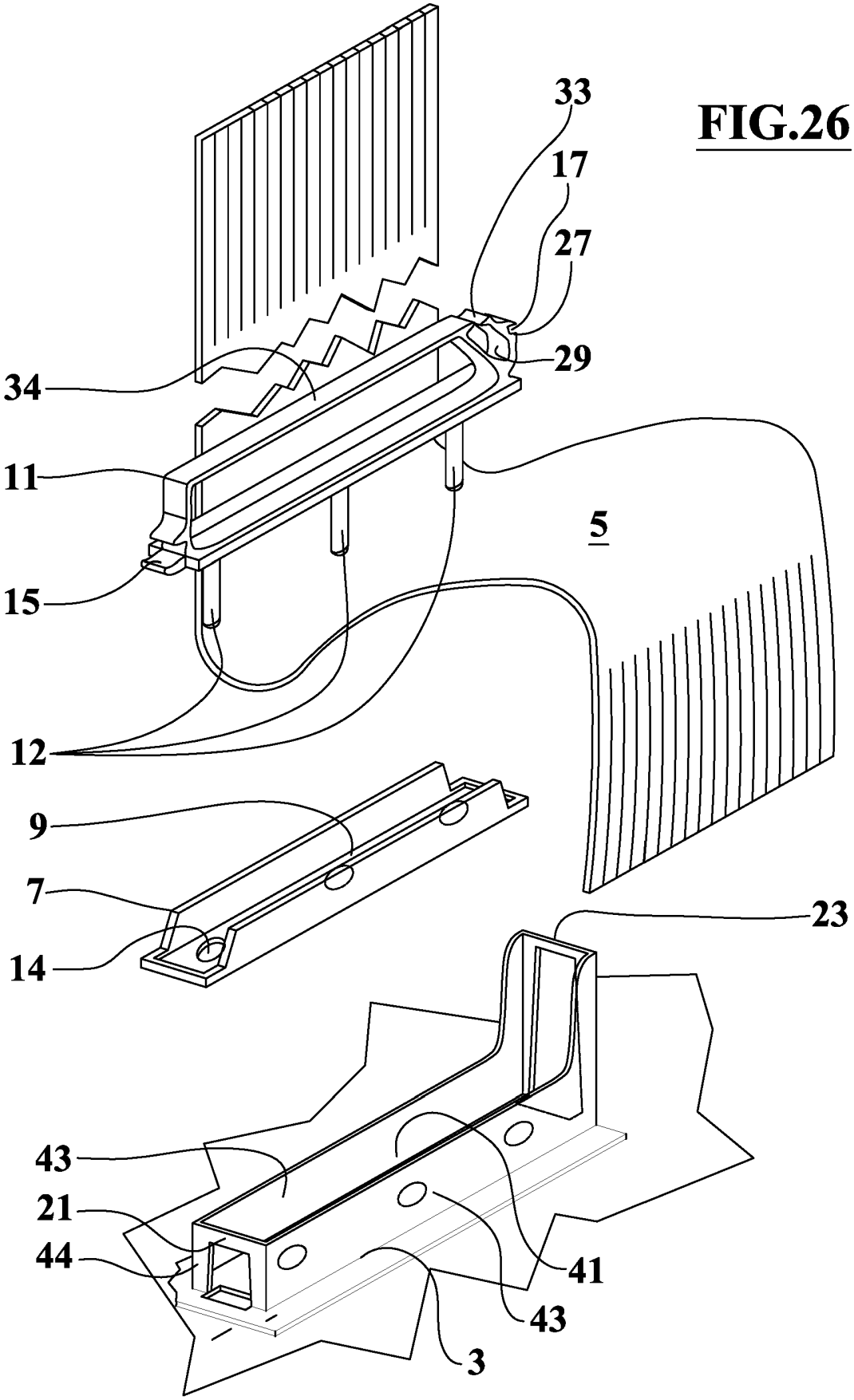


FIG.25

FIG.26



REFERENCES CITED IN THE DESCRIPTION

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