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(54) **REVOLVING SPRINKLER FOR PROFESSIONAL DISHWASHER OR DISINFECTION APPARATUS**

DREHSPRINKLER FÜR PROFESSIONELLE GESCHIRRSPÜLMASCHINE ODER
DESINFEKTIONSVORRICHTUNG

GICLEUR ROTATIF POUR APPAREIL DE DÉSINFECTION OU LAVE-VAISSELLE
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Description

[0001] The present invention relates to revolving sprinklers for professional dishwashers or similar machines, such as apparatuses for disinfection, and in particular to a sprinkler provided with closure terminals divided into two elements of which one element is easily removable.

[0002] It is known that a conventional revolving sprinkler essentially consists of an elongated tubular body that is centrally pivoted on a hollow attachment with a vertical axis, corresponding to the axis of rotation of the sprinkler, mounted at the outlet of a water supply duct. The rotatory motion about this axis is usually created by at least one propulsion nozzle at each end, the jet emitted by such a nozzle being substantially perpendicular to the axis of rotation, while washing nozzles are arranged along the sprinkler to emit jets substantially parallel to the axis of rotation.

[0003] Each end of the tubular body of the sprinkler is closed by a terminal in which there may be formed more washing nozzles and/or a housing for a magnet, which is used in combination with a Reed sensor for detecting the speed of rotation of the sprinkler. These terminals are mounted on the tubular body in a removable manner, typically by means of screws, in order to access the internal cavity of the sprinkler through its ends when it is necessary to carry out the periodical cleaning or sanitizing of the sprinkler by removing dirt and deposits that can build up inside it.

[0004] This problem is particularly serious in a professional dishwasher in which the wash liquid is not replaced at each cycle of operation but only integrated with an addition of clean water. Therefore, the presence of dirt increases with each cycle rather quickly, given the continuous use of the machine, and it is necessary to perform a frequent cleaning of the sprinkler. A similar problem of frequent cleaning is present in the apparatuses for disinfection, in which the standards of cleanliness are particularly high and require that the washing circuit, including the interior of the sprinkler, is kept constantly clean.

[0005] The presence of means such as screws for fixing the terminals implies rather long intervention times for their removal and reapplication, especially if the location of such fixing means makes the operation inconvenient and may even require the removal of the sprinkler from the machine.

[0006] Furthermore, the water tightness between the body of the sprinkler, usually made of metal, and the terminals, usually made of plastic, is not optimal also due to the different coefficients of thermal expansion. On the other hand it is not possible to have a sealant between the parts given the necessity of frequent removal of the terminals.

[0007] EP 1870113 describes a sprinkler in which the terminals are not fixed by screws but by resilient locking means which engage corresponding seats formed on the tubular body or on the terminal, so as to allow a rapid removal and reapplication of the terminal without the use

of tools. A similar solution is effective in reducing the intervention times but does not solve the problems of tightness, which on the contrary may be more serious since the elastic locking is less tight than the fixing with screws.

[0008] JP H09 42243 describes a similar sprinkler with monolithic terminals that are mounted on the tubular body by means of resilient locking means, only that in this case there is an O-ring therebetween and the shape of the terminal and body is a cylindrical shape of circular cross-section, which poses a restraint on the shape of the sprinkler body. Furthermore, the above-mentioned tightness problem caused by the different coefficients of thermal expansion remains unsolved.

[0009] WO 2011/154813 describes a sprinkler in which each terminal is formed by two elements: a first element fixed by screws to the tubular body and a second element rotatably mounted on the first element and movable between a closed position and an open position in which it allows access to the internal cavity of the sprinkler. More specifically, the second element is locked in the closed position via an elastic clip which engages latches formed on the first element, so as to allow a rapid opening and closing of the terminal without the use of tools by means of the rotation of the second element around an axis contained in the plane of rotation of the sprinkler and perpendicular to the longitudinal axis thereof.

[0010] A similar solution is effective in reducing the intervention times but does not solve completely the problems of tightness, because although the first element remains mounted on the tubular body allowing to apply a sealant therebetween now the water tightness is difficult between the two elements which make up the terminal. In fact the sealing is obtained by means of a peripheral rib that protrudes from the second element and fits into a corresponding peripheral groove formed in the first element, trying to accomplish a labyrinth seal which is the most common solution for two rigid elements which are frontally coupled by means of the above-mentioned rotation.

[0011] However, such a labyrinth seal does not guarantee a good tightness both for its considerable extension, along the whole periphery of the two elements, and for its complex shape that includes various curves both in the horizontal plane and in the vertical plane. Another drawback stems from the frontal coupling between the rib and the groove, whereby it is sufficient that a particle of dirt is deposited in the groove to adversely affect the coupling between the two elements and consequently the sealing along the whole periphery.

[0012] Another disadvantage of this prior art terminal is the fact that the hinging means between the two elements consist of a pair of semi-cylinders protruding from the first element which accommodate a pair of pins protruding from the second element. Since they are small plastic details, these protruding parts are quite fragile and it is sufficient that one of them is broken to be forced to replace the entire terminal.

[0013] The object of the present invention is therefore

to provide a revolving sprinkler which overcomes the above-described limitations of prior art sprinklers. This object is achieved by means of a sprinkler comprising closure terminals made up of two elements which are slidably coupled, with elastic locking of the second element on the sprinkler, the water tightness between them being ensured by an O-ring interposed between two cylindrical portions of preferably circular cross-section. Other advantageous features are disclosed in the dependent claims.

[0014] The main advantage of the sprinkler according to the present invention is that of having a greater efficacy because the water tightness ensured by an O-ring arranged between the cylindrical parts is more effective than the prior art labyrinth seal, moreover particles of dirt do not affect it since they are removed during the sliding coupling of the two elements of the terminal.

[0015] A further advantage of this sprinkler derives from the fact that its closure terminals have a higher strength and reliability, thanks to the absence of delicate details that are not required for a sliding coupling.

[0016] These and other advantages and characteristics of the sprinkler according to the present invention will become apparent to those skilled in the art from the following detailed description of an embodiment thereof with reference to the accompanying drawings in which:

Fig.1 is a perspective top view of a sprinkler according to the invention, with an open terminal and a closed terminal;

Fig.2 is an enlarged exploded view of one end of the sprinkler that shows in greater detail the components of a terminal; and

Fig.3 is a bottom plan view of said sprinkler.

[0017] Referring to the said figures there is seen that a revolving sprinkler according to the invention comprises a tubular body 1 provided with a plurality of wash and/or propulsion nozzles as well as a central socket 2 for its mounting on a supply pipe (not shown). In the figures there is shown in particular a revolving sprinkler which is fed from above, but it is clear that what is said also applies to a sprinkler with which is fed from below, i.e. with socket 2 facing downwards. Furthermore, body 1 is shown traditionally formed by two superimposed shaped panels of metallic material (e.g. stainless steel) that are coupled along the longitudinal sides by folding the edges of the top plate over the edges of the bottom plate, but it is clear that what is said also applies to a sprinkler with the body realized by means of other processes and/or other materials.

[0018] At each end of body 1 there is disposed a closure terminal formed by a first element 3, secured to body 1 by means of a screw 4, and by a second element 5 which is slidably coupled to the first element 3 and is secured to body 1 through elastic locking means. In the illustrated preferred embodiment, the second element 5 is provided with a longitudinal tab 6 which extends up to

screw 4, whose head is received in a hole 7 of tab 6 so as to act as a retaining catch. For the removal of the second element 5 it is therefore sufficient to lift tab 6, which is flexible enough for the purpose, and disengage it from screw 4 so as to be able to slide back the second element 5.

[0019] More specifically, the first element 3 is preferably constituted by an annular body 8 whose external contour matches in shape and size the internal end cross-section of the tubular body 1. Said annular body 8 is preferably provided with a frontal peripheral flange 9 that goes into abutment on the end of the tubular body 1, so as to define the depth of insertion of body 8 into body 1.

[0020] In this way, a hole 10 formed in a rear longitudinal tab 11 of the first element 3 arrives in correspondence with a hole 12 formed in the tubular body 1, so that screw 4 passing through said hole 12 can engage tab 11 thereby securing the first element 3.

[0021] The first element 3 is also provided with an axial sleeve 13, preferably of circular shape, that extends outwardly from a front wall which closes the annular body 8. Therefore, water can exit the end of body 1 of the sprinkler only through said sleeve 13, on which there is inserted an O-ring 14 that is preferably housed in a suitable seat formed on the external surface of sleeve 13.

[0022] Note that an optimal tightness between the first element 3 and the tubular body 1 can be easily obtained by arranging a sealant between the two parts, thanks also to the frontal flange 9. On the contrary, in the above-mentioned WO 2011/154813 the first element must necessarily be mounted externally to the body of the sprinkler to enable the rotary coupling with the second element, whereby the tightness between the two parts is not as optimal.

[0023] The second element 5 is preferably constituted by an annular body 15 whose internal cross-section matches in shape and size the external end contour of the tubular body 1. Said annular body 15 is provided with an axial cylindrical portion 16, closed at the front, which is shaped and sized to receive sleeve 13 and achieve therewith a cylindrical sealing by means of O-ring 14.

[0024] An inclined nozzle 17 (Fig.3) is preferably formed in portion 16 to emit a jet along the longitudinal axis of the sprinkler, and a housing 18 is preferably provided next to portion 16 to house a magnet used to detect the speed of rotation of the sprinkler as previously mentioned. Note that the two terminals of the sprinkler are structurally identical to minimize the cost of production, however only one of them will contain the magnet and they will be mounted in inverted positions at the two ends as shown in figures 1 and 3.

[0025] In the light of the above description, it is readily understood how the sprinkler according to the present invention achieves the desired results of optimal water tightness, strength and ease of removal and reapplication of the terminals since it is sufficient to disengage tab 6 from screw 4 to remove the second element 5 and to gain access to the interior of the tubular body 1 through sleeve

13. Similarly, the second element 5 is repositioned on the sprinkler with great ease and speed without any risk of breaking delicate plastic details and with the guarantee of tightness ensured by the cylindrical coupling between sleeve 13 and portion 16 with the interposition of gasket 14 (which can be replaced with great ease in case of breakage or wear).

[0026] It is clear that the above-described and illustrated embodiment of the sprinkler according to the invention is just an example susceptible of various modifications. In particular, the exact shape and arrangement of the two elements 3 and 5 of the terminal, of the components 13, 14, 16 which achieve the seal between them, and of the elastic means for locking the second element 5 may vary somewhat depending on specific manufacturing requirements as long as the general structure shown above is maintained.

[0027] For example, the elastic locking of the second element 5 could be realized on the first element 3 instead of directly on the tubular body 1 as illustrated above, or the first element 3 could be mounted externally on the sprinkler body 1 in which case of course the shapes and sizes of bodies 8 and 15 would be modified accordingly.

Claims

1. Revolving sprinkler comprising an open-ended tubular body (1) provided with wash and/or propulsion nozzles, a socket (2) for the mounting thereof on a water supply pipe, and a closure terminal arranged at each end of said tubular body (1), each of said closure terminals being made up of a first element (3) secured on the tubular body (1) and of a second element (5) locked on the sprinkler by elastic locking means, **characterized in that** said first and second element (3, 5) are slidably coupled and achieve a watertight coupling therebetween by means of an O-ring (14) interposed between two cylindrical portions (13, 16) of preferably circular cross-section, one of said two cylindrical portions (13, 16) being formed on the first element (3) and the other of said two cylindrical portions (13, 16) being formed on the second element (5).
2. Sprinkler according to claim 1, **characterized in that** the first element (3) is fitted inside the tubular body (1) and the second element (5) is fitted outside the tubular body (1).
3. Sprinkler according to claim 2, **characterized in that** the first element (3) essentially consists of an annular body (8) whose external contour matches in shape and size the internal end cross-section of the tubular body (1) and the second element (5) essentially consists of an annular body (15) whose internal cross-section matches in shape and size the external end contour of the tubular body (1).

4. Sprinkler according to claim 2 or 3, **characterized in that** the annular body (8) is provided with a frontal peripheral flange (9) suitable to define the depth of introduction of said annular body (8) into the tubular body (1).
5. Sprinkler according to claim 3 or 4, **characterized in that** the first element (3) is provided with a rear longitudinal tab (11) having a hole (10) that is located in correspondence with a hole (12) formed in the tubular body (1), the first element (3) being secured on the tubular body (1) by means of a screw (4) that passes through said hole (12) in the tubular body (1) and engages the hole (10) of said tab (11).
6. Sprinkler according to claim 5, **characterized in that** the elastic locking means of the second element (5) consist of a flexible longitudinal tab (6) extending from the second element (5) up to the screw (4) and provided with a hole (7) suitable to receive the head of the screw (4).
7. Sprinkler according to any of the preceding claims, **characterized in that** the first element (3) is provided with an axial sleeve (13) extending outwards from a front wall and the second element (5) is provided with an axial cylindrical portion (16), frontally closed, that is shaped and sized to receive said sleeve (13) and achieve therewith a cylindrical seal by means of the O-ring (14), which is preferably housed in a seat formed on the external surface of the sleeve (13).
8. Sprinkler according to any of the preceding claims, **characterized in that** the second element (5) of at least one of the terminals is provided with an inclined nozzle (17) suitable to emit a jet along the longitudinal axis of the sprinkler.
9. Sprinkler according to any of the preceding claims, **characterized in that** the second element (5) of at least one of the terminals is provided with a magnet contained in a housing (18).
10. Sprinkler according to any of the preceding claims, **characterized in that** the two terminals are structurally identical and are mounted in inverted positions.

Patentansprüche

1. Rotationssprinkler, umfassend einen endseitig offenen, rohrförmigen Körper (1), der mit Wasch- und/oder Antriebsprühdüsen versehen ist, eine Fassung (2) zur dessen Montage an einer Wasserversorgungsleitung, und einen verschließbaren Abschluss, der an beiden Enden des rohrförmigen Körpers (1) angebracht ist, wobei jeder der beiden ver-

- abschließbaren Abschlüsse aus einem ersten Element (3) hergestellt ist, welches an dem rohrförmigen Körper (1) festgelegt ist, und aus einem zweiten Element (5), das mittels eines elastischen Verriegelungsmittels an dem Sprinkler arretiert ist, **dadurch gekennzeichnet, dass** die besagten, ersten und zweiten Elemente (3, 5) verschiebbar gekoppelt sind und eine wasserdichte Kupplung zwischen den beiden mittels eines O-Rings (14) erreichen, der zwischen zwei zylinderförmigen Teilen (13, 16) eingefügt ist, die bevorzugt einen kreisförmigen Querschnitt aufweisen, wobei eines der beiden besagten, zylinderförmigen Teile (13, 16) an dem ersten Element (3) ausgebildet ist und das andere von den beiden zylinderförmigen Teilen (13, 16) an dem zweiten Element (5) gebildet ist.
2. Rotationssprinkler gemäß Anspruch 1, **dadurch gekennzeichnet, dass** das erste Element (3) innerhalb des rohrförmigen Körpers (1) eingepasst ist und das zweite Element (5) außerhalb des rohrförmigen Körpers (1) montiert ist.
3. Rotationssprinkler gemäß Anspruch 2, **dadurch gekennzeichnet, dass** das erste Element (3) substantiell aus einem ringförmigen Körper (8) besteht, dessen Außenkontur von der Form und der Größe zum Innenquerschnitt des Endabschnitts des rohrförmigen Körpers (1) passt, und das zweite Element (5) substantiell aus einem ringförmigen Körper (15) besteht, dessen Innenquerschnitt hinsichtlich Form und Größe zu der Kontur des äußeren Endes des rohrförmigen Körpers (1) passt.
4. Rotationssprinkler gemäß Anspruch 2 oder 3, **dadurch gekennzeichnet, dass** der ringförmige Körper (8) mit einem stirnseitigen Außenflansch (9) versehen ist, der dazu geeignet ist, die Tiefe der Einführung des ringförmigen Körpers (8) in den Rohrkörper (1) festzulegen.
5. Rotationssprinkler gemäß Anspruch 3 oder 4, **dadurch gekennzeichnet, dass** das erste Element (3) mit einer rückwärtigen, längsgerichteten Lasche (11) versehen ist, die ein Loch (10) aufweist, das als Entsprechung zu dem in dem rohrförmigen Körper ausgebildeten Loch (12) in dem rohrförmigen Körper (1) geformt ist, wobei das erste Element (3) an dem rohrförmigen Körper (1) mittels einer Schraube (4) festgelegt ist, die das besagte Loch (12) in dem rohrförmigen Körper (1) durchsetzt und in das Loch (10) der besagten Lasche (11) eingreift.
6. Rotationssprinkler gemäß Anspruch 5, **dadurch gekennzeichnet, dass** das elastische Verriegelungsmittel des zweiten Elements (5) aus einer flexiblen längsgerichteten Lasche (6) besteht, die sich von dem zweiten Element (5) bis zu der Schraube (4) erstreckt und mit einem Loch (7) zur Aufnahme des Kopfes der Schraube (4) versehen ist.
7. Rotationssprinkler gemäß einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das erste Element (3) mit einer axialen Hülse (13) versehen ist, die sich von einer Vorderseite nach außen erstreckt, und das zweite Element (5) mit einem axialen, zylinderförmigen Teil (16) versehen ist, das frontal verschlossen ist und das hinsichtlich Form und Größe zur Aufnahme der besagten Hülse (13) ausgelegt ist und somit eine zylinderförmige Abdichtung mittels des O-Ringes (14) erreicht, der bevorzugt in einer Aufnahme untergebracht ist, die an der Außenfläche der Hülse (13) ausgebildet ist.
8. Rotationssprinkler gemäß einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das zweite Element (5) an wenigstens einem der Abschlüsse mit einer geneigten Düse (17) versehen ist, die dazu ausgelegt ist, einen Strahl entlang der Längsachse des Rotationssprinklers auszustoßen.
9. Rotationssprinkler gemäß einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das zweite Element (5) an wenigstens einem der Abschlüsse mit einem in einem Gehäuse (18) aufgenommenen Magneten versehen ist.
10. Rotationssprinkler gemäß einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die zwei Abschlüsse strukturell identisch sind und an invertierten Positionen montiert sind.

Revendications

1. Gicleur rotatif comprenant un corps tubulaire à extrémité ouverte (1) prévu avec des buses de lavage et/ou propulsion, une douille (2) pour son montage sur un tuyau d'alimentation en eau, et une borne de fermeture agencée à chaque extrémité dudit corps tubulaire (1), chacune desdites bornes de fermeture étant composée avec un premier élément (3) fixé sur le corps tubulaire (1) et un second élément (5) verrouillé sur le gicleur par des moyens de verrouillage élastiques, **caractérisé en ce que** lesdits premier et second éléments (3, 5) sont couplés de manière coulissante et réalisent un couplage étanche à l'eau entre eux au moyen d'un joint torique (14) intercalé entre deux parties cylindriques (13, 16) de section transversale de préférence circulaire, l'une desdites deux parties cylindriques (13, 16) étant formée sur le premier élément (3) et l'autre desdites deux parties cylindriques (13, 16) étant formée sur le second élément (5).
2. Gicleur selon la revendication 1, **caractérisé en ce**

que le premier élément (3) est monté à l'intérieur du corps tubulaire (1) et le second élément (5) est monté à l'extérieur du corps tubulaire (1).

3. Gicleur selon la revendication 2, **caractérisé en ce que** le premier élément (3) se compose essentiellement d'un corps annulaire (8) dont le contour externe correspond, du point de vue de la forme et de la taille, à la section transversale d'extrémité interne du corps tubulaire (1) et le second élément (5) se compose essentiellement d'un corps annulaire (15) dont la section transversale interne correspond, du point de vue de la forme et de la taille, au contour d'extrémité externe du corps tubulaire (1). 5
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4. Gicleur selon la revendication 2 ou 3, **caractérisé en ce que** le corps annulaire (8) est prévu avec une bride périphérique frontale (9) appropriée pour définir la profondeur d'introduction dudit corps annulaire (8) dans le corps tubulaire (1). 15
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5. Gicleur selon la revendication 3 ou 4, **caractérisé en ce que** le premier élément (3) est prévu avec une languette longitudinale arrière (11) ayant un trou (10) qui est positionné en correspondance avec un trou (12) formé dans le corps tubulaire (1), le premier élément (3) étant monté sur le corps tubulaire (1) au moyen d'une vis (4) qui passe par ledit trou (12) dans le corps tubulaire (1) et vient en prise avec le trou (10) de ladite languette (11). 25
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6. Gicleur selon la revendication 5, **caractérisé en ce que** les moyens de verrouillage élastiques du second élément (5) se composent d'une languette longitudinale flexible (6) s'étendant à partir du second élément (5) jusqu'à la vis (4) et prévue avec un trou (7) approprié pour recevoir la tête de la vis (4). 35
7. Gicleur selon l'une quelconque des revendications précédentes, **caractérisé en ce que** le premier élément (3) est prévu avec un manchon axial (13) s'étendant vers l'extérieur à partir d'une paroi avant et le second élément (5) est prévu avec une partie cylindrique axiale (16), fermée de manière frontale, qui est formée et dimensionnée pour recevoir ledit manchon (13) et réaliser, avec ce dernier, une étanchéité cylindrique au moyen du joint torique (14) qui est de préférence logé dans un siège formé sur la surface externe du manchon (13). 40
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8. Gicleur selon l'une quelconque des revendications précédentes, **caractérisé en ce que** le second élément (5) d'au moins l'une des bornes est prévu avec une buse inclinée (17) appropriée pour émettre un jet le long de l'axe longitudinal du gicleur. 55
9. Gicleur selon l'une quelconque des revendications précédentes, **caractérisé en ce que** le second élé-

ment (5) d'au moins l'une des bornes est prévu avec un aimant contenu dans un boîtier (18).

10. Gicleur selon l'une quelconque des revendications précédentes, **caractérisé en ce que** les deux bornes sont structurellement identiques et sont montées dans des positions inversées.

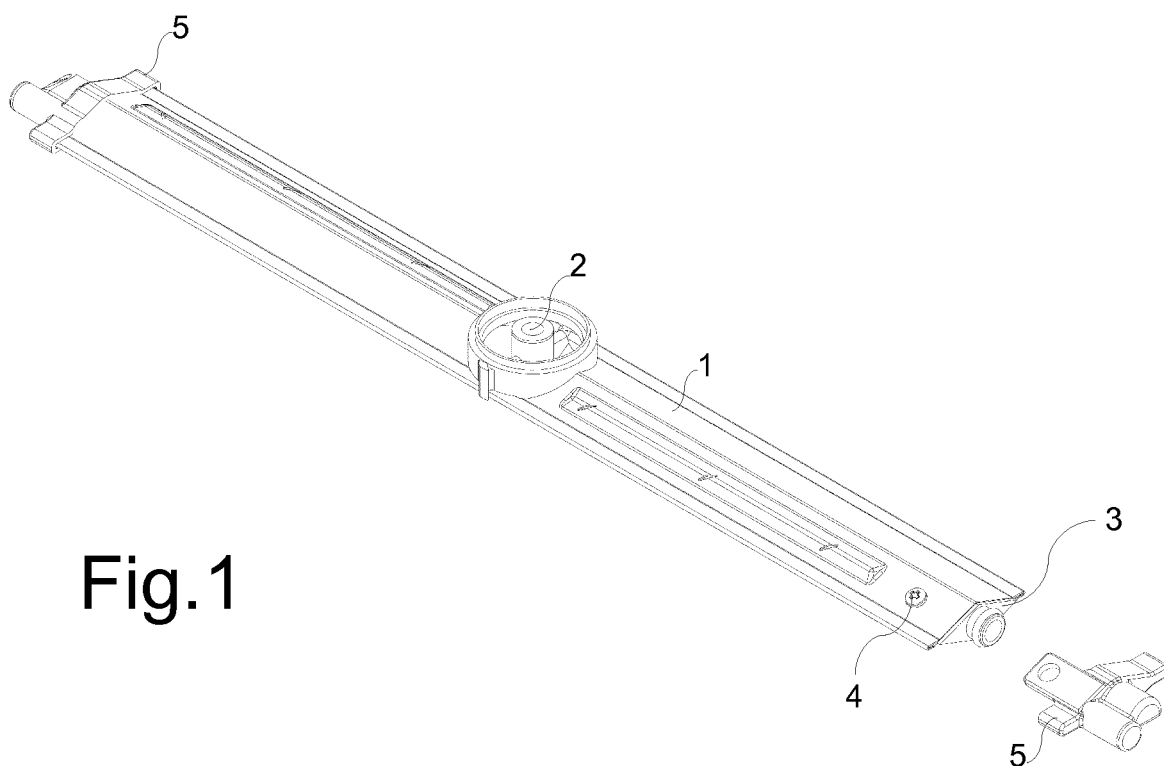


Fig.1

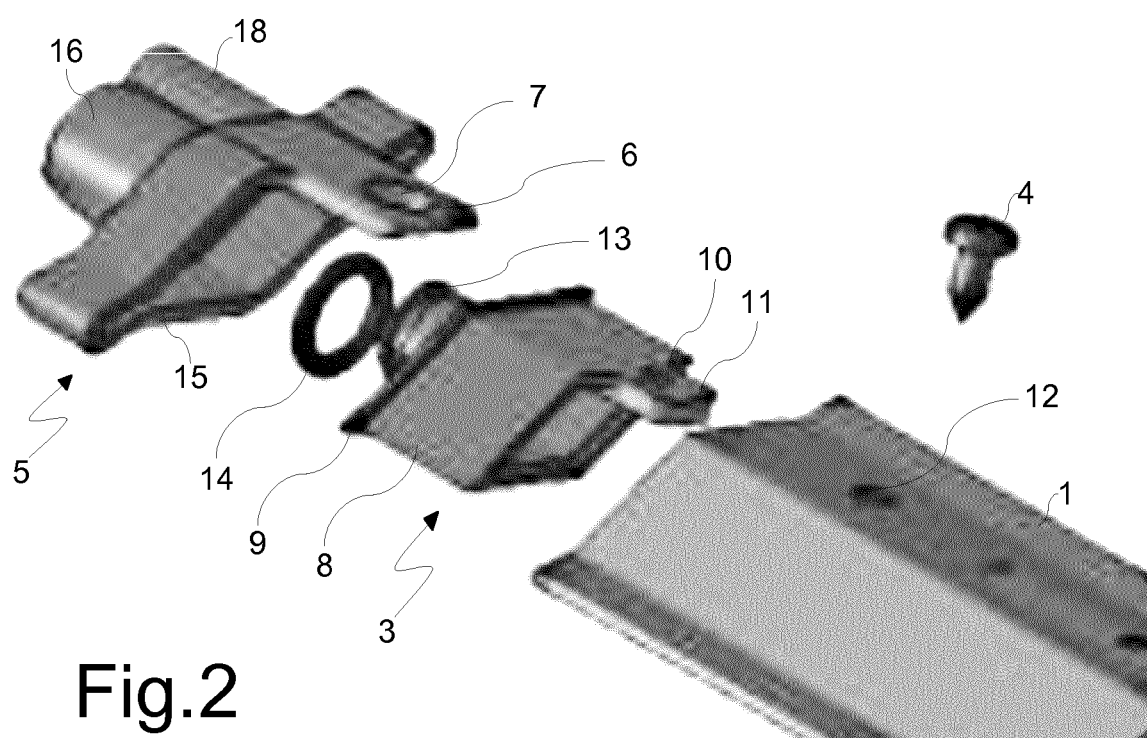
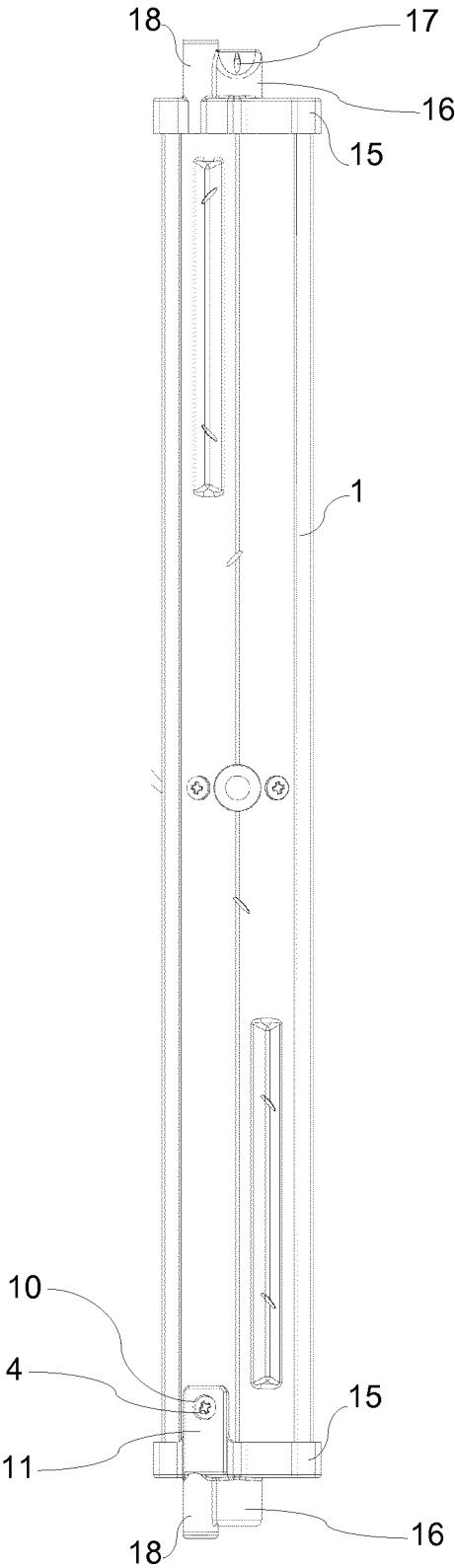


Fig.2

Fig.3



REFERENCES CITED IN THE DESCRIPTION

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