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(54) **A connector assembly for connecting a domestic implement to a handle**

(57) There is provided connector assembly (1) of which the front insertion section (70) extends over a distance along the longitudinal axis (L) and comprises one or more transversal elements, each extending over a distance along the longitudinal axis (L) which is smaller than the distance of the insertion section (70) and each configured such that it causes a reciprocating movement of the locking catch (32) transverse to the longitudinal axis (L) when passing said locking catch (32) before reaching the connected state.

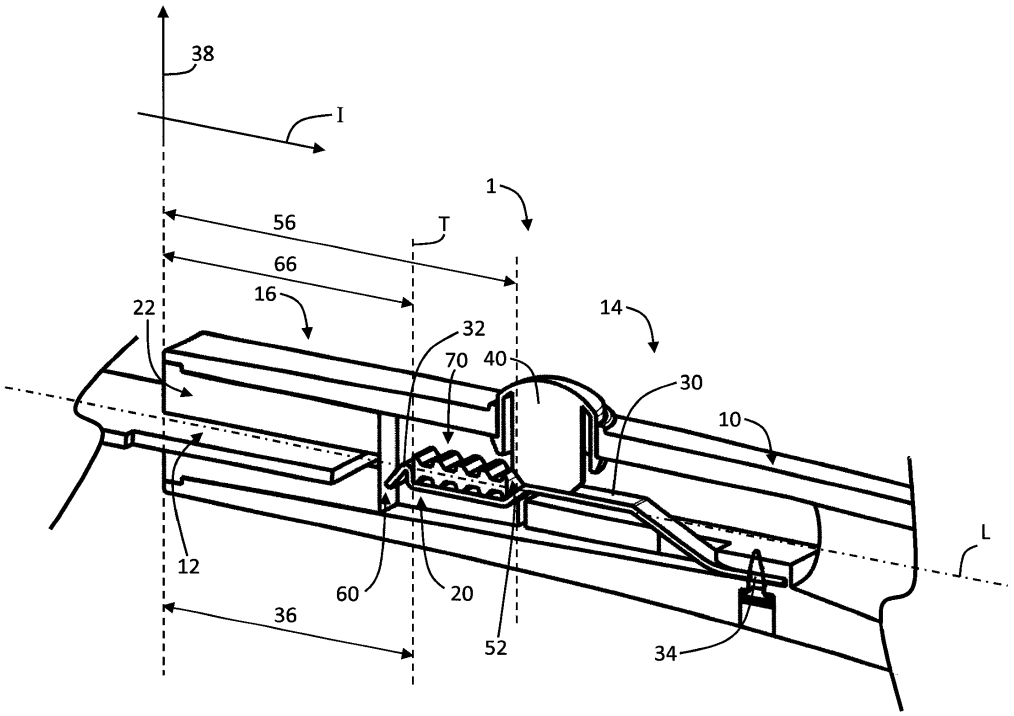

Fig. 5

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Description

Field of the Invention

[0001] The present invention generally relates to connector assemblies in order to connect a domestic implement to a handle, and more particularly to connector assemblies used to secure barbequing and other cooking tools.

Background of the Invention

[0002] EP0057916 describes a connector assembly for connecting a domestic implement to a handle, respectively depicted as elements 86 and 10 on Figure 1. The connector assembly comprises a hollow connecting sleeve, depicted as element 16 on Figure 1, in which a plug-in pin from the domestic implement is inserted, depicted as element 18 on Figure 1. A leaf spring is secured inside the hollow connecting sleeve. The plug-in pin presents a locking hole, depicted as element 61 on Figure 1. The locking of the plug-in pin in the coupling sleeve occurs when a bent portion of a leaf spring drops into this locking hole of the plug-in pin, as depicted in Figure 1. The locking can be released by a push button located at the end of the leaf spring, depicted as element 48 on Figure 1. When pushed, the button releases the bent portion of the leaf spring and the plug-in pin can be removed from the connecting sleeve.

[0003] According to the connector assembly described in EP0057916, the domestic implement must be completely inserted, i.e. until the bent portion of a leaf spring drops into the locking hole of the plug-in pin, in order to be securely fixed to the handle. If the leaf spring does not drop into the locking hole of the plug-in, the domestic implement falls off the handle. Also, if the locking of the leaf spring in the hole of the plug-in is not associated with a clear clicking sound, the user is not aware if the connection between the domestic implement and the handle is secure. The domestic implement can then fall off the handle which is a potential safety risk and renders the use of the connector assembly unreliable for the user.

[0004] An alternative realization of a connector assembly is described in US1753441. The domestic implement presents notches, as depicted as element 27 on Figure 9. The notches are arranged upon one side and disposed at spaced intervals throughout the length of the domestic implement. The notches are adapted to selectively accommodate a locking pin of the handle, depicted as element 28 on Figure 1. When the locking pin 28 fits in one notch of the domestic implement, the domestic implement is rigidly retained against sliding movement and inward movement within the handle. The length of the inserted portion of the domestic implement in the handle can be adjusted by lifting the locking pin of the handle, and by securely fixing it in another notch of the domestic implement.

[0005] The locking pin of the handle must be lifted to change the position of the fixation of the handle to the domestic implement described in US1753441. The user is not aware in which notch the locking pin is inserted, and therefore if the domestic implement is fully inserted in the handle. Also, the user does not get a clear confirmation when the locking pin fits inside one notch of the domestic implement. There exists a risk that the locking pin is not fully inserted inside a notch and that the domestic implement makes an unintended sliding movement. This makes the use of the connector assembly unreliable for the user.

[0006] Another alternative realization of a connector assembly is described in US3306639. A domestic implement presents a series of transverse grooves, depicted as element 14 on Figure 2, spaced along one flat surface of the domestic implement. The domestic implement is inserted in a handle. The handle connector itself is made out of two pieces. The handle presents an aperture, depicted as element 40 on Figure 2. The second piece of the handle connector is a ring with a diameter larger than the one of the handle and that overlaps with the handle. The ring comprises a roller, depicted as element 38 on Figure 3, slightly shorter in length than the transverse width of an opening, depicted as element 28 on Figure 2. In locking position, the opening 28 of the ring is positioned above the aperture 40 of the handle, and the roller 38 fits through both the opening 28 and the aperture 40 to engage in a selected transverse groove of the domestic implement.

[0007] The handle of the connector assembly described in US3306639 is made of two separate pieces. This makes the manufacturing and assembly of the handle more expensive and more time consuming. Also, the aperture 40 of the handle and the opening 28 of the ring must be accurately aligned in order for the roller to fit in a groove of the domestic implement. This makes the connection between the two elements complicated and sensitive to manufacturing tolerances.

[0008] For the connector assembly described in US3306639, the user is not aware in which groove the roller is inserted, and therefore experiences difficulties in determining whether the domestic implement is fully inserted in the handle. Also, the user does not get a clear confirmation when the roller fits inside one groove of the domestic implement. There exists a risk that the roller is not inserted inside a groove and that the domestic implement makes an unintended sliding movement. This makes the use of the connector assembly unreliable for the user.

[0009] The fixation described in US3306639 between the domestic implement and the handle relies on a holding force, that locks the connector in a particular position along the longitudinal direction, which is determined by the force pushing the roller in a groove of the domestic implement. It is clear that the holding force of such a connection is limited in order to allow for a release of the connection by means of a force along the longitudinal direction of the domestic implement. There thus exists

the risk that, for example, the weight carried by the domestic implement might create a force along the longitudinal direction that exceeds the holding force of the roller causing the domestic implement to be released inadvertently. This makes the use of this connector assembly unreliable for the user.

[0010] It is an objective of the present invention to disclose a connector assembly and the related method that overcomes the above identified shortcomings of existing tools. More particularly, it is an objective to disclose a simple and reliable implementation of such connector assembly and method for securely fastening a domestic implement to a handle, where the user gets a confirmation that the domestic implement is securely and correctly fastened to the handle in a desired position, and where the risk posed by the domestic implement falling off the handle when not completely connected in that position is reduced. It is a further objective to provide a connector assembly that is strong enough to prevent the domestic implement from falling off the handle even if the domestic implement is carrying a heavy weight. This is especially relevant if the domestic implement is for example a cooking utensil, such as for example a barbeque cooking utensil, which is required to securely hold food items of potentially considerable weight in a heated environment.

Summary of the Invention

[0011] According to a first aspect of the invention, there is provided a connector assembly configured to releasably connect a domestic implement to a handle extending along a longitudinal axis, the connector assembly comprising:

- at the end of the handle, a handle connector portion comprising:
  - a cavity extending from a cavity entrance into the handle along the longitudinal axis;
  - a resilient pawl which comprises a free end comprising a locking catch which extends in the cavity; and a fixed end which is connected to the handle;
  - a release button movably connected to the handle and configured to cooperate with the resilient pawl such that the transversal position of the locking catch is changed against the bias force of the resilient pawl when pressing the release button; and
- at the end of the implement, an implement connector portion comprising an implement insertion part extending from an implement insertion end towards the implement along the longitudinal axis, and configured such that at least a part matingly corresponds with its outer circumference to the inner circumference of the cavity when in a connected state, the implement insertion part comprising;
  - a locking recess extending transversely to the longitudinal axis;
  - a front insertion section arranged along the longitudinal axis in between the implement insertion end and the locking recess; and

wherein the handle connector portion and the implement connector portion are configured to cooperate such that in the connected state the locking catch is not releasable from the locking recess by means of a force along the longitudinal axis; and is releasable from the locking recess by pressing the release button,
CHARACTERISED IN THAT
said front insertion section extends over a distance along the longitudinal axis and comprises one or more transversal elements, each extending over a distance along the longitudinal axis which is smaller than the distance of the insertion section and each configured such that it causes a reciprocating movement of the locking catch transverse to the longitudinal axis when passing said locking catch before reaching the connected state.

[0012] This connector assembly improves the reliability of the connection as when establishing a connection the transverse reciprocating movement of the locking catch of the resilient pawl in cooperation with the front insertion section will cause click sounds that warn the user that the domestic implement is approaching its final position for enabling a correctly secured locking. In this way the alerted user will be more vigilant for the final clicking sound generated when the locking catch of the resilient pawl engages with the locking recess, which will clearly be different from the clicking sounds generated by the reciprocating movement as now the locking catch of the resilient pawl cooperates with the locking recess instead of the transversal elements. This will enable the user to verify with greater certainty that a reliable connection has been established before use of the tool. Additionally, even when the user does not succeed in establishing a reliable connection in which the locking catch of the resilient pawl is sufficiently inserted into the locking recess, this will not result in the implement completely falling out of the handle, which could result in safety hazards for the user. In such a situation, the locking catch of the resilient pawl will be held by the transverse elements on the front insertion section, and the user can safely check the reliability of the connection by exerting a predetermined force on the handle along the longitudinal direction in a direction away from the implement which exceeds the holding force generated by the transverse elements. If the connection is not fully secured the user will be able to release the connection without pressing the release button, Additionally the reliability is further improved as the reciprocating movement of the locking catch of the resilient pawl prior to its engagement with the locking recess enables a higher certainty the locking catch is fully introduced into the locking recess as the preliminary exposure of the resilient pawl to this vibrating movement will enable a higher chance of a reliable con-

nection, even when different forces along the longitudinal direction are exerted by different types of users. Still further the transverse elements on the insertion section create a predetermined resistance during the insertion state, which ascertains that the users will be exerting a predetermined minimum force when the locking catch approaches the locking recess thereby still further enhancing the reliability of the connection in the locked state.

[0013] According to an advantageous embodiment, the connector assembly is further characterised in that the locking catch and the locking recess are configured such that the transversal locking movement of said locking catch transverse to the longitudinal axis when proceeding to the locked state is larger than the reciprocating movement.

[0014] In this way the user is warned during the insertion state by lighter clicking sounds which form a suitable reference sound level for the harder clicking sound when the locked state is reached, which forms a particular intuitive and user friendly confirmation that a reliable connection has been established.

[0015] According to a further embodiment, the connector assembly is further characterised in that the locking catch is positioned at a longitudinal locking distance along the longitudinal axis from the cavity entrance and biased into a transversal position along a transversal direction transverse to the longitudinal axis, and
wherein the handle connector portion and the implement connector portion are configured to cooperate such that:

- in order to establish a connection, the implement insertion part is introduced by its implement insertion end into the cavity by means of forces applied along the longitudinal axis thereby proceeding from:
    - a disconnected state in which the longitudinal distance between the implement insertion end and the cavity entrance is smaller than the longitudinal locking distance; and in which of the locking catch is biased into a transversal resting position;
    - to an insertion state in which the longitudinal distance between the implement insertion end and the cavity entrance is larger than the longitudinal locking distance, and the longitudinal distance between the locking recess and the cavity entrance is smaller than the longitudinal locking distance; and in which the transversal position of the locking catch is changed from the transversal resting position in a direction against the bias force of the resilient pawl by the front insertion section;
    - to a connected state in which the longitudinal distance between the locking recess and the cavity entrance is equal to the longitudinal locking distance; and in which the locking catch is biased into a transversal locking position, in which the locking catch cannot be released from the locking recess by means of a force along the longitudinal axis; and
- in order to release the connection the implement insertion part is extracted from the cavity by means of forces applied along the longitudinal axis after proceeding from.
    - the connected state;
    - to a released state in which the locking catch is released from the locking recess by changing the transversal position of the locking catch from the transversal locking position in a direction against the bias force of the resilient pawl by pressing the release button.

[0016] In this way the user can safely check the reliability of the connection by exerting a predetermined force on the handle along the longitudinal direction in a direction away from the implement which exceeds the holding force generated by the transverse elements. If the connection is not fully secured the user will be able to release the connection without pressing the release button,

[0017] According to a further embodiment, the connector assembly is further characterised in that the locking catch and the transversal elements are configured such that the locking catch is movable along the one or more transversal elements by means of a force along the longitudinal direction exceeding a predetermined threshold force when in the insertion state, without pressing the release button.

[0018] This ascertains that the users will be exerting a predetermined minimum force when the locking catch approaches the locking recess thereby still further enhancing the reliability of the connection in the locked state. Additionally, even when the user does not succeed in establishing a reliable connection in which the locking catch of the resilient pawl is sufficiently inserted into the locking recess, this will not result in the implement completely falling out of the handle, which could result in safety hazards for the user as the implement will only be extracted from the handle when a user exerts a force exceeding the predetermined holding force.

[0019] According to a further embodiment, the connector assembly is further characterised in that the front insertion section comprises a plurality of transversal elements at different positions along the longitudinal direction.

[0020] This enforces the beneficial effect of the reciprocating motion locking catch of the resilient pawl.

[0021] According to an optional embodiment, the connector assembly is further characterised in that the locking catch of the resilient pawl comprises an abutment surface configured to contact the locking recess when in the connected state.

[0022] This allows for a simple and reliable construction of the resilient pawl.

[0023] According to an advantageous embodiment, the connector assembly is further characterised in that the resilient pawl comprises a further abutment surface configured to contact the implement insertion end when in the connected state.

[0024] This further enhances reliability of the connection when in the connected state.

[0025] According to an optional embodiment, the connector assembly is further characterised in that the resilient pawl comprises at least one still further abutment surface configured to contact the transversal elements at their side towards the implement insertion end and / or their opposing side when in the connected state.

[0026] This still further enhances reliability of the connection when in the connected state.

[0027] According to an advantageous embodiment, the connector assembly is further characterised in that the implement connector portion is symmetrical with respect to a plane along the longitudinal axis for a reversible connection to the handle connector portion.

[0028] This increases flexibility for the user regarding the orientation of the implement with respect to the handle.

[0029] According to an optional embodiment, the connector assembly according to a first aspect of the present invention is further characterised in that the resilient pawl is one or more of the following:

- a spring biased pawl;
- a pawl at least partly formed from resilient material or a leaf spring.

[0030] In this way a simple and reliable construction of the resilient pawl can be realized.

[0031] According to a second aspect of the invention, there is provided a domestic implement assembly comprising a connector assembly according to the first aspect of the invention, characterised in that the domestic implement assembly further comprises:

- a handle connected to the handle connector portion of the connector assembly; and
- an implement connected to the implement connector portion of the connector assembly.

[0032] Such a connector assembly is especially advantageous when used in such a domestic implement assembly, such as for example cooking implement which could have sharp or pointy elements that could form a safety hazard for the user when they inadvertently would fall out of the handle if the inserted implement into the handle did not realize a sufficiently reliable connection.

[0033] According to a further embodiment, the domestic implement assembly is further characterised in that the domestic implement further comprises:

- a further handle, pivotably connected to the handle, and connected to the handle connector portion of the further connector assembly according to a first aspect of the invention; and
- a further implement connected to the implement connector portion of the further connector assembly.

[0034] Such a connector assembly is especially advantageous when used in this type of domestic implement assemblies as it needs to be ascertained that both the implement and further implement are reliably secured to the handle.

[0035] According to an optional embodiment, the domestic implement is further characterised in that the domestic implement is a cooking utensil, for example a barbeque cooking utensil.

[0036] Especially for barbeque cooking utensils a reliable connection is important as in general the forces exerted on these type of cooking utensils are larger than on cooking utensils for household cooking. Additionally such barbeque cooking utensils are relatively large and the fact that the implement can be releasably connected to the handle has still a further advantage as this for example facilitates cleaning of these implements by means of a dishwasher because the size of the individual elements is reduced.

[0037] According to still further embodiments, the domestic implement according to a second aspect of the present invention could comprises any of the embodiments of the connector assembly according to the first aspect of the present invention.

[0038] According to a third aspect of the invention, there is provided a domestic implement assembly comprising a:

- a connector assembly configured to releasably connect an implement to a handle extending along a longitudinal axis, said connector assembly comprising:
  - at the end of the handle, a handle connector portion comprising:
    - a cavity extending from a cavity entrance into the handle along the longitudinal axis;
    - a resilient pawl which comprises a free end comprising a locking catch which extends in the cavity; and a fixed end which is connected to the handle;
    - a release button movably connected to the handle and configured to cooperate with the resilient pawl such that the transversal position of the locking catch is changed against the bias force of the resilient pawl when pressing the release button; and
  - at the end of the implement, an implement connector portion comprising an implement insertion part extending from an implement insertion end towards the implement along the longitudi-

nal axis, and configured such that at least a part matingly corresponds with its outer circumference to the inner circumference of the cavity when in a connected state, the implement insertion part comprising;

- a locking recess extending transversely to the longitudinal axis;
- a front insertion section arranged along the longitudinal axis in between the implement insertion end and the locking recess; and

wherein the handle connector portion and the implement connector portion are configured to cooperate such that in the connected state the locking catch is not releasable from the locking recess by means of a force along the longitudinal axis; and is releasable from the locking recess by pressing the release button;

- a handle connected to the handle connector portion of the connector assembly; and
- an implement connected to the implement connector portion of the connector assembly;

CHARACTERIZED IN THAT the implement connector portion is symmetrical with respect to a plane along the longitudinal axis for a reversible connection to the handle connector portion, such that different types of domestic implements and/or different orientations of the domestic implements can be used as the implement and such that the orientation of the button of the handle relative to the implement can be changed.

[0039] This increases flexibility for the user regarding the orientation of the implement with respect to the handle. In this way the user can for example choose the preferred position of the release button with respect to the implement.

[0040] According to an advantageous embodiment, the domestic implement assembly further comprises:

- a further handle, pivotably connected to the handle, and connected to the handle connector portion of a further connector assembly; and
- a further implement connected to the implement connector portion of the further connector assembly; and

such that different types of said implements and / or different orientations of said implements can be used as the said implement and as said further implement.

[0041] This embodiment allows for new and advantageous combinations of different implements in such an implement assembly.

[0042] According to still further embodiments, the domestic implement according to a third aspect of the present invention could comprises any of the embodiments of the connector assembly according to the first aspect of the present invention.

Brief Description of the Drawings

[0043]

Fig. 1 schematically illustrates an embodiment of an implement connector portion of an embodiment of the connector assembly according to the present invention comprising

Fig. 2 schematically illustrates an embodiment of a handle connector portion of the embodiment of the connector assembly of Figure 1.

Fig. 3 schematically illustrates the embodiment of the connector assembly of Figures 1 and 2 in a disconnected state.

Fig. 4 schematically illustrates the embodiment of the connector assembly of Figure 3 in an insertion state.

Fig. 5 schematically illustrates the embodiment of the connector assembly of Figure 3 in a connected state.

Fig. 6 schematically illustrates the embodiment of the connector assembly of Figure 3 in a release state.

Fig. 7 schematically illustrates the transversal position of the locking catch of the embodiment of the connector assembly of Figure 3 when proceeding from the disconnected to the locked state.

Fig. 8 schematically illustrates an alternative embodiment of a handle connector portion capable of cooperating with the implement connector portion of Figure 1.

Fig. 9 - 11 schematically illustrates alternative embodiments of a domestic implement comprises a further handle and a further implement releasably connected by a connector assembly.

Fig. 12 schematically illustrates a further embodiment of a domestic implement comprising a connector assembly according to Figure 3, in the form of a cooking utensil.

Detailed Description of Embodiment(s)

[0044] According to an embodiment shown in Fig. 1, a domestic implement 12 comprises at its end an implement connector portion 16. It should be clear that the implement connector portion 16 is shown as a partial cross section in a plane along the longitudinal axis L. The domestic implement 12, as for example shown in Figure 12, could for example be a cooking utensil such as a barbeque cooking utensil manufactured from any suita-

ble material such as for example metal or a suitable heat resistant suitable plastic or coating. As shown the implement connector portion 16 is distinct element that is fixed to the domestic implement for example by gluing or any other suitable means. This is beneficial when for example the implement is made of a first material such as metal and the implement connector portion is made of another material such as for example a suitable plastic which can be more easily and efficiently manufactured into the desired shape. This also allows to manufacture the implement connector portion in larger quantities as the same implement connector portion 16 can be fitted to a range of different cooking implements 12. However, it is clear that according to alternative embodiments, it is for example also possible to manufacture the domestic implement 12 and the implement connector portion 16 in one piece.

[0045] The implement connector portion 16 comprises an implement insertion part 50 extending from an implement insertion end 52 towards the domestic implement 12 along a longitudinal axis L. The implement insertion part 50 is configured such that at least a part matingly corresponds with its outer circumference to the inner circumference of a cavity 20 of a handle 10 as will be explained in further detail below with reference to Fig. 2. The implement insertion part 50 comprises a locking recess 60 extending transversely to the longitudinal axis L. Although the locking recess 60, as shown is embodied as a hole 60 extending completely through the body of the implement insertion part 50 transversely to the longitudinal axis L along a transversal direction T, according to alternative embodiments alternative recesses, which for example do not create a hole but suitably extend transversely in the body of the implement insertion part 50. The implement insertion part 50 further comprises a front insertion section 70 arranged along the longitudinal axis L in between the implement insertion end 52 and the locking recess 60. As shown, the front insertion section 70 extends over a distance 72 along the longitudinal axis L and comprises a plurality of transversal elements 74, each extending over a respective distance 76 along the longitudinal direction L which is smaller than the distance 72 of the insertion section 70. Although the embodiment of Figure 1, shows five such transversal elements 74, it is clear that according to alternative embodiments a different number is possible, such as for example 2, 3, 4, 6, 7 or more. As shown the transversal elements 74 are formed as parallel ribs that extend transvers to the plane formed by the longitudinal direction L and the transversal direction T, however alternative embodiments are possible, as long as each of the transversal elements 74 is configured such that it causes a reciprocating movement 110 of a locking catch 32 of a handle connector portion 14 of a handle 10 transverse to the longitudinal axis L when passing the locking catch 32 before reaching a connected state as will be explained in further detail below. As shown, the implement connector portion 16 is symmetrical with respect to a plane along the longitudinal axis L and transverse to the transversal direction T, and in this way allows for a reversible connection to a handle connector portion 14 of a handle 10 as will be explained in further detail below. However it is clear that alternative embodiments are possible, for example in which only one side of the front insertion section 70 is suitable for cooperating with a locking catch 32 of a handle connector portion and comprises transversal elements 74.

[0046] Fig. 2 shows an embodiment of a handle connector portion 14 suitable for cooperating with the embodiment of the implement connector portion of Fig. 1. As shown the handle 10 comprises at its end facing the domestic implement 12 a handle connector portion 14. The handle connector portion 14 comprises a cavity 20 extending from a cavity entrance 22 into the handle 10 along the longitudinal axis L. The handle connector portion 14 further comprises a resilient pawl 30 which comprises a free end 32. As shown the resilient pawl 30 is formed by a means of a pawl at least partly made of resilient material, such as for example a suitable plastic or metal or for example a leaf spring, however according to alternative embodiments the resilient pawl 30 itself could made of rigid material and be suitably pivotally connected to the handle 10 and be made resilient by means of a suitable spring bias.

[0047] As shown the free end 32 comprises a locking catch 32 which extends in the cavity 20. At its opposing end the resilient pawl 30 comprises a fixed end 34 which is connected to the handle 10. As shown the fixed end 34 is suitably connected by means of a screw, however alternative connection means such as for example gluing, bolts, etc. are possible. The handle connector portion 14 further comprises a release button 40 movably connected to the handle 10 and configured to cooperate with the resilient pawl 30 such that a transversal position 38 along the transversal direction T of the locking catch 32 is changed against a bias force of the resilient pawl 30 when pressing the release button 40.

[0048] As shown, the locking catch 32 of the resilient pawl 30 comprises an abutment surface 320 configured to contact a locking recess 60 of the domestic implement connector 14 when connected as shown in Fig. 5. The resilient pawl 30 comprises a further abutment surface 310 configured to contact the implement insertion end 52 of a domestic implement 12 when connected to the domestic implement 12. Although this further abutment surface 310 advantageously improves the connection, it is clear that alternative embodiments of the resilient pawl 30 are possible without such a further abutment surface 310. Additionally the matingly connected transverse surface 330 of the handle connector portion 14 and transverse surface 340 of the implement connector portion 16 when in the connected state, cooperate with the abutment surface 320 to further enhance the reliability of the connection. An insertion direction I of a domestic implement 12 in the handle 10 is indicated by the direction I parallel to the longitudinal axis L and oriented from the cavity entrance 22 of the handle 10 to the opposite side of the cavity 20 of the handle 10. As shown, the locking

catch 32 is positioned at a longitudinal locking distance 36 along the longitudinal axis L from the cavity entrance 22 and is biased into a transversal position 38 along the transversal direction T transverse to the longitudinal axis L.

[0049] Fig. 3 shows a connector assembly 1 comprising the implement connector portion 16 of Fig. 1 and the handle connector portion 14 of Fig. 2. As shown the connector assembly 1 is part of respectively a domestic implement 12 and a handle 10 and is configured to releasably connect this domestic implement 12 to a handle 10 extending along a longitudinal axis L. An insertion direction I of a domestic implement 12 in the handle 10 is indicated by the direction I parallel to the longitudinal axis L and oriented from the cavity entrance 22 of the handle 10 to the opposite side of the cavity 20 of the handle 10. The handle connector portion 14 and the implement connector portion 16 are configured to cooperate such that in order to establish a connection, the implement insertion part 50 is introduced by its implement insertion end 52 into the cavity 20 by means of forces applied along the longitudinal axis L thereby proceeding from a disconnected state as shown in Fig. 3 to the connected state shown in Fig. 5. The implement insertion part 50 extending from an implement insertion end 52 towards the domestic implement 12 along the longitudinal axis L is configured such that at least a part of its outer circumference matingly corresponds with to the inner circumference of the cavity 20 of the handle 10 as shown. Fig. 3 depicts a disconnected state 100 in which the longitudinal distance 56 between the implement insertion end 52 and the cavity entrance 22 is smaller than the longitudinal locking distance 36. The distances 56 and 36 are defined along the longitudinal axis L and oriented according to the insertion direction 1. The origin O of the insertion direction I is defined at the vertical of the cavity entrance 22 as clearly shown in Fig. 2. This means that the value of the distance 36 is a positive value. In Fig. 3, the distance 56 is also a positive. However, it should be clear that the value of the distance 56 are to be considered a negative value when the domestic implement 12 is not yet inserted into the cavity 20 of the handle 10 and thus positioned in at the side of the negative values with respect to the origin of the insertion direction I in front of the cavity entrance 22.

[0050] Fig. 4, shows the connector assembly 1 of Fig. 3 when the implement connector portion 16 was moved by means of a force along the longitudinal direction L further into the cavity 20 along the insertion direction I thus arriving in an insertion state 102. It is clear that in this insertion state 102, as will be explained in further detail with respect to Fig. 7, the transversal elements 74 of the front insertion section 70 comprises 3 transversal elements 74 cause a reciprocating movement 110 of the locking catch 32 transverse to the longitudinal axis L when this locking catch 32 is moved past them along while proceeding along the insertion direction I before reaching the connected state 104 as shown in Fig. 5. As shown, in the insertion state 102, the longitudinal distance 56 between the implement insertion end 52 and the cavity entrance 22 is larger than the longitudinal locking distance 36, and the longitudinal distance 66 between the locking recess 60 and the cavity entrance 22 is smaller than the longitudinal locking distance 36. The distances 66, 56 and 36 are defined along the longitudinal axis L and oriented according to the insertion direction I, and as explained above, the origin O of the insertion direction I is defined at the vertical of the cavity entrance 22. It is clear that the locking catch 32 is movable along one or more of the transversal elements 74 by means of a force along the longitudinal axis L exceeding a predetermined threshold force when in the insertion state 102, without pressing the release button 40. It is thus clear that when the user moves the locking catch 32 along the transversal elements 74 this generates a transversal reciprocating movement of the locking catch 32 which generates a repetitive light clicking sound every time the locking catch 32 proceeds from one transversal element 74 to the next. Additionally it is clear that this insertion phase makes sure that the user exerts during establishment of a connection a force along the longitudinal direction which is higher than the predetermined threshold force, thereby guaranteeing a sufficiently high force along this longitudinal direction when proceeding to the connected state for securely positioning the locking catch 32 in the locking recess 60 in the subsequent connected state shown in Fig. 5.

[0051] As shown in Fig. 5, when the user has pushed the implement connector portion 14 further into the cavity 20 after the insertion state, the connected state 104 is reached, in which the handle connector portion 14 and the implement connector portion 16 are configured to cooperate such that the locking catch 32 is not releasable from the locking recess 60 by means of a force along the longitudinal axis L, this means a force exceeding the forces that are to be expected when manipulated by a user and certainly exceeding the abovementioned threshold force. As shown, in this connected state 104, the longitudinal distance 66 between a locking recess 60 and the cavity entrance 22 is equal to the longitudinal locking distance 36. The distances 66, 56 and 36 are defined along the longitudinal axis L and oriented according to the insertion direction I. As the connector assembly 1 ensures that it proceeds from the insertion state to the connected state by means of a force exceeding a predetermined threshold force irrespective of the establishing the connection, it is ascertained that the locking catch 32 is securely inserted into the locking recess in a consistent way, Additionally, as will be shown in Fig. 7 the movement along the transversal direction of the locking catch 32 when proceeding from the insertion state to the locked state will be larger than the reciprocating motion during the insertion state, thereby causing a larger and different clicking sound then the light clicking sound during the insertion state. The user is thus alerted and presented with a suitable reference clicking sound during the inser-

tion state for verifying the secure connection when presented with the larger clicking sound when proceeding to the connected state.

[0052] Fig. 6 depicts how the connector assembly 1 forming the connection between the domestic implement 12 and the handle 10 can be released from the connected state of Fig. 5 thereby proceeding to a released state 106. As shown the extraction proceeds from a connected state 104 to a released state 106 in which the locking catch 32 is released from the locking recess 60 by pressing the release button 40 and applying a force in a direction against the bias force of the resilient pawl 30. Subsequently the implement insertion part 50 can be extracted from the cavity 20 by means of forces applied along the longitudinal axis L.

[0053] Fig. 7 schematically illustrates the transversal position 38 of the locking catch 32 of the embodiment of Fig. 3 during the different states illustrated in Figures 3-5. As shown and already explained above, the front insertion section 70 extends over a distance 72 along the longitudinal axis L and comprises a plurality of transversal elements 74, each extending over a respective distance 76 along the longitudinal axis L which is smaller than the distance 72 of the insertion section 70. The top x-axis of the graph represents the longitudinal distance 56 along the insertion direction I between the implement insertion end 52 and the cavity entrance 22, with its origin at the cavity entrance 22 as explained above. The bottom x-axis of the graph represents the longitudinal distance 66 between the locking recess 60 and the cavity entrance 22 along the insertion direction I. The locking catch 32 is positioned at a longitudinal locking distance 36 along the longitudinal axis L from the cavity entrance 22 and is biased into a transversal resting position 38R along the transversal direction T transverse to the longitudinal axis L. This transversal position 38 of the locking catch 32 is plotted as y-axis of the graph. The origin of the graph is the origin O of the insertion direction I defined at the vertical of the cavity entrance 22 of the handle 10. In the disconnected state 100 around to the origin O, the locking catch range 32 is biased into a transversal resting position 38R. In the insertion state 102, the transversal position 38 of the locking catch 32 is changed from the transversal resting position 38R in a direction against the bias force of the resilient pawl 30 by the front insertion section 70. The beginning of the insertion state is characterized by the fact that the longitudinal distance 56 is equal to the longitudinal locking distance 36. The bias of the locking catch 32 reaches the bias 382 when a transversal element 74 causes a reciprocating movement 110 of the locking catch 32 transverse to the longitudinal axis L when passing the locking catch 32. The locking catch 32 and the locking recess 60 are configured such that the transversal locking movement 112 of the locking catch 32 transverse to the longitudinal axis L during the insertion state 102 is larger than the reciprocating movement 110. In this case, the bias of the locking catch 32 reaches the bias 381. In the insertion state 102, the longitudinal distance 66 between the locking recess 60 and the cavity entrance 22 is smaller than the longitudinal locking distance 36. In the connected state 104, the locking catch is biased into a transversal locking position 38L, in which the locking catch 32 cannot be released from the locking recess 60 by means of a force along the longitudinal axis L. In the connected state 104, the longitudinal distance 56 is larger than the longitudinal locking distance 36, and the longitudinal distance 66 is equal to the longitudinal locking distance 36. By pressing the release button 40, the transversal position of the locking catch 32 can be changed from a locking position 38L in a direction against the bias force of the resilient pawl 30 after which the implement connector portion 16 can be extracted in a released state and the locking catch again proceeds to its biased transversal resting position 38R.

[0054] According to an alternative embodiment shown in Fig. 8, the handle connector portion 14 comprises a resilient pawl 30 with a plurality of abutment surfaces 374 configured to contact transversal elements 74 of the front insertion section 70 of the embodiment of Fig. 1 at their side towards the implement insertion end 52 and/or their opposing side when in the connected state 104, thereby enabling a further increase in locking force when in the connected state.

[0055] Figs. 9 - 11 show a further embodiment of a domestic implement which next to a handle 10, implement 12 and connector assembly 1 as explained above, comprises a further handle 210 pivotably connected to the handle 10, and connected to the handle connector portion 214 of the further connecter assembly 1. The distance between the handle 10 and the further handle 210 can be adapted when the two handles pivot around the pivot 290. The pivot 290 is the rotation centre of the pivot movement and the handle 10 and the further handle 210 pivot around the axis P, perpendicular to the longitudinal axis L. The domestic implement 12 further comprises a further implement 12 connected to the implement connector portion 216 of the further connector assembly 1. The implement connector portion 16 of the domestic implement 212 is further symmetrical with respect to a plane along the longitudinal axis L for a reversible connection to the handle connector portions 14 and 214. The domestic implement 12 can be connected to the handle connector portion 14 of the handle 10, or can be connected to the handle connector portion 214 of the handle 210. The domestic implement 212 can be connected to the handle connector portion 14 of the handle 10, or can be connected to the handle connector portion 214 of the handle 210. An insertion direction I of a domestic implement 12 in the handle 10 is indicated by the direction I parallel to the longitudinal axis L and oriented from the cavity entrance 22 of the handle 10 to the opposite side of the cavity 20 of the handle 10. The origin O of the insertion direction I is defined at the vertical of the cavity entrance 22. As shown in Figures 10 and 11 this enables to use new and advantageous combinations of implements, especially when these can be connected in dif-

ferent orientations to the handle. The domestic implements 12 and 212 can be identical, or can be different as depicted in Fig. 10 and 11. As shown this is especially useful for a cooking utensil, for example a tool for barbeque or for cooking.

[0056] Fig 12 schematically shows an embodiment of a domestic implement 12 comprising a connector assembly 1 according to the embodiment of Figure 3.

[0057] It is clear, that according to alternative embodiments, a releasable connection of a domestic implement 12 to a handle 10 as depicted in Figs 9-12 might be realized by a connector assembly 1 according to the embodiment of Figure 3, wherein the front insertion section 70 of the implement insertion part 50 of the domestic implement 12 extends over a distance 72 along the longitudinal axis L and which does not comprise a plurality of transversal elements 74. When, as shown in Figs 9-12, the implement connector portion 16 is symmetrical with respect to a plane along the longitudinal axis L and transverse to the transversal direction T, and in this way allows for a reversible connection to a handle connector portion 14 of a handle 10, still a new and advantageous domestic implement assembly is realised. This allows a user of the domestic implement 12 comprising such a connector assembly 1 to secure the domestic implement 12 to a handle 10 at his convenience in one position, or to rotate the domestic implement 12, for example by 180° around the longitudinal axis, before securing it to the handle 10. This makes the use of the domestic implement 12 user friendly as the user can choose the preferred position of the release button relative to the orientation of the domestic implement 12. When connected a position, such as for example shown in Fig. 12 the release button 40 is above a horizontal plane along the longitudinal axis L. Thus making the release button more easily accessible for the thumb of a user. It is clear that alternatively the implement 12, can be reconnected to the handle 10 after a 180° rotation around the longitudinal axis L, in which the release button 40 will be positioned under this horizontal plane along the longitudinal axis L, Thus making the release button more easily accessible for the fingers of a user when holding the handle 10.

[0058] It is clear that further alternative embodiments are possible as long as the implement connector portion 16 is symmetrical with respect to a plane along the longitudinal axis L for a reversible connection to the handle connector portion 14, such that different types of domestic implements and/or different orientations of the domestic implements can be used as the implement 2 and such that the orientation of the button 40 of the handle 10 relative to the implement 12 can be changed.

[0059] This is especially advantageous for embodiments of the domestic implement assembly such as for example shown in Figs 10 and 11 in which the domestic implement assembly further comprises a further handle 210, pivotably connected to the handle 10, and connected to the handle connector portion 214 of a further connector assembly 1; and a further implement 212 connected to the implement connector portion 216 of the further connector assembly 1. As shown the implement 12 in Fig. 10 is embodied as a fork 12 of a cooking implement and combined with another fork 212 as further implement 212. As shown, the pivotably connected handles 10, 210 can be releasably connected to the same fork 12 as implement 12, but in a different orientation, combined with a different further implement 212 in the form of a spatula 212 thus advantageously increasing flexibility and user friendliness. It is clear that alternative embodiments are possible, specifically with respect to the types of implements and different combinations of implements 12, 212, as long as the pivotably connected handle 10 and further handle 210 in general allow the use of different types of said implements and/or different orientations of said implements.

[0060] Although the present invention has been illustrated by reference to specific embodiments, it will be apparent to those skilled in the art that the invention is not limited to the details of the foregoing illustrative embodiments, and that the present invention may be embodied with various changes and modifications without departing from the scope thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein. In other words, it is contemplated to cover any and all modifications, variations or equivalents that fall within the scope of the basic underlying principles and whose essential attributes are claimed in this patent application. It will furthermore be understood by the reader of this patent application that the words "comprising" or "comprise" do not exclude other elements or steps, that the words "a" or "an" do not exclude a plurality, and that a single element, such as a computer system, a processor, or another integrated unit may fulfil the functions of several means recited in the claims. Any reference signs in the claims shall not be construed as limiting the respective claims concerned. The terms "first", "second", third", "a", "b", "c", and the like, when used in the description or in the claims are introduced to distinguish between similar elements or steps and are not necessarily describing a sequential or chronological order. Similarly, the terms "top", "bottom", "over", "under", and the like are introduced for descriptive purposes and not necessarily to denote relative positions. It is to be understood that the terms so used are interchangeable under appropriate circumstances and embodiments of the invention are capable of operating according to the present invention in other sequences, or in orientations different from the one(s) described or illustrated above.

Claims

1. A connector assembly (1) configured to releasably connect a domestic implement (12) to a handle (10) extending along a longitudinal axis (L), said connector assembly (1) comprising:

    - at the end of the handle (10), a handle connector portion (14) comprising:

        - a cavity (20) extending from a cavity entrance (22) into the handle (10) along the longitudinal axis (L);
        - a resilient pawl (30) which comprises a free end comprising a locking catch (32) which extends in the cavity (20); and a fixed end (34) which is connected to the handle (10);
        - a release button (40) movably connected to the handle (10) and configured to cooperate with the resilient pawl (30) such that the transversal position (38) of the locking catch (32) is changed against the bias force of the resilient pawl (30) when pressing the release button (40); and

    - at the end of the implement (12), an implement connector portion (16) comprising an implement insertion part (50) extending from an implement insertion end (52) towards the implement (12) along the longitudinal axis (L), and configured such that at least a part matingly corresponds with its outer circumference to the inner circumference of the cavity (20) when in a connected state (104), the implement insertion part (50) comprising;

        - a locking recess (60) extending transversely to the longitudinal axis (L);
        - a front insertion section (70) arranged along the longitudinal axis (L) in between the implement insertion end (52) and the locking recess (60); and

    wherein the handle connector portion (14) and the implement connector portion (16) are configured to cooperate such that in the connected state (104) the locking catch (32) is not releasable from the locking recess (60) by means of a force along the longitudinal axis (L); and is releasable from the locking recess (60) by pressing the release button (40),
    CHARACTERISED IN THAT
    said front insertion section (70) extends over a distance (72) along the longitudinal axis (L) and comprises one or more transversal elements (74), each extending over a distance (76) along the longitudinal axis (L) which is smaller than the distance (72) of the insertion section (70) and each configured such that it causes a reciprocating movement (110) of the locking catch (32) transverse to the longitudinal axis (L) when passing said locking catch (32) before reaching the connected state (104).

2. A connector assembly according to claim 1, **characterised in that** the locking catch (32) and the locking recess (60) are configured such that the transversal locking movement (112) of said locking catch (32) transverse to the longitudinal axis (L) when proceeding to the locked state (104) is larger than said reciprocating movement (110).

3. A connector assembly (1) according to claim 1 or 2, **characterised in that** the locking catch (32) is positioned at a longitudinal locking distance (36) along the longitudinal axis (L) from the cavity entrance (22) and biased into a transversal position (38) along a transversal direction (T) transverse to the longitudinal axis (L), and
wherein the handle connector portion (14) and the implement connector portion (16) are configured to cooperate such that:

    - in order to establish a connection, the implement insertion part (50) is introduced by its implement insertion end (52) into the cavity (20) by means of forces applied along the longitudinal axis (L) thereby proceeding from:

        - a disconnected state (100) in which the longitudinal distance (56) between the implement insertion end (52) and the cavity entrance (22) is smaller than the longitudinal locking distance (36); and in which of the locking catch (32) is biased into a transversal resting position (38R);
        - to an insertion state (102) in which the longitudinal distance (56) between the implement insertion end (52) and the cavity entrance (22) is larger than the longitudinal locking distance (36), and the longitudinal distance (66) between the locking recess (60) and the cavity entrance (22) is smaller than the longitudinal locking distance (36); and in which the transversal position (38) of the locking catch (32) is changed from the transversal resting position (38R) in a direction against the bias force of the resilient pawl (30) by the front insertion section (70);
        - to a connected state (104) in which the longitudinal distance (66) between the locking recess (60) and the cavity entrance (22) is equal to the longitudinal locking distance (36); and in which the locking catch (32) is biased into a transversal locking position (38L), in which the locking catch (32) cannot be released from the locking recess (60) by means of a force along the longitudinal axis

(L); and

- in order to release the connection the implement insertion part (50) is extracted from the cavity (20) by means of forces applied along the longitudinal axis (L) after proceeding from.

- the connected state (104);
- to a released state (106) in which the locking catch (32) is released from the locking recess (60) by changing the transversal position (38) of the locking catch (32) from the transversal locking position (38L) in a direction against the bias force of the resilient pawl (30) by pressing the release button (40).

4. A connector assembly according to claim 3, **characterised in that** the locking catch (32) and the transversal elements (74) are configured such that the locking catch (32) is movable along the one or more transversal elements (74) by means of a force along the longitudinal direction (L) exceeding a predetermined threshold force when in the insertion state (102), without pressing the release button (40).

5. A connector assembly according to any of the preceding claims, **characterised in that** the front insertion section (70) comprises a plurality of transversal elements (74) at different positions along the longitudinal direction (L).

6. A connector assembly according to any of the preceding claims, **characterised in that** the locking catch (32) of the resilient pawl (30) comprises an abutment surface (320) configured to contact the locking recess (60) when in the connected state (104).

7. A connector assembly according to claim 6, **characterised in that** the resilient pawl (30) comprises a further abutment surface (310) configured to contact the implement insertion end (52) when in the connected state (104).

8. A connector assembly according to claim 5 or 6, **characterised in that** the resilient pawl (30) comprises at least one still further abutment surface (374) configured to contact the transversal elements (74) at their side towards the implement insertion end (52) and / or their opposing side when in the connected state (104).

9. A connector assembly according to any of the preceding claims, **characterised in that** the implement connector portion (16) is symmetrical with respect to a plane along the longitudinal axis (L) for a reversible connection to the handle connector portion (14).

10. A connector assembly according to any of the preceding claims, **characterised in that** the resilient pawl (30) is one or more of the following:

- a spring biased pawl;
- a pawl at least partly formed from resilient material or a leaf spring.

11. A domestic implement assembly comprising a connector assembly according to any of the preceding claims, **characterised in that** the domestic implement assembly further comprises:

- a handle (10) connected to the handle connector portion (14) of the connector assembly (1); and
- an implement (12) connected to the implement connector portion (16) of the connector assembly (1).

12. A domestic implement assembly according to claim 11, **characterised in that** the domestic implement further comprises:

- a further handle (210), pivotably connected to the handle (10), and connected to the handle connector portion (214) of the further connector assembly (1) according to any of the claims 1 to 10; and
- a further implement (212) connected to the implement connector portion (216) of the further connector assembly (1).

13. A domestic implement assembly according to claim 11 or 12, **characterised in that** the domestic implement is a cooking utensil, for example a barbeque cooking utensil.

14. A domestic implement assembly comprising:

- a connector assembly (1) configured to releasably connect an implement (12) to a handle (10) extending along a longitudinal axis (L), said connector assembly (1) comprising:

- at the end of the handle (10), a handle connector portion (14) comprising:

- a cavity (20) extending from a cavity entrance (22) into the handle (10) along the longitudinal axis (L);
- a resilient pawl (30) which comprises a free end comprising a locking catch (32) which extends in the cavity (20); and a fixed end (34) which is connected to the handle (10);
- a release button (40) movably connected to the handle (10) and config-

ured to cooperate with the resilient pawl (30) such that the transversal position (38) of the locking catch (32) is changed against the bias force of the resilient pawl (30) when pressing the release button (40); and

- at the end of the implement (12), an implement connector portion (16) comprising an implement insertion part (50) extending from an implement insertion end (52) towards the implement (12) along the longitudinal axis (L), and configured such that at least a part matingly corresponds with its outer circumference to the inner circumference of the cavity (20) when in a connected state (104), the implement insertion part (50) comprising;

- a locking recess (60) extending transversely to the longitudinal axis (L);
- a front insertion section (70) arranged along the longitudinal axis (L) in between the implement insertion end (52) and the locking recess (60); and

wherein the handle connector portion (14) and the implement connector portion (16) are configured to cooperate such that in the connected state (104) the locking catch (32) is not releasable from the locking recess (60) by means of a force along the longitudinal axis (L); and is releasable from the locking recess (60) by pressing the release button (40),

- a handle (10) connected to the handle connector portion (14) of the connector assembly (1); and
- an implement (12) connected to the implement connector portion (16) of the connector assembly (1)

CHARACTERIZED IN THAT the implement connector portion (16) is symmetrical with respect to a plane along the longitudinal axis (L) for a reversible connection to the handle connector portion (14), such that different types of domestic implements and/or different orientations of the domestic implements can be used as the implement (12) and such that the orientation of the button (40) of the handle (10) relative to the implement (12) can be changed.

15. A domestic implement assembly according to claim 14, **characterized in that** the domestic implement assembly further comprises:

- a further handle (210), pivotably connected to the handle (10), and connected to the handle connector portion (214) of a further connector assembly (1); and
- a further implement (212) connected to the implement connector portion (216) of the further connector assembly (1); and

such that different types of said implements and/or different orientations of said implements can be used as said implement (12) and as said further implement (212).

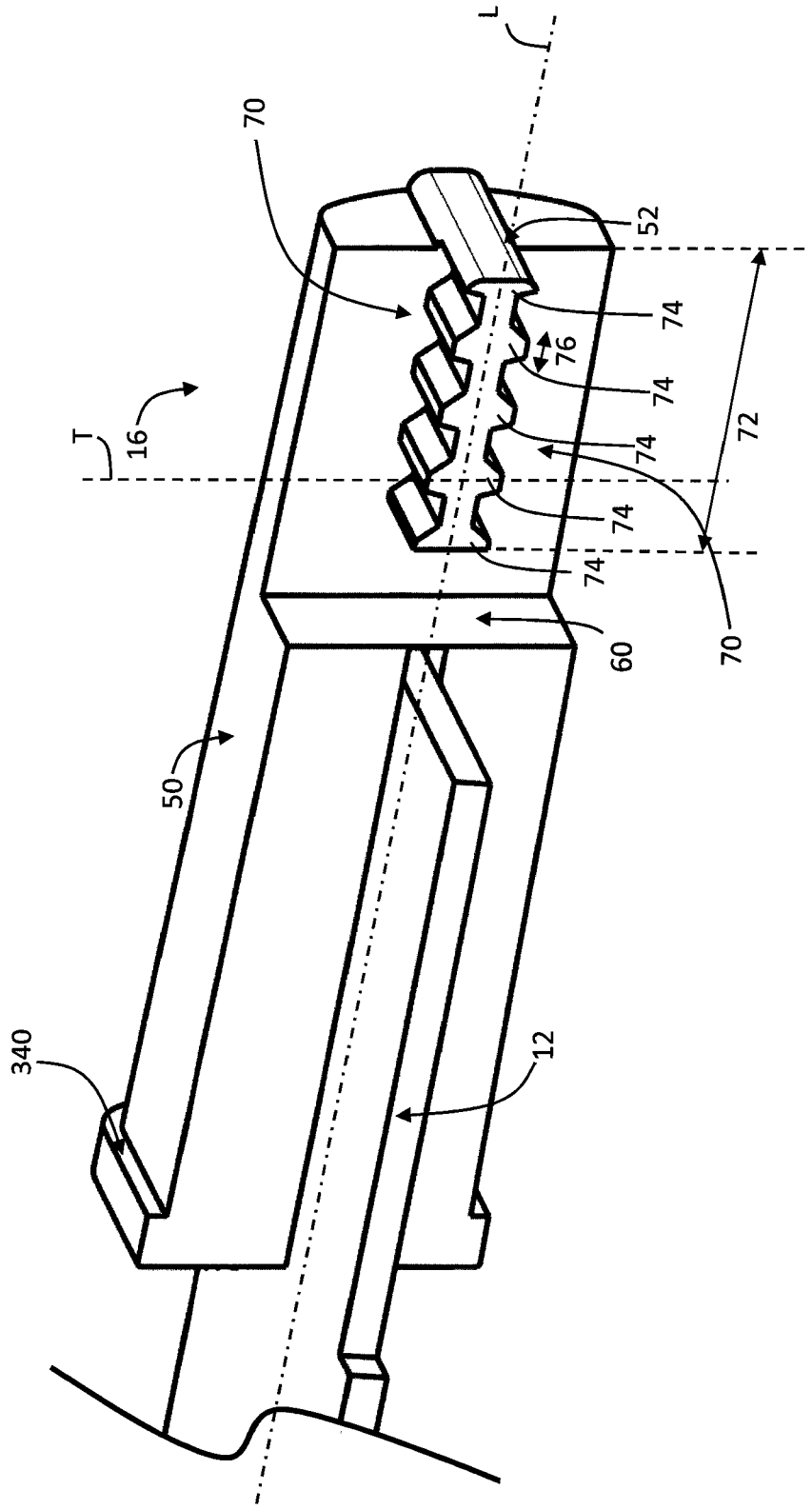

Fig. 1

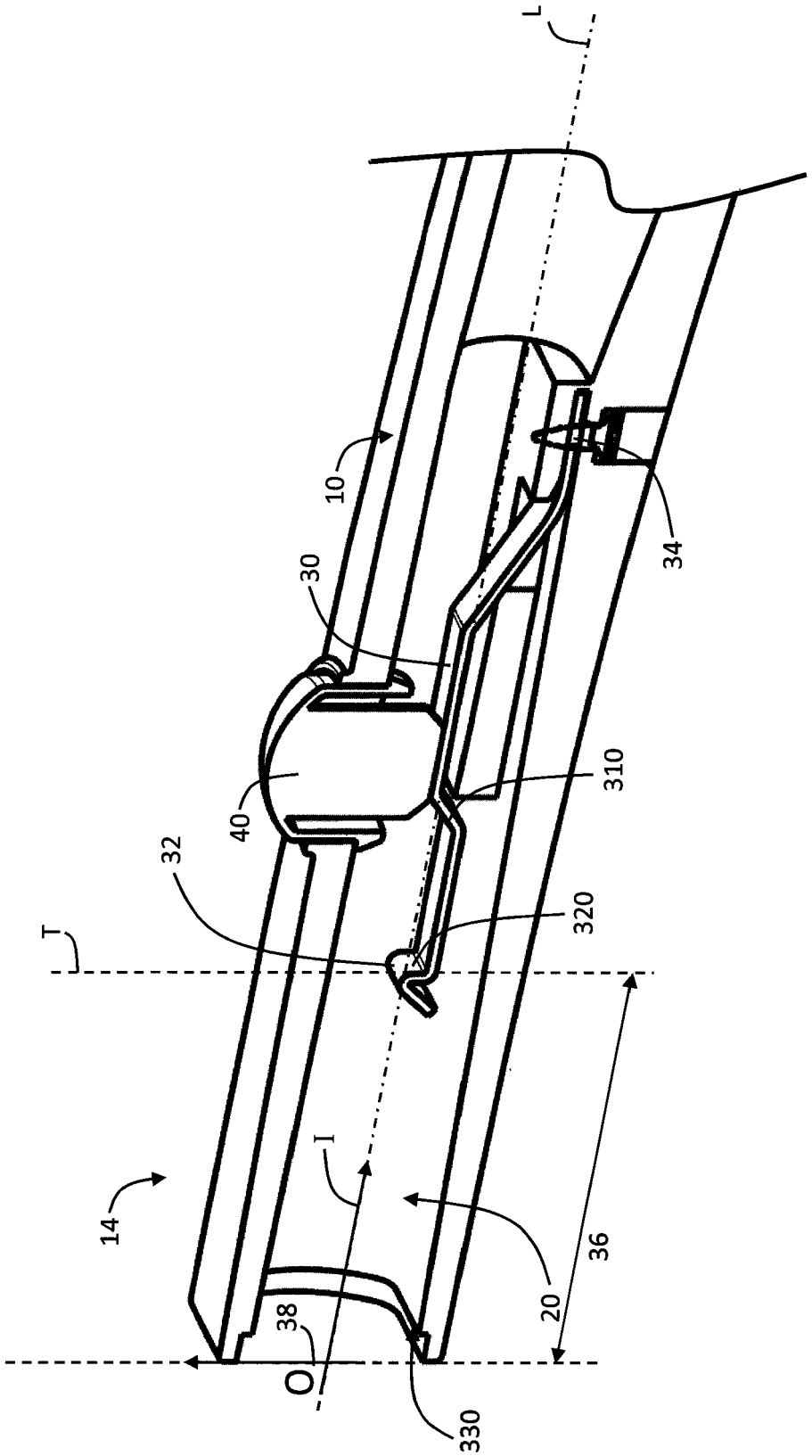

Fig. 2

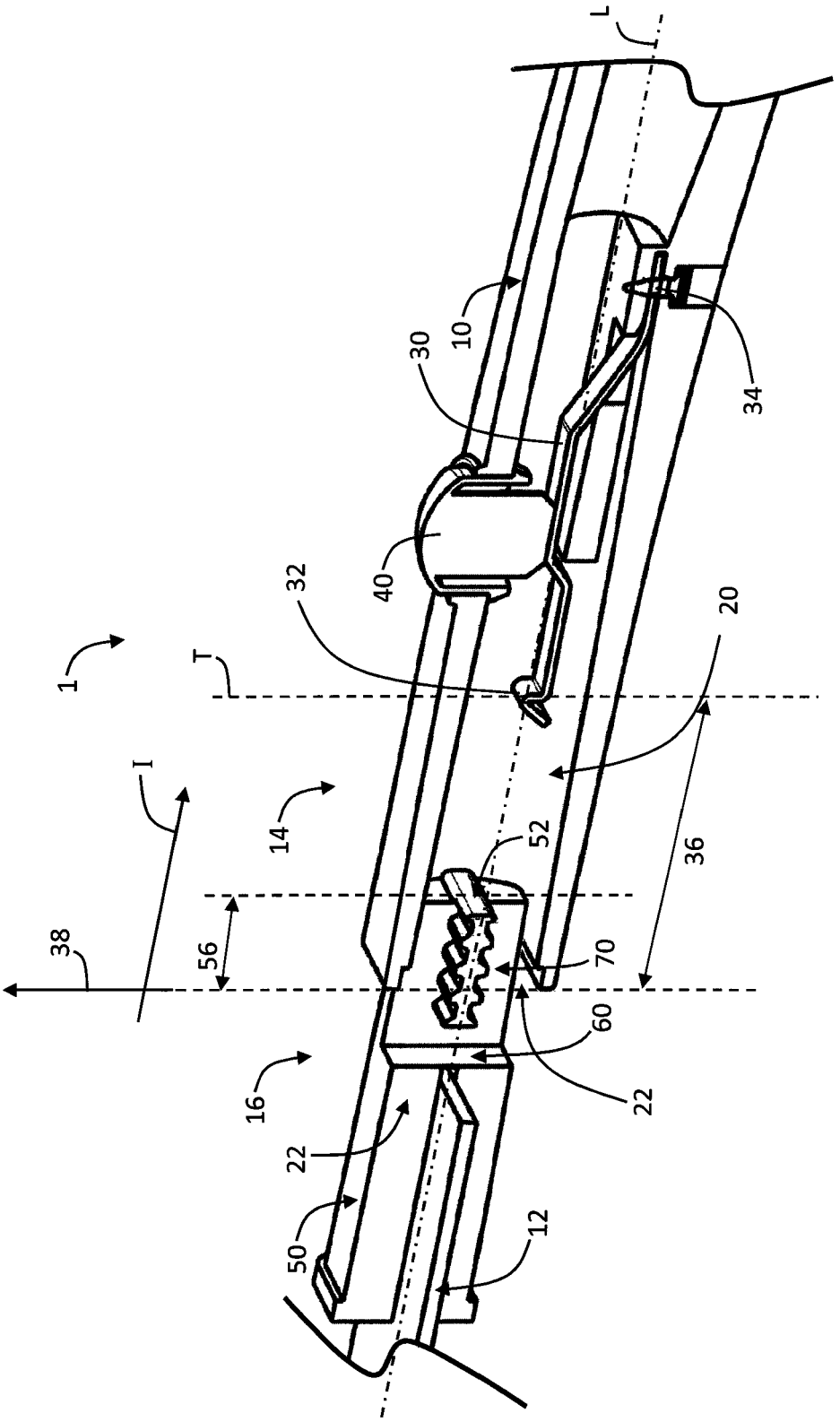

Fig. 3

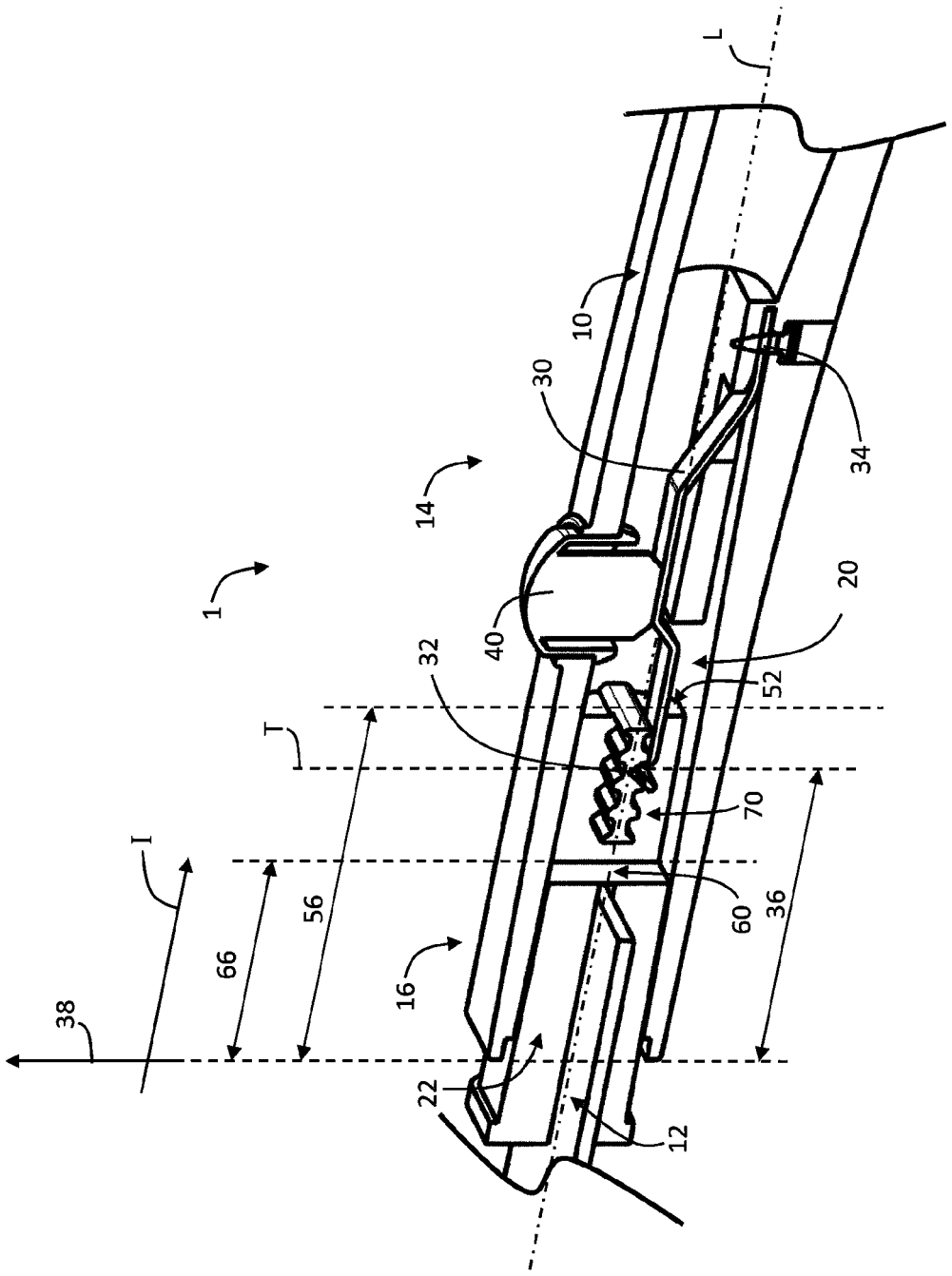

Fig. 4

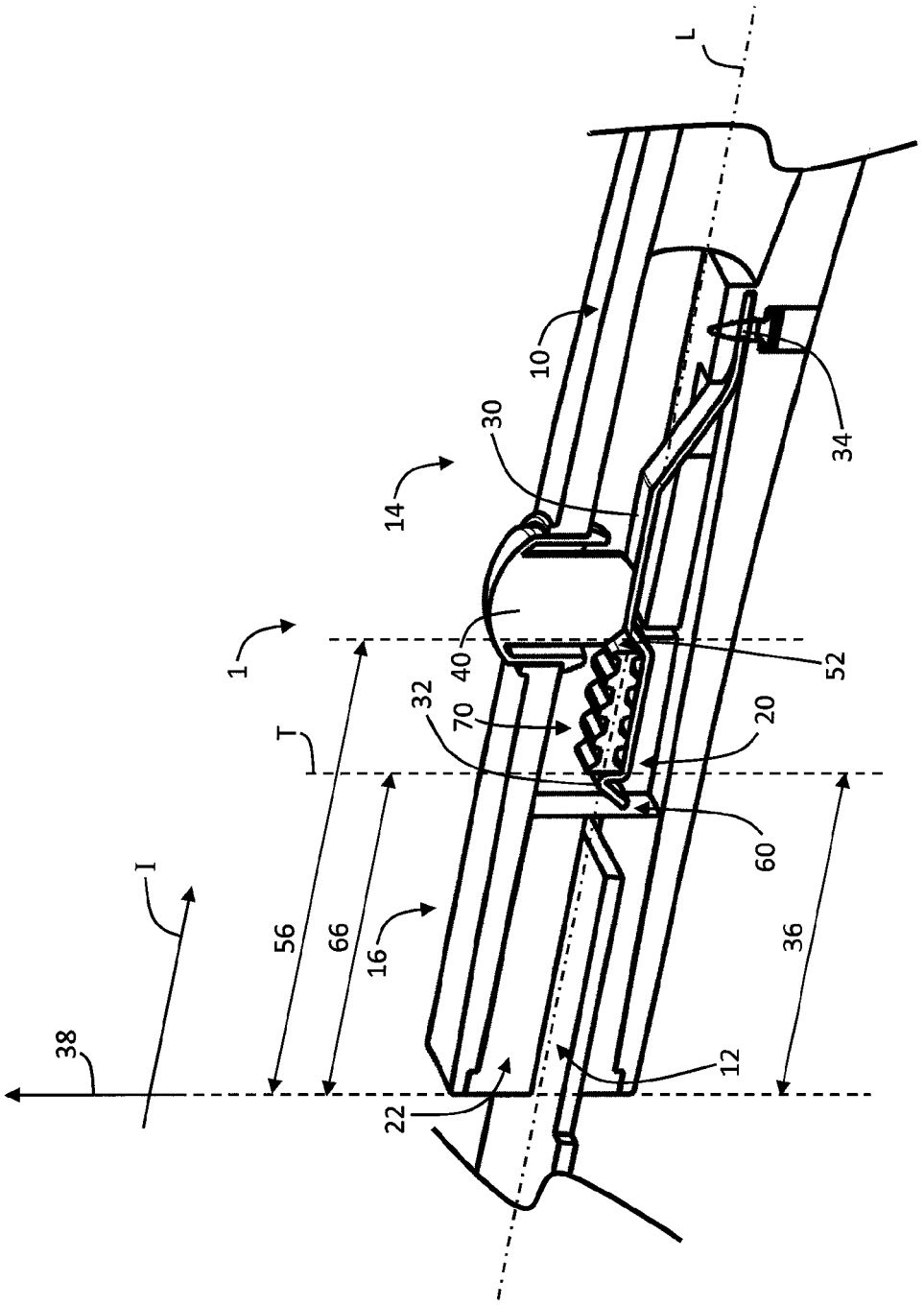

Fig. 5

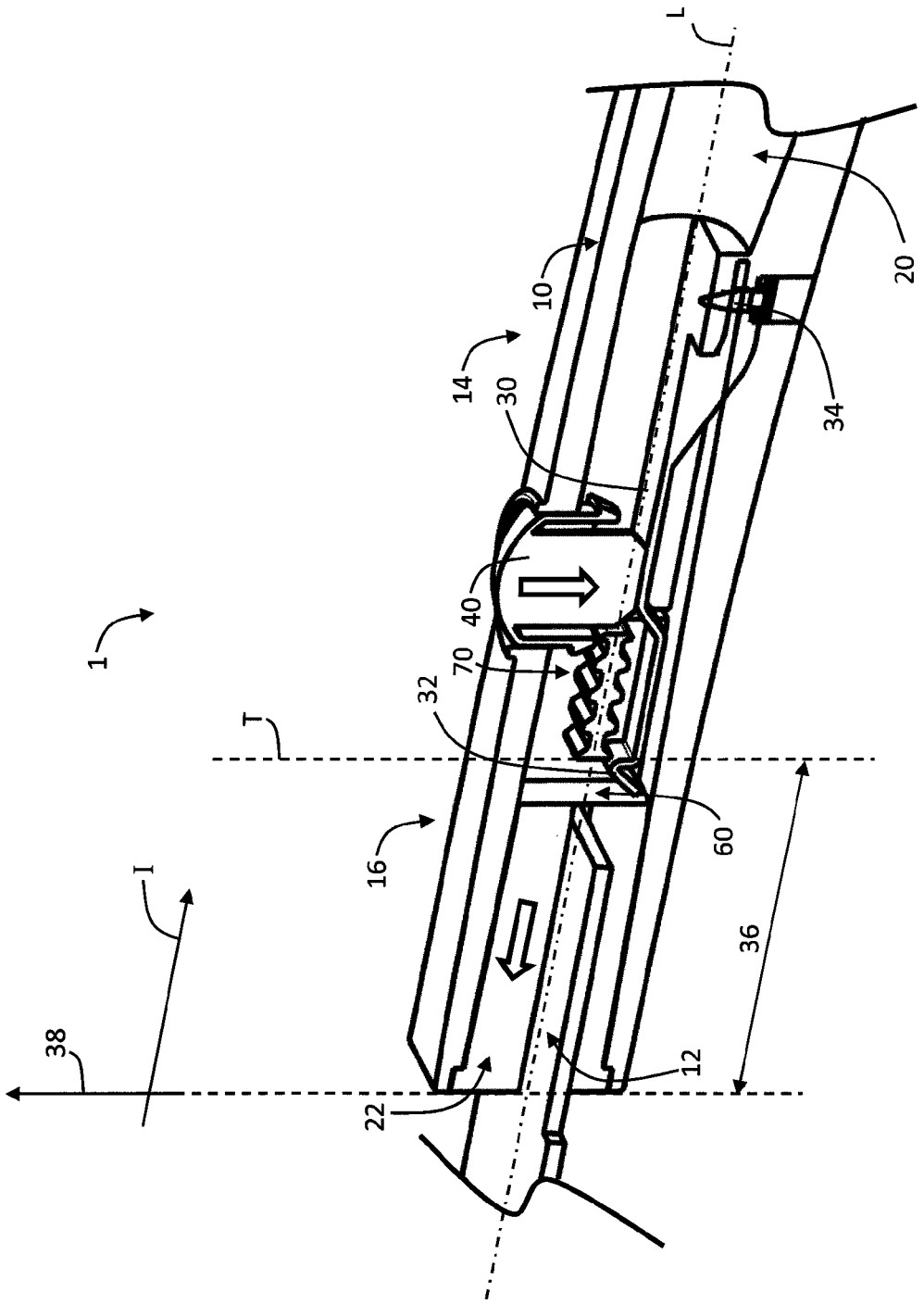

Fig. 6

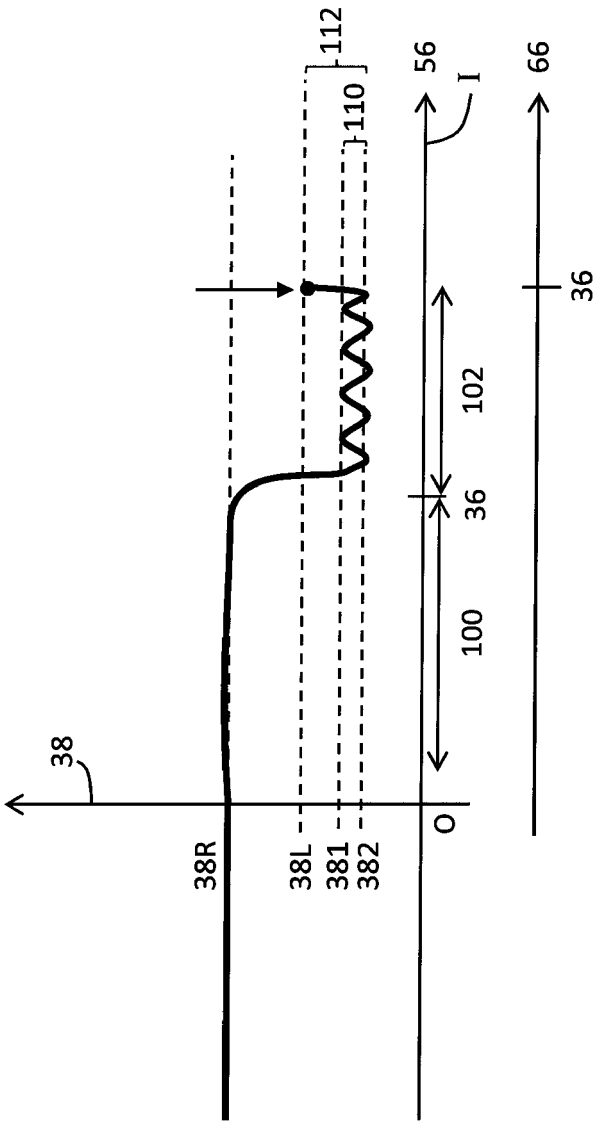

Fig. 7

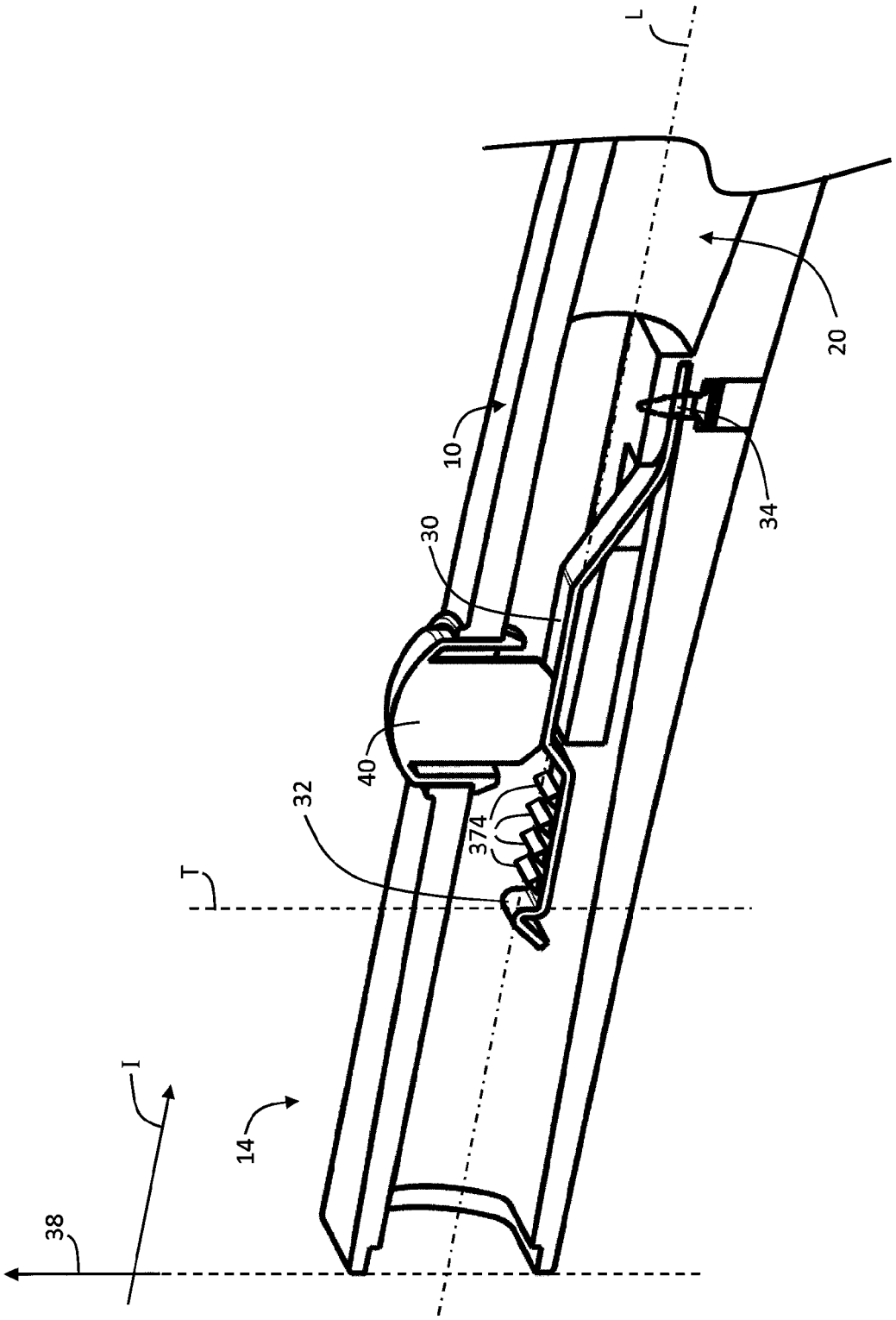

Fig. 8

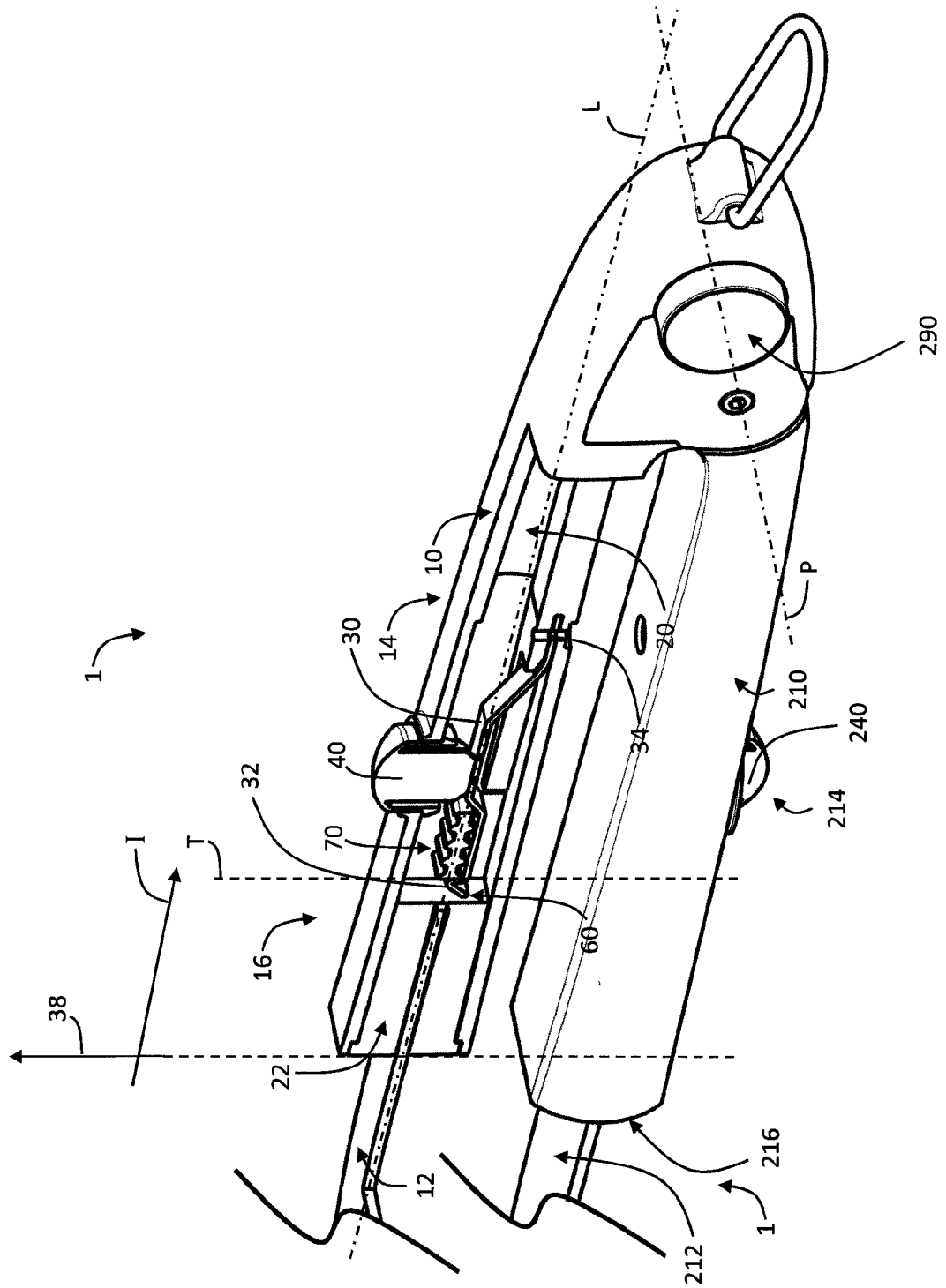
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Fig. 9

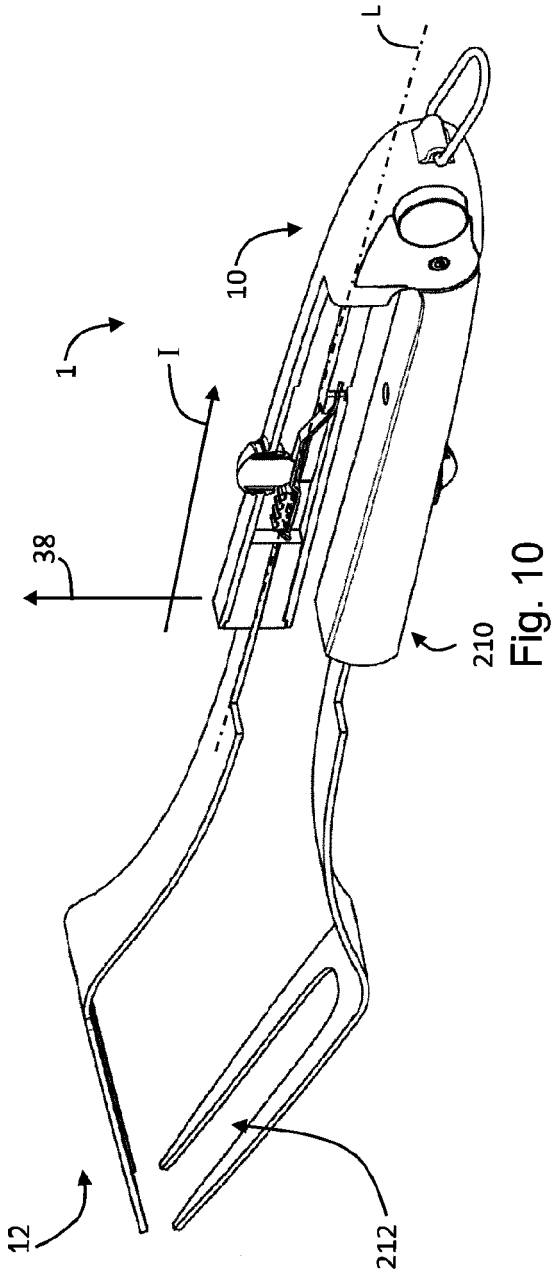

Fig. 10

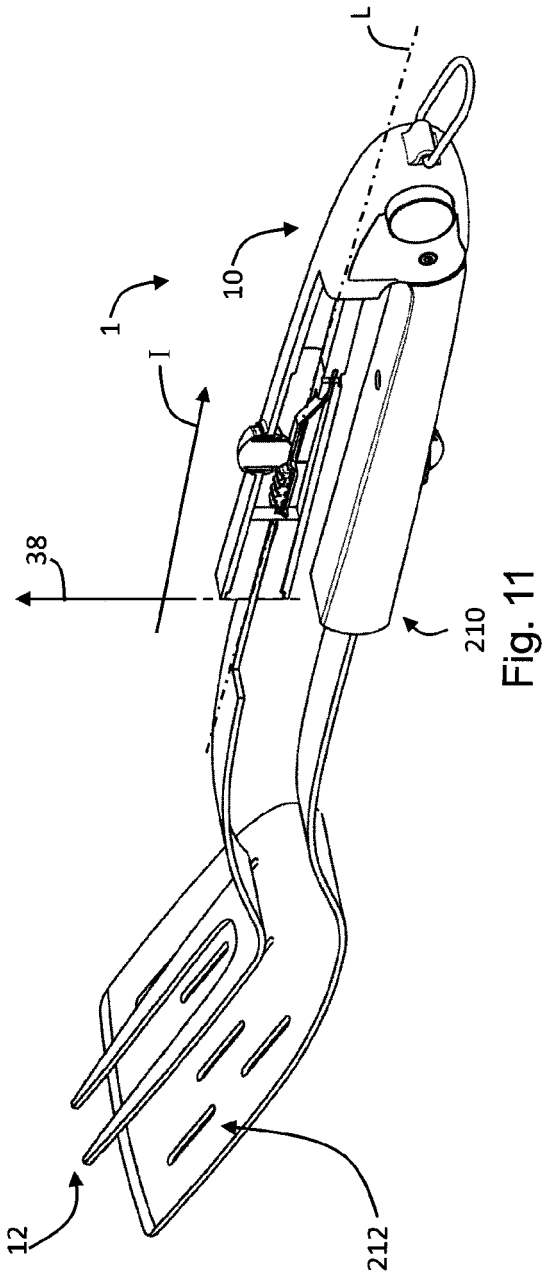

Fig. 11

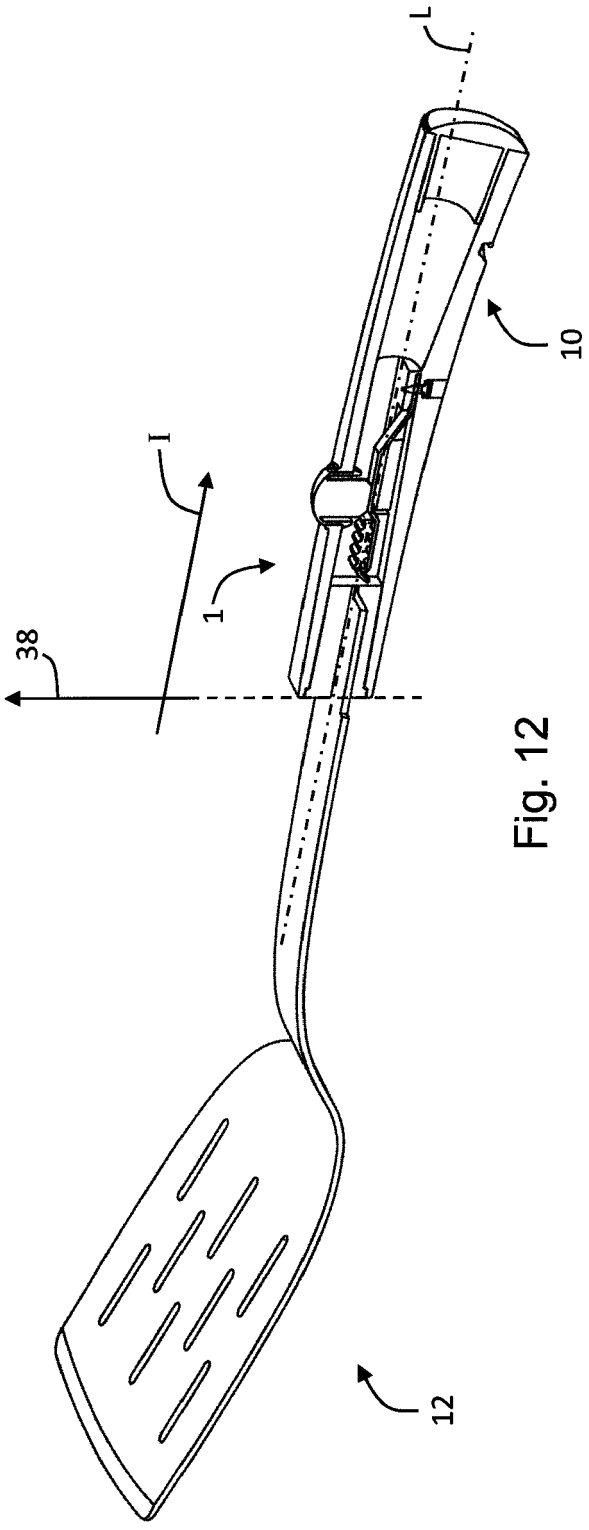

Fig. 12

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EUROPEAN SEARCH REPORT

Application Number
EP 14 16 8893

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 2003/097759 A1 (BOND GREGG [US] ET AL) 29 May 2003 (2003-05-29) * paragraphs [0027] - [0033] * * figures 1,6 * -----	1-13	INV. B25G3/18 A47J45/07
A	EP 1 369 209 A2 (PROXXON SA [LU]) 10 December 2003 (2003-12-10) * paragraph [0013] * * figures 1,2 * -----	1-13	
A	US 6 055 733 A (CHEN YIH-LONG [TW]) 2 May 2000 (2000-05-02) * the whole document * -----	1-13	

TECHNICAL FIELDS SEARCHED (IPC)

B25G
A47J

~~The present search report has been drawn up for all claims~~

Place of search	Date of completion of the search	Examiner
The Hague	14 November 2014	Bonnin, David

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

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European Patent Office
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Application Number
EP 14 16 8893

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☒ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1-13 ----------

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).

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LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 14 16 8893

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-13

   Domestic implement assembly comprising a connector assembly with transversal element

   ---

2. claims: 14, 15

   Domestic implement assembly comprising a connector assembly with a symmetrical implement connector portion

   ---

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 14 16 8893

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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14-11-2014

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2003097759 A1	29-05-2003	NONE	
EP 1369209 A2	10-12-2003	DE 10225056 A1	18-12-2003
		EP 1369209 A2	10-12-2003
US 6055733 A	02-05-2000	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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- EP 0057916 A **[0002] [0003]**
- US 1753441 A **[0004] [0005]**
- US 3306639 A **[0006] [0007] [0008] [0009]**