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(71) Applicant: **ILLINOIS TOOL WORKS INC.** [US/US];
155 Harlem Avenue, Glenview, IL 60025 (US).

(72) Inventor: **PFEIFFER, Christian**; C/o Illinois Tool Works
Inc., 155 Harlem Avenue, Glenview, IL 60025 (US).

(74) Agent: **NIEBERDING, Michael, J.** et al.; Thompson Hine
LLP, 10050 Innovation Drive, Suite 400, Danton, OH
45342-4934 (US).

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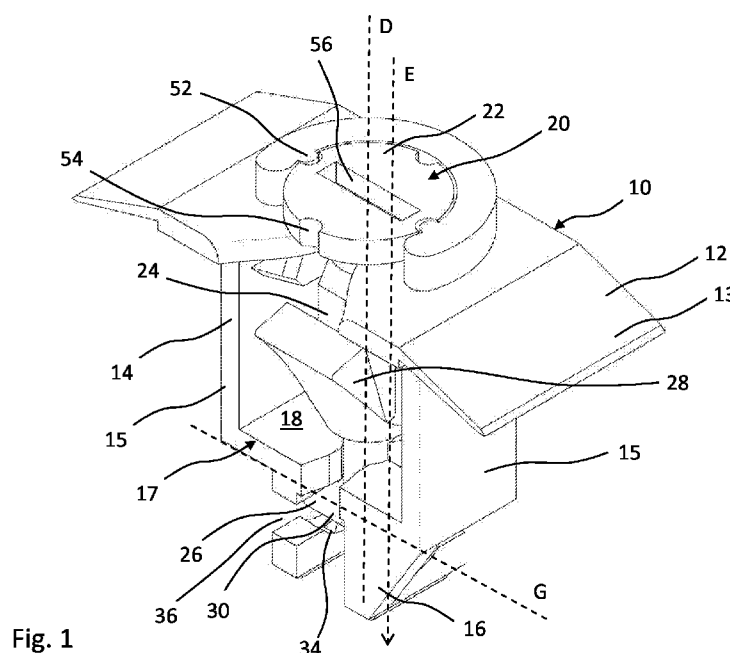


Fig. 1

(57) Abstract: A device for fastening an add-on part to a carrier component includes a housing part (10) with a receiving space (18), and a clip part (20) receivable in the receiving space (18) in a use state. In the use state the clip part (20) is rotatable about an axis of rotation (D) between a locking position and an unlocking position. The clip part (20) has latching members (28) which, in the locking position, protrude outward from the housing part (10) and, in the unlocking position, are received within the housing part (10). The latching members (28) can latch on an opening of the carrier component. The clip part (20) is pivotable about a hinge axis (G) running substantially perpendicularly to the axis of rotation (D) from a manufacturing state with the clip part (20) outside the receiving space (18), into the use state. In the use state, the clip part (20) and hinge axis (G) are rotatable about the axis of rotation (D) between the locking and unlocking positions.



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DEVICE FOR FASTENING AN ADD-ON PART TO A CARRIER COMPONENT

TECHNICAL FIELD

[0001] The invention relates to a device for fastening an add-on part to a carrier component, in particular for the connection of vehicle parts, comprising a housing part with a receiving space, and a clip part which can be received in the receiving space of the housing part, wherein the clip part in a use state in which it is received in the receiving space is rotatable about an axis of rotation between a locking position and an unlocking position, wherein the clip part has latching means which, in the locking position, protrude outward in relation to the housing part and, in the unlocking position, are received within the housing part, wherein the latching means of the clip part are designed in order, in a state of the housing part inserted into the carrier component, to latch in the locking position on an opening of the carrier component, wherein the clip part is designed to be pivotable about a hinge axis running substantially perpendicularly to the axis of rotation from a manufacturing state, in which the clip part is arranged outside the receiving space, into the use state.

BACKGROUND

[0002] Fastening devices of the above-mentioned type in the automotive sector serve, for example, for fastening a cladding part to a vehicle body. In order for an add-on part to be fastened to a carrier component, the device is inserted through a passage opening of the add-on part and through a passage opening of the carrier component in such a manner that the latching means of the clip part, in particular when interacting with latching means of the housing part, jam the carrier component and the add-on component relative to one another. In the locking position, the device thus establishes the add-on part on the carrier component. When the clip part is rotated about the axis of rotation from the locking position to the unlocking position, the latching connection of the device to the add-on part or the carrier component, respectively, is released and the device can again be retrieved from the passage openings mentioned.

[0003] Known fastening devices are often complex in terms of manufacturing. WO 2016/069 125 A1 thus describes a three-part fastening element having a box-shaped

main body, a clip part that is inserted into the main body, and having a pair of elastically deformable wings that engage with the clip part. For assembling, the box-shaped main body is inserted in a correspondingly shaped opening of a vehicle component, wherein the wings on opposite sides protrude through openings in the side walls of the main body and, when being inserted, elastically deform into the main body. The wings subsequently exit the main body again and establish the fastening element on the vehicle component. By rotating the clip part about its longitudinal axis, the wings, while deforming, are again retracted into the housing, on account of which the fastening element can be removed from the vehicle component. Such a fastening element is complex in terms of construction and is not very durable by virtue of the heavy mechanical load arising on account of the deformation.

[0004] Manufacturing of such a fastening device that is simpler in terms of construction can be achieved by a common injection-molding process for the clip part and the housing part. A fastening element having a main body and a core having a torsion rod is thus known from WO 2018/009 288 A1, wherein the core by way of a hinge axis can be adjusted from a manufacturing state outside the main body to a use state in the main body. This adjustment capability enables simple manufacturing of the fastening element having the clip part in the manufacturing state, in particular in a plastics injection-molding method having only one injection-molding tool. However, the heavy mechanical load of the torsion rod herein is disadvantageous. When inserting the fastening element into an opening of a vehicle component, a protrusion of the torsion rod thus comes into contact with an edge of the vehicle component, this leading to the torsion rod being torsioned about its longitudinal axis. After the protrusion has passed through the opening of the vehicle component, the torsion rod moves back to its locking position in which the protrusion establishes the fastening element on the vehicle component. The core of said fastening element is thus pretensioned to the locking position. In order for the fastening element to be released, a tool has to be inserted into the head of the torsion rod, and the torsion rod in relation to the main body has to be torsioned in such a manner that the core reaches the unlocking position. The torque to be applied to this end has to be maintained during the entire procedure of disassembling since the core would otherwise jump back into the locking position. This is complex. Moreover, as has been mentioned, heavy mechanical loads

which can have a negative effect on the service life of the fastening element arise by virtue of the torsioning.

SUMMARY

[0005] Proceeding from the prior art explained, the invention is based on the object of providing a device for fastening an add-on part to a carrier component which is particularly durable and permits reliable as well as reversible fastening.

[0006] The invention achieves the object by a device as claimed in claim 1. Advantageous design embodiments are the subject matter of the dependent claims, of the description, as well as of the figures.

[0007] In the device according to the invention of the type mentioned at the outset, in the use state, the clip part is designed to be rotatable together with the hinge axis about the axis of rotation between the locking position and the unlocking position.

[0008] The carrier component can be a vehicle body, for example a vehicle door or a part of the vehicle door, respectively. The add-on part can be, for example, a cladding part, for example a door cladding. The vehicle can be a passenger motor vehicle or a commercial motor vehicle.

[0009] The device according to the invention comprises a housing part and a clip part and is thus in particular designed in two parts. However, the device is preferably manufactured integrally, in particular by a plastics injection-molding method. Such manufacturing of the device herein is performed having the clip part in the manufacturing state. In the manufacturing state the clip part is arranged outside the receiving space of the housing part, in particular so as to be adjusted in relation to the housing part by an angle about the hinge axis. For example, the clip part in the manufacturing state can be adjusted in relation to the housing part by an angle of 90° about the hinge axis. The clip part can also be at an angle of 180° in relation to the housing part, thus in particular increase the length of the housing part in an insertion direction. The insertion direction herein refers to the direction in which the housing part, in particular having the clip part situated in the use position, is inserted into a passage opening of an add-on part and/or carrier component. In the conjoint production of the housing part and the clip part, connecting webs which for using the

device first have to be broken open can be formed in particular between the clip part and the housing part in the plastics injection-molding method. The clip part, proceeding from the manufacturing state, can be pivoted to the use state by simply being pivoted about the hinge axis into the receiving space of the housing part. The pivotability about the hinge axis by way of simple manufacturing of the device, in particular in a single-component injection-molding method, also permits the use state to be reached in a simple manner. The hinge axis can run through a hinge component that is received in a bearing receptacle of the housing part, wherein the hinge component in the pivoting movement is pivoted conjointly with the clip part about the hinge axis. The hinge axis can in particular run through a spindle component that is mounted in a bearing receptacle of the housing part. Consequently, the spindle component, by virtue of the mounting in the bearing receptacle, in the pivoting movement is moved about the hinge axis. The hinge axis can also be formed by a ball-and-socket joint which can in particular also enable the rotation about the axis of rotation. The clip part can thus be mounted on the housing part via a ball-and-socket joint, wherein the axis of rotation and the hinge axis can run through the ball-and-socket joint.

[0010] The housing part, in particular having the clip part in the locking state, can be inserted into a passage opening of an add-on part and a carrier component, wherein the latching means of the clip part come into contact with the opening or the openings, respectively, and can be elastically deformed in an inward manner. After the latching means have passed through the passage openings, the latching means can again be deformed in an outward manner to their resting position and thus engage behind the opening of the carrier component. The latching means can thus be formed to be elastic; the latching means can in particular comprise elastic latching arms. The latching arms can extend away from a shank of the housing part and be elastically deformable in an inward manner in the direction of the shank.

[0011] Without departing from the use state, the clip part can be adjusted between the locking state and the unlocking state. The hinge axis of the clip part herein does not remain in its original position but likewise rotates about the axis of rotation. The hinge axis runs substantially perpendicularly, in particular perpendicularly, to the axis of rotation. On account of the rotation of the clip part about the axis of rotation, the hinge axis is moved in a plane. The clip part can thus be moved between the locking position and the unlocking position without any deformation, in particular without any deformation of the latching

means. Consequently, the clip part in the use state during a rotation about the axis of rotation between the locking position and the unlocking position is not torsioned as is the case in the prior art explained at the outset. In the case of the device according to the invention, the clip part in the unlocking position as well as in the locking position is held in a stable manner and in particular is not imparted any restoring force toward the locking position. The optionally provided latching arms can in particular be moved between the locking position and the unlocking position without any elastic deformation of said latching arms. The hinge axis can run through a hinge component that is received in a bearing receptacle of the housing part, as mentioned above, wherein the hinge component in the use state of the clip part is designed to be rotatable together with the clip part about the axis of rotation between the locking position and the unlocking position. During a rotation of the clip part, the hinge component is then rotated in relation to the bearing receptacle. Any deformation, in particular torsioning, of the clip part can thus be avoided. A lower mechanical load of the clip part and in particular of the entire device is achieved by virtue of the rotatability of the hinge axis about the axis of rotation. The device according to the invention is more stable and durable and can in particular be repeatedly assembled and disassembled without losing its holding force.

[0012] According to one design embodiment, the hinge axis of the clip part, in particular a spindle component forming the hinge axis, is received in a bearing receptacle of the housing part. As has already been mentioned, the hinge axis can be formed by a spindle component. For example, the spindle component can have two bearing fingers that extend away in opposite directions. The bearing fingers can thus be received in the bearing receptacle of the housing part. The bearing fingers can in particular in each case be received in one of two mutually opposite bearing openings of the bearing receptacle. During a rotation of the clip part about the axis of rotation between the locking position and the unlocking position, the spindle component, in particular the bearing fingers, is/are moved about the axis of rotation in a corresponding manner. A bearing of the hinge axis of the clip part in the bearing receptacle of the housing part herein is established in such a manner that the movement of the clip part about the axis of rotation is enabled substantially perpendicular to the hinge axis. The hinge axis, in particular the mentioned bearing fingers, can thus be received in the bearing receptacle of the housing part at least during the

movement of the clip part about the hinge axis from the manufacturing state to the use state.

[0013] According to a respective design embodiment, the hinge axis of the clip part however leaves the bearing receptacle of the housing part during rotation of the clip part about the axis of rotation from the locking position into the unlocking position or during rotation of the clip part from the unlocking position into the locking position. Consequently, in the use state, the spindle component can leave the bearing receptacle during a rotation of the clip part about the axis of rotation. The mentioned bearing fingers herein can in particular leave their respective bearing opening of the bearing receptacle of the housing part. To this end, the bearing receptacle can have passage openings in the plane through the hinge axis defined by the rotation of the hinge axis about the axis of rotation. After the manufacturing of the device, in particular by the plastics injection-molding method, the clip part by pivoting about the hinge axis can consequently be pivoted into the receiving space of the housing part and thus to the use state, wherein the spindle component within the bearing receptacle rotates about the hinge axis. As soon as the clip part reaches its use state, a rotation of the clip part about the axis of rotation can take place and the clip part can thus be adjusted while the hinge axis or the bearing fingers, respectively, exits/exit the bearing receptacle of the housing part. Whether the clip part herein is adjusted from the unlocking position to the locking position, or from the locking position to the unlocking position, depends on the alignment in which the clip part has been manufactured on the housing part. For example, it can be provided that the clip part in the manufacturing state in relation to the housing part is aligned in such a manner that by pivoting the clip part about the hinge axis from the manufacturing state to the use state the clip part is moved to the locking position. The device can thus be moved to an assembly-ready state in a simple manner by repositioning the clip part by a predefined angular range, for example the mentioned 90° or 180°. Of course, the clip part in the manufacturing state in relation to the housing part can also be aligned in such a manner that by pivoting the clip part about the hinge axis from the manufacturing state to the use state the clip part is moved to the unlocking position. The bearing receptacle can in particular be arranged in a foot portion of the housing part, and the hinge axis, or the spindle component thereof, respectively, can be arranged at a foot end of the clip part.

[0014] According to an alternative design embodiment, the clip part is mounted on the housing part via a ball-and-socket joint, wherein the hinge axis and the axis of rotation run through the ball-and-socket joint. Instead of the clip part being mounted by way of the mentioned spindle component that is received in the bearing receptacle, it can consequently be provided in particular that a correspondingly spherical bearing portion of the clip part is received in a substantially spherical bearing receptacle of the housing part. The ball-and-socket joint thus formed enables pivoting of the clip part from the manufacturing state to the use state about the hinge axis and rotating the clip part about the axis of rotation between the locking position and the unlocking position. The axes that are substantially perpendicular to one another, i.e. the axis of rotation and the hinge axis, herein intersect in particular in the center of the spherical bearing portion. The rotatability of the hinge axis about the axis of rotation according to the invention can also be achieved on account of such a ball-and-socket joint.

[0015] According to one design embodiment, the housing part has a contact portion for contact against the add-on part, a cage portion, which adjoins the contact portion in an insertion direction, delimits the receiving space and has two side walls extending parallel to each other and to the axis of rotation and a foot portion adjoining the cage portion in the insertion direction, wherein the bearing receptacle is arranged in the foot portion. According to this design embodiment, the clip part by way of its hinge axis is consequently mounted on the foot portion of the housing part. As has already been mentioned above, the insertion direction describes the direction in which the housing part together with the clip part in the use state is inserted into a passage opening of the add-on part and/or of the carrier component. The insertion direction can in particular run parallel to the axis of rotation. The clip part in terms of the use state can have a head portion, in particular at the height level of the contact portion of the housing part, a shank which in the insertion direction adjoins the head portion and has a latching means and a foot end that in the insertion direction adjoins the shank. The clip part can in particular have the hinge axis at the foot end. The bearing receptacle of the housing part that is arranged on the foot portion can be formed for receiving a spindle component or a spherical bearing portion, as has been explained above. The clip part can correspondingly be received in the bearing receptacle by way of the spindle component of said clip part that is arranged at the foot end, or by way of the spherical bearing portion of said clip part that is in particular arranged at the foot end.

[0016] According to one design embodiment, in the use state, the clip part is secured in the housing part via holding means in relation to a movement along the axis of rotation and/or in relation to a movement about the hinge axis back into the manufacturing state. The clip part can thus be securely held when in the use state received in the receiving space of the housing part. The clip part can thus in particular be held in the housing part in relation to a movement along the axis of rotation and/or perpendicular to the axis of rotation. The holding means can in particular form a fixed bearing for the hinge axis or the spindle component thereof, respectively, such that substantially only a rotating movement of the clip part about its axis of rotation is possible. Holding means of this type can, for example, be arranged on the mentioned contact portion of the housing part or on the foot portion, or on a transition between the foot portion and the cage portion of the housing part, respectively. According to a respective design embodiment, the housing part has a C-shaped holding receptacle, wherein, in the use state, the clip part engages with a holding portion in the C-shaped holding receptacle in a latching manner. A plurality of holding receptacles of this type can also be provided, for example one on the contact portion and one on the foot portion of the housing part. The holding means herein can be understood to comprise the C-shaped holding receptacle of the housing part and the holding portion of the clip part. The C-shaped holding receptacle herein is aligned in such a manner that during a pivoting of the clip part from the manufacturing state about the hinge axis to the use state the holding portion of the clip part penetrates the passage opening of the C-shaped holding receptacle and thus makes its way into the holding receptacle. The clip part can thus latch in the holding portion, on account of which the clip part is secured in relation to a movement about the hinge axis from the use state back to the manufacturing state. Such an adjustment back to the manufacturing state can at least only be achieved while applying an adjusting force that exceeds the holding force of the holding receptacle by again passing through the passage opening. It is thus ensured that the clip part in the case of forces that usually arise in the operation of the device remains in the use state. The holding portion of the clip part can in particular be formed to correspond to the holding receptacle, for example be circular in the cross section. Holding means which suppress a movement of the clip part relative to the housing part along the axis of rotation, thus perpendicular to the hinge axis, can also be provided. This is in particular expedient when the hinge axis during a rotating movement of the clip part about the axis of rotation within the use state leaves the bearing receptacle of said hinge axis, thus in particular in the unlocking state. The

housing part can thus have holding protrusions that protrude from the mentioned side walls into the cage portion and on which the latching means during a movement of the clip part along the axis of rotation counter to the insertion direction impact in the unlocking state, wherein the latching means can in particular be formed as latching arms that project from the shank of the clip part on opposite sides.

[0017] According to one design embodiment, the device is manufactured by plastics injection molding, wherein connecting bridges formed between the clip part and the housing part by the injection molding can be broken open by the pivoting of the clip part about the hinge axis from the manufacturing state into the use state. As has already been mentioned at the outset, the device can be manufactured integrally by the plastics injection-molding method. Such manufacturing is possible using only one injection-molding tool while forming the connecting bridges between the clip part and the housing part. The connecting bridges can extend in particular between the hinge axis, or the spindle component thereof, respectively, for example between the bearing fingers, and the bearing receptacle of the housing part. According to this design embodiment, said connecting bridges can be broken open in a simple manner by adjusting the clip part from the manufacturing state to the use state. The integrally produced device can thus be immediately used for fastening by pivoting the clip part about the hinge axis.

[0018] According to one design embodiment, the latching means have two latching arms which are arranged on opposite outer sides of the clip part and each extend away from the clip part, wherein, in the locking position, the latching arms each reach through one of two mutually opposite side openings of the housing part. As has already been mentioned, the latching means can have latching arms. The latching arms can in particular be formed on the shank of the clip part and from the latter extend away on opposite sides. The latching arms in the locking position can in particular reach through side openings formed in the cage portion of the housing part. The latching arms thus project beyond the cage portion of the housing part. In the state of the device inserted in a passage opening of an add-on part and/or of a carrier component, the cage portion of the housing part can protrude so far through the passage opening in such a manner that the latching arms that in the locking position protrude through the side openings of the cage portion can latch on the opening of the add-on part and/or carrier component. In the unlocking position, the latching arms herein can be adjusted into the receiving space, in particular into the cage portion. The

latching arms in this instance no longer protrude beyond the side openings of the housing part, and the device can be released from the add-on part or carrier component, respectively.

[0019] According to one design embodiment, positioning means are provided, the positioning means positioning the clip part in relation to the housing part in the locking position and/or in the unlocking position. The positioning means can comprise positioning grooves or positioning ribs arranged on the clip part and, corresponding thereto, positioning ribs or positioning grooves arranged on the housing part, wherein the positioning grooves and the positioning ribs in the locking position and/or in the unlocking position of the clip part are mutually engaged. The positioning means can in particular be arranged on the head portion of the clip part and on the contact portion of the housing part. The positioning grooves and positioning ribs are in particular rotationally offset in pairs by the rotary offset, for example by 90°, about the axis of rotation between the locking position and the unlocking position. The clip part by way of the mutually engaging positioning grooves and positioning ribs can be positioned in the locking position, or in the unlocking position, respectively, in such a manner that the clip part in the respective position has a specific resistance in relation to a rotation about the axis of rotation. It can thus be achieved that a defined torque first has to be exerted on the clip part in order to leave the unlocking position or the locking position, respectively. The clip part can in particular latch into the locking position, or the unlocking position, respectively, by way of the positioning means. The positioning means provide the operator with a haptic feedback when the locking position or the unlocking position, respectively, is reached.

[0020] The invention moreover relates to a system comprising a carrier component, in particular a first vehicle component, with a first passage opening and an add-on part which is to be fastened to the carrier component, in particular a second vehicle component, with a second passage opening, furthermore comprising a device according to the invention, which is inserted into the first passage opening and into the second passage opening.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] An exemplary embodiment of the invention will be explained hereunder by means of figures in which, in a schematic manner

[0022] figure 1 shows a fastening device according to the invention with the clip part in the locking position, in a perspective view;

[0023] figure 2 shows a longitudinal section through the device from figure 1;

[0024] figure 3 shows the device from figure 1 in a lateral view;

[0025] figure 4 shows the fastening device according to the invention with the clip part in the unlocking position, in a perspective view;

[0026] figure 5 shows the device from figure 4 in a lateral view;

[0027] figure 6 shows the fastening device according to the invention with the clip part in the manufacturing state, in a perspective view; and

[0028] figure 7 shows the device from figure 6 in a lateral view.

[0029] In as far as not otherwise stated, the same reference signs hereunder refer to identical items.

DETAILED DESCRIPTION

[0030] The figures show an exemplary embodiment of a device according to the invention for fastening an add-on part to a carrier component. The add-on part and the carrier component are not illustrated herein.

[0031] The device comprises a housing part 10 with a contact portion 12 for contact on an add-on part, a cage portion 14 which in an insertion direction E adjoins the contact portion 12, as well as a foot portion 16 which in the insertion direction E adjoins the cage portion 14. The cage portion 14 in the cross section is formed so as to be rectangular having two mutually opposite side walls 14 which extend so as to be parallel to one another and to the insertion direction E, and a receiving space 18 which is limited by the side walls 14. The receiving space 18 is outwardly open toward the environment by way of mutually opposite side openings 17 of the cage portion 14. The cage portion can of course also have any other shape; in particular, the cage portion in its cross section can be adapted to a passage opening of the add-on part and/or of the carrier component.

[0032] The device moreover comprises a clip part 20 with a head portion 22, a shank 24 which in the use state (see figs. 1 to 5) of the clip part 20 in the insertion direction E adjoins the head portion 22, as well as a foot end 26 which in the use state in the insertion direction E adjoins the shank 24. Latching arms 28 which on opposite sides extend away from the shank 24 are provided on the shank 24 as latching means. The clip part 20 at the foot end 26 has a hinge axis G with a spindle component 30, comprising two bearing fingers 32 which extend away from one another in opposite directions. The bearing fingers 32 are formed so as to be rotatably received in correspondingly shaped bearing openings 34 of a bearing receptacle in the foot portion 16 of the housing part 10. The hinge axis G is perpendicular to an axis of rotation D about which the clip part 20 in the use state can be moved between a locking position and an unlocking position.

[0033] The locking position of the clip part 20 can be seen in figures 1 to 3, wherein the latching arms 28 in said locking position protrude through the side openings 17 of the cage portion 14 and thus project outwardly in relation to the cage portion 14 or the housing part 10, respectively. The device in said locking position can establish an add-on part on a carrier component. The device herein can be inserted so far along the insertion direction E through a passage opening of the add-on part and a passage opening of the carrier component in such a manner that the contact portion 12 of the housing part 10 contacts an upper side of the add-on part and the latching arms 28 latch on the passage opening of the carrier component, in particular contact a lower side of the carrier component. To this end, the contact portion 12 can in particular have resilient latching tabs 13 which conjointly with the latching arms 28 can form the latching means for establishing the device on the add-on part and carrier component. When inserting the device having the clip part 20 in the use state, the in particular elastically formed latching arms 28 herein can first be inwardly deformed by the peripheries that limit the passage openings and after passing through the passage openings can again be moved back to the initial position of said latching arms 28.

[0034] Proceeding from the locking position that can be seen in figures 1 to 3, the clip part 20 can be rotated by 90° about its axis of rotation D to the unlocking position which can be seen in figures 4 and 5. The latching arms 28 in the unlocking position are received within the receiving space 18 of the cage portion 14 and are thus out of engagement with the carrier component. In this unlocking position, the device can consequently be retrieved in a simple manner from the passage openings.

[0035] Manufacturing of the device can be integrally performed by plastics injection-molding, wherein the clip part 20 after the conjoint production with the housing part 10 is in the manufacturing state that can be seen in figures 6 and 7. The clip part 20 in the manufacturing state, as opposed to the use state, is not received in the receiving space 18 but lies outside the latter. The clip part 20 in this illustration in the insertion direction E protrudes away from the housing part 10, is thus offset by 180° in relation to the axis of rotation D. By virtue of the use of only one injection-molding tool in the production of the fastening device by plastics injection-molding, connecting bridges 40 are formed between the hinge axis G and the bearing receptacle of the housing part 10 formed by the bearing openings 34, as can be seen in particular in figure 2. Such integral manufacturing is particularly simple.

[0036] Proceeding from the manufacturing state that can be seen in figures 6 and 7, the clip part 20 can be pivoted about the hinge axis G into the use state in the receiving space 18 of the cage portion 14. The spindle component 30 herein, by way of its bearing fingers 32, rotates in the bearing receptacle formed by the bearing openings 34. When the clip part 20, proceeding from the manufacturing state that can be seen in figures 6 and 7, is rotated by 180° about the hinge axis G, the clip part 20 by way of a first holding portion 42 that is formed on the head portion 22 enters in a latching manner a C-shaped first holding receptacle 44 of the contact portion 12. Moreover, the clip part 20 by way of a second holding portion 46 which is formed at the foot end 26 enters a second C-shaped holding receptacle 48 which is formed on the foot portion 16 at the base of the receiving space 18. The clip part 20 is thus secured in relation to a movement about the hinge axis G back to the manufacturing state in the housing part 10. The clip part 20 that now is pivoted to the use state is in the locking state as is illustrated in figures 1 to 3.

[0037] It now is provided according to the invention that the clip part 20 in the use state during a rotation of the clip part 20 about the axis of rotation D conjointly with the hinge axis G is rotated between the locking position that can be seen in figures 1 to 3 and the unlocking position that can be seen in figures 4 and 5. The spindle component 30 which extends along the hinge axis G by way of its bearing fingers 32 herein leaves the bearing openings 34 of the bearing receptacle of the housing part 10, wherein the bearing fingers 32 penetrate in each case a passage opening 36 that interrupts the respective bearing opening 34. The bearing openings 34 on account of the passage openings 36 are likewise C-shaped.

The spindle component 30 and the hinge axis G during a rotation of the clip part 20 about the axis of rotation D consequently move within a plane that is perpendicular to the axis of rotation D. It can be seen in figures 4 and 5 that, in the unlocking position, the hinge axis G (and the spindle component 30 thus likewise) now also has been rotated by 90° about the axis of rotation D in relation to the position of said hinge axis G in the locking position (figures 1 to 3). Heavy mechanical loads of the clip part and in particular of the entire fastening device are avoided on account of this rotatability of the hinge axis G about the axis of rotation D according to the invention, torsioning of the clip part particularly being avoided. The clip part, and in particular the latching arms thereof, can thus be moved back and forth between the locking position and the unlocking position without any deformation.

[0038] In order for the clip part 20 to be axially established in relation to a movement counter to the insertion direction E in the unlocking position, holding protrusions 50 which protrude into the receiving space 18 and which during a movement of this type collide in each case with an upper side of the latching arms 28 in such a manner are provided.

[0039] The housing part 10 on an upper side of the contact portion 12 has positioning grooves 52 which interact with positioning ribs 54 which are provided in the head portion 22 of the clip part 20. The positioning grooves 52 and positioning ribs 54 are shaped in a mutually corresponding manner and enable the clip part 20 to latch in the locking position and in the unlocking position. It can thus be indicated in a haptic manner to an operator whether the locking position or the unlocking position, respectively, has been reached. Moreover, a tool receptacle 56 for engaging a tool for rotating the clip part 20 about its axis of rotation D is provided in the head portion 22.

List of reference signs

10	Housing part
12	Contact portion
13	Latching tabs
14	Cage portion
15	Side walls
16	Foot portion
17	Side openings
18	Receiving space
20	Clip part
22	Head portion
24	Shank
26	Foot end
28	Latching arms (as latching means)
30	Spindle component
32	Bearing fingers
34	Bearing openings
36	Passage opening
40	Connecting bridges
42	First holding portion
44	First holding receptacle
46	Second holding portion
48	Second holding receptacle
50	Holding protrusions
52	Positioning grooves
54	Positioning ribs
56	Tool receptacle
E	Insertion direction
D	Axis of rotation
G	Hinge axis

CLAIMS

1. A device for fastening an add-on part to a carrier component, in particular for the connection of vehicle parts, comprising a housing part (10) with a receiving space (18), and a clip part (20) which can be received in the receiving space (18) of the housing part (10), wherein the clip part (20) in a use state in which it is received in the receiving space (18) is rotatable about an axis of rotation (D) between a locking position and an unlocking position, wherein the clip part (20) has latching means (28) which, in the locking position, protrude outward in relation to the housing part (10) and, in the unlocking position, are received within the housing part (10), wherein the latching means (28) of the clip part (20) are designed in order, in a state of the housing part (10) inserted into the carrier component, to latch in the locking position on an opening of the carrier component, wherein the clip part (20) is designed to be pivotable about a hinge axis (G) running substantially perpendicularly to the axis of rotation (D) from a manufacturing state, in which the clip part (20) is arranged outside the receiving space (18), into the use state, wherein, in the use state, the clip part (20) is designed to be rotatable together with the hinge axis (G) about the axis of rotation (D) between the locking position and the unlocking position.

2. The device as claimed in claim 1, wherein the hinge axis (G) of the clip part (20), in particular a spindle component (30) forming the hinge axis (G), is received in a bearing receptacle (34) of the housing part (10).

3. The device as claimed in claim 2, wherein the hinge axis (G) of the clip part (20) leaves the bearing receptacle (34) of the housing part (10) during rotation of the clip part (20) about the axis of rotation (D) from the locking position into the unlocking position or during rotation of the clip part (20) about the axis of rotation (D) from the unlocking position into the locking position.

The device as claimed in one of the preceding claims, wherein the clip part (20) is mounted on the housing part (10) via a ball-and-socket joint, wherein the hinge axis (G) and the axis of rotation (D) run through the ball-and-socket joint.

4. The device as claimed in one of claims 2 to 4, wherein the housing part (10) has a contact portion (12) for contact against the add-on part, a cage portion (14), which adjoins the contact portion (12) in an insertion direction (E), delimits the receiving space (18) and

has two side walls (15) extending parallel to each other and to the axis of rotation (D) and a foot portion (16) adjoining the cage portion (14) in the insertion direction (E), wherein the bearing receptacle (32) is arranged in the foot portion (16).

5. The device as claimed in one of the preceding claims, wherein, in the use state, the clip part (20) is secured in the housing part (10) via holding means (44, 48, 42, 46, 50) in relation to a movement along the axis of rotation (D) and/or in relation to a movement about the hinge axis (G) back into the manufacturing state.

6. The device as claimed in claim 6, wherein the housing part (10) has a C-shaped holding receptacle (44, 48), wherein, in the use state, the clip part (20) engages with a holding portion (42, 46) in the C-shaped holding receptacle (44, 48) in a latching manner.

7. The device as claimed in one of the preceding claims, wherein the device is manufactured by plastics injection molding, wherein connecting bridges (40) formed between the clip part (20) and the housing part (10) by the injection molding can be broken open by the pivoting of the clip part (20) about the hinge axis (G) from the manufacturing state into the use state.

8. The device as claimed in one of the preceding claims, wherein the latching means have two latching arms (28) which are arranged on opposite outer sides of the clip part (20) and each extend away from the clip part (20), wherein, in the locking position, the latching arms (28) each reach through one of two mutually opposite side openings (17) of the housing part (10).

9. The device as claimed in one of the preceding claims, wherein positioning means (52, 54) are provided, the positioning means positioning the clip part (20) in relation to the housing part (10) in the locking position and/or in the unlocking position.

10. A system comprising a carrier component, in particular a first vehicle component, with a first passage opening and an add-on part which is to be fastened to the carrier component, in particular a second vehicle component, with a second passage opening, furthermore comprising a device, which is inserted into the first passage opening and into the second passage opening, as claimed in one of the preceding claims.

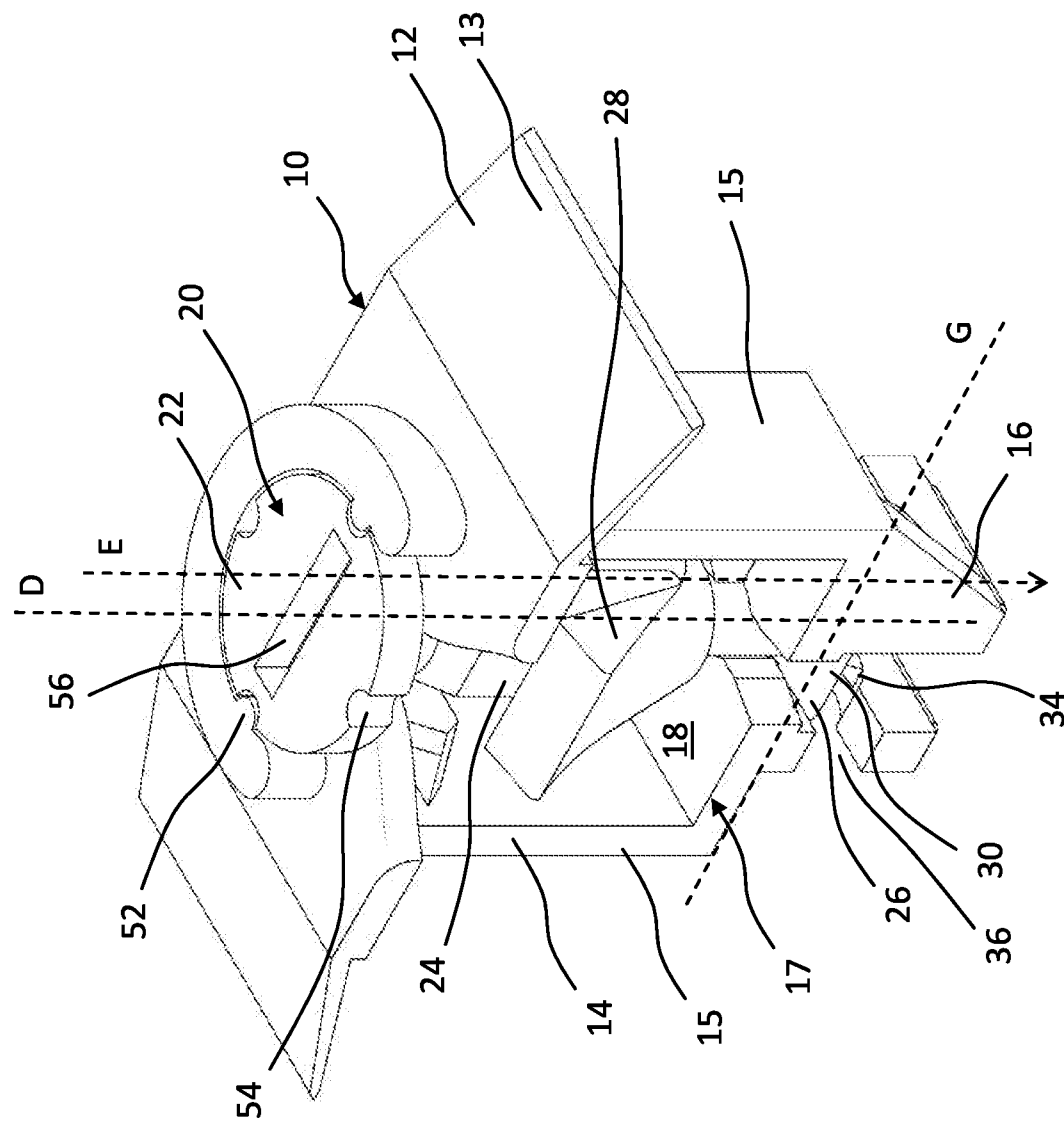


Fig. 1

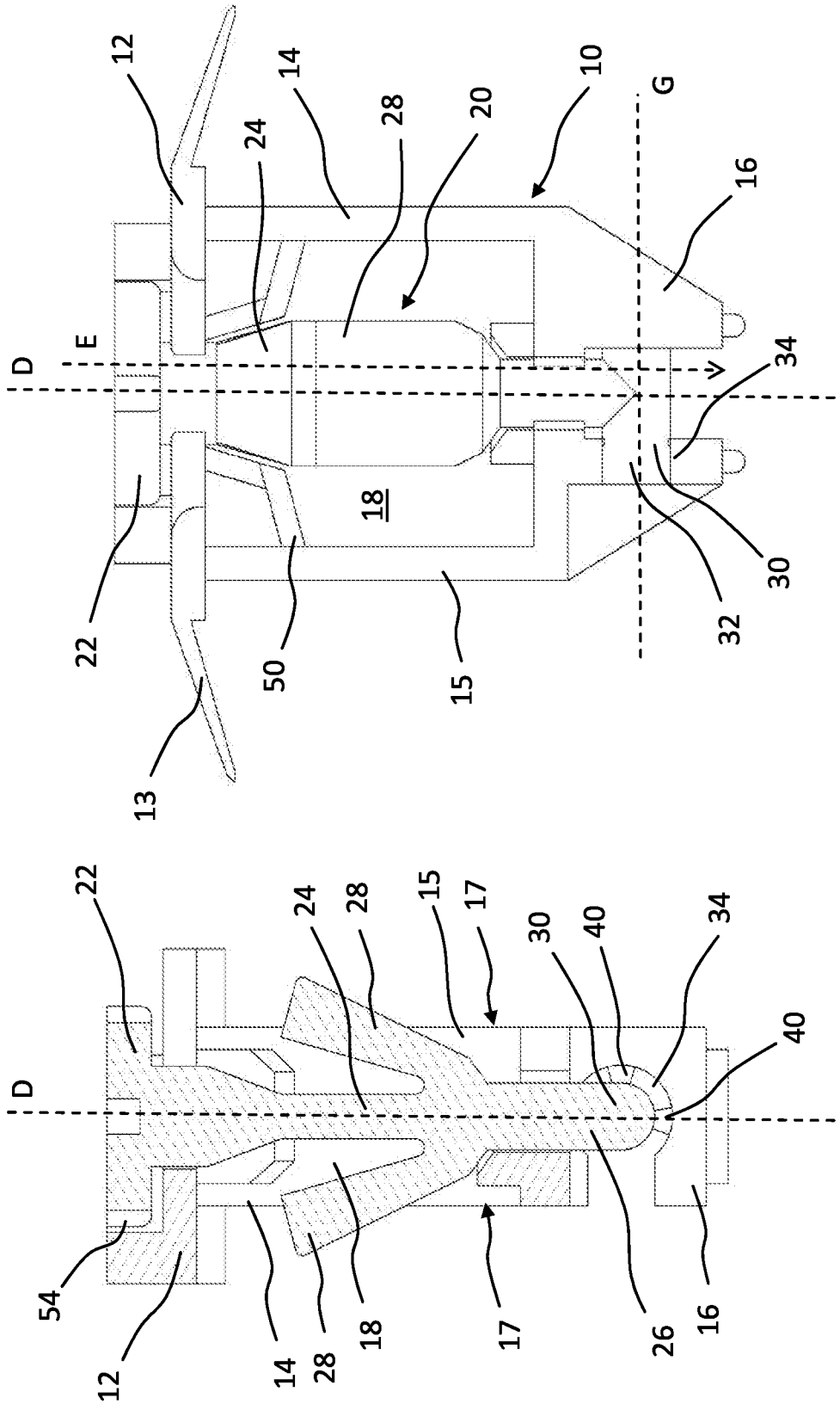


Fig. 3

Fig. 2

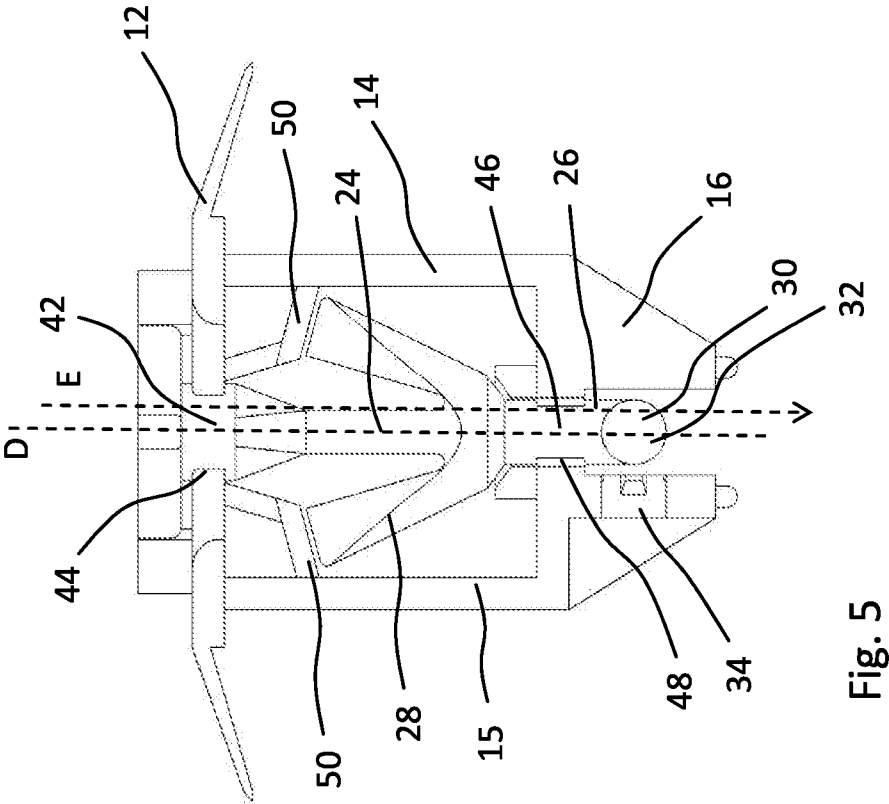


Fig. 5

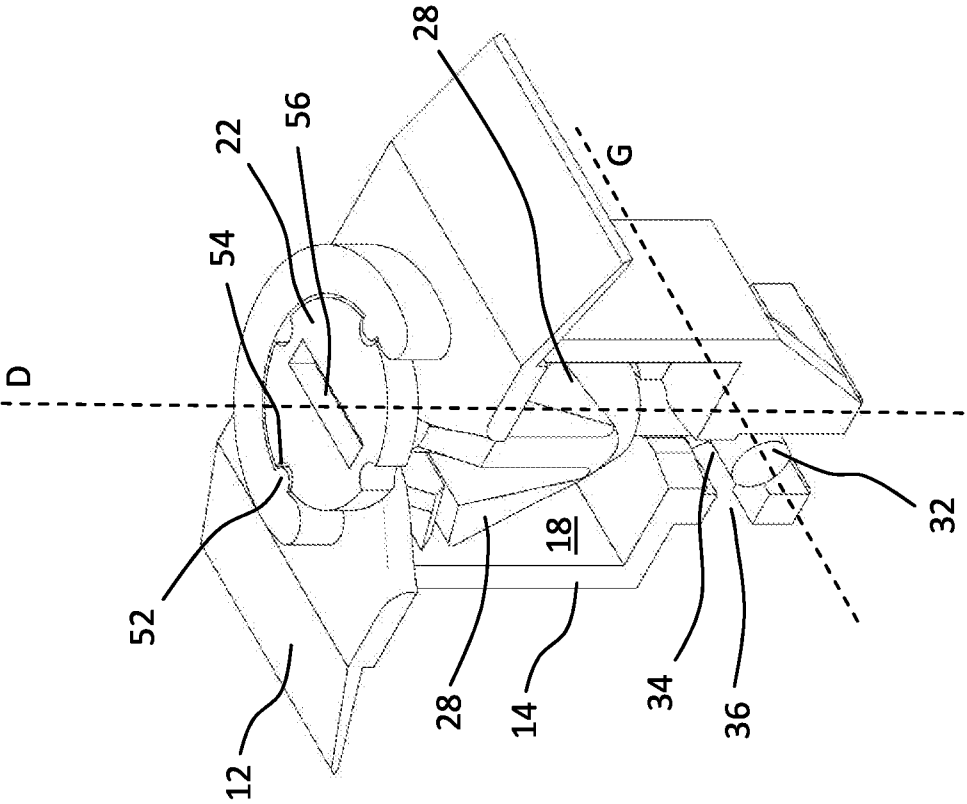


Fig. 4

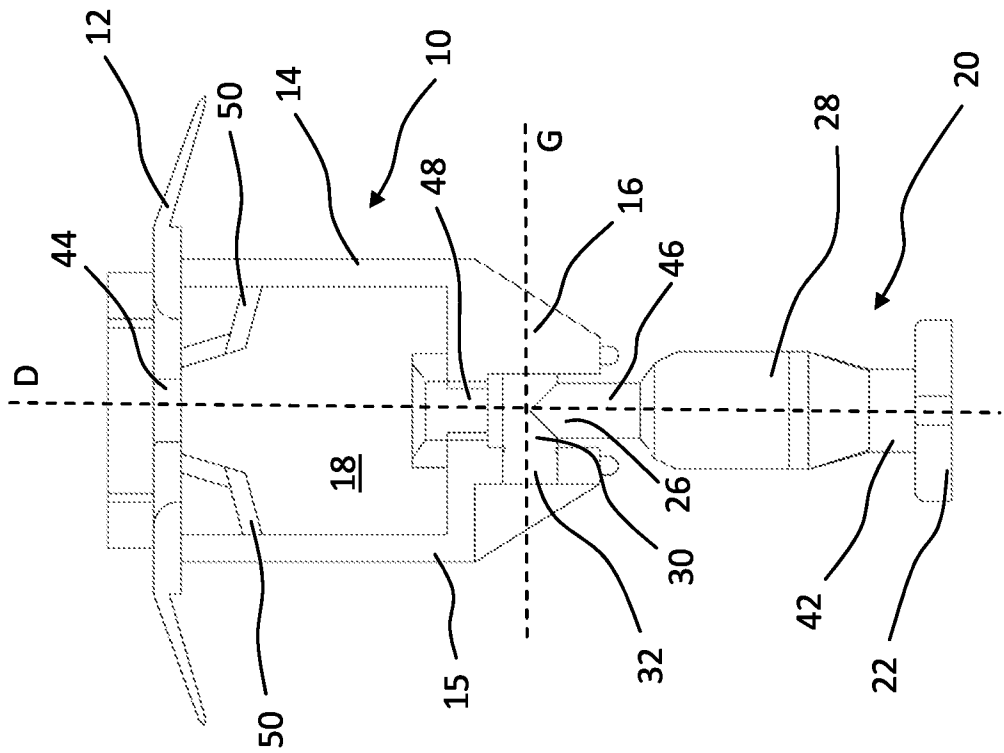


Fig. 6

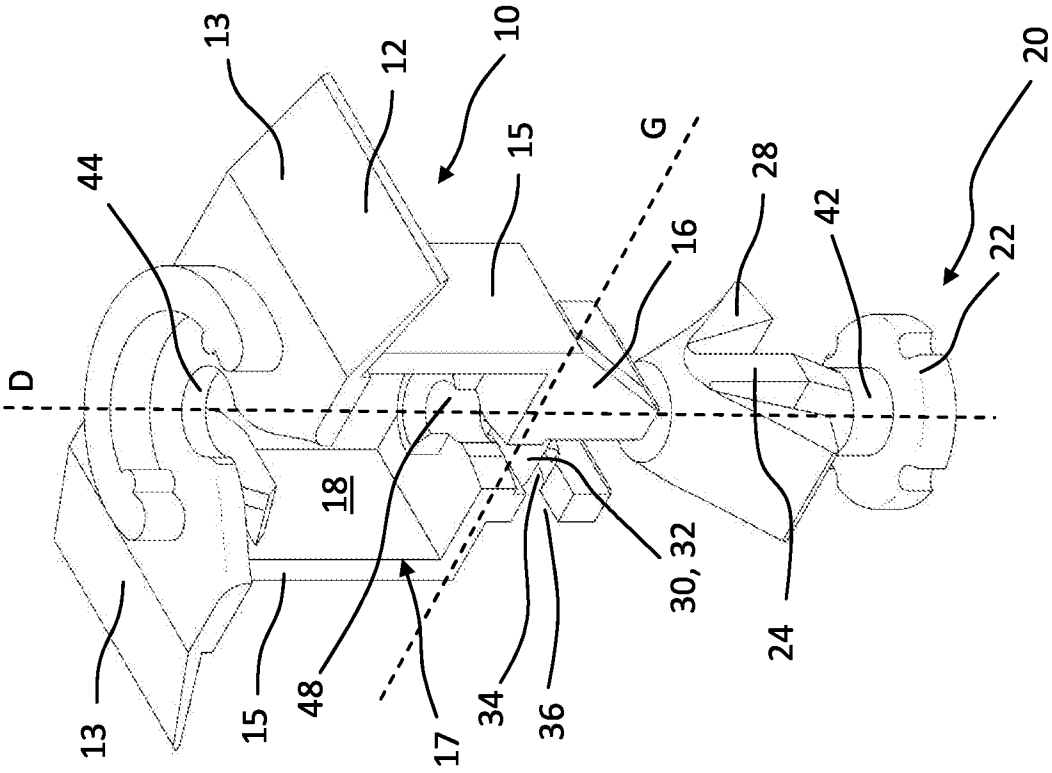


Fig. 7

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2019/048078

A. CLASSIFICATION OF SUBJECT MATTER

INV. F16B21/02
ADD. B60R13/02 F16B19/10 F16B21/07

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F16B B60R

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EP0-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2018/009288 A1 (ILLINOIS TOOL WORKS [US]) 11 January 2018 (2018-01-11) cited in the application paragraphs [0001] - [0058]; figures 1-15 -----	1-10
A	EP 1 998 983 A1 (ILLINOIS TOOL WORKS [US]) 10 December 2008 (2008-12-10) paragraphs [0012] - [0023]; figures 1-3 -----	1-10

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

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Date of the actual completion of the international search

4 November 2019

Date of mailing of the international search report

15/11/2019

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Sisinni, Giovanni

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2019/048078

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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EP 1998983	A1	10-12-2008	EP 1998983 A1 10-12-2008
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