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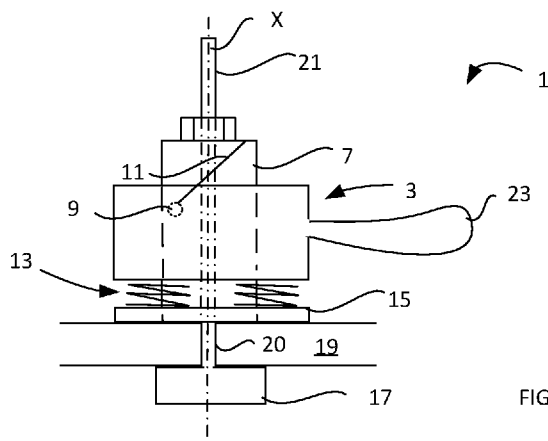


FIG. 2

(57) Abstract: The present invention regards a spring biased bayonet lock (1) and a method of locking a first member (61) to a second member (67) by means of the spring biased bayonet lock (1) comprising a bayonet member (8) extending in axial direction (X) and a rotary member (3) arranged coaxially with the bayonet member (8); the rotary member (3) comprises a first guide element (9) configured for engagement with a second guide element (11) of the bayonet member (8) and comprises a pressing portion (15) configured to move toward a base portion (17) of the bayonet member (8) upon rotation of the rotary member (3). The first and second guide element (9, 11) interact for providing a clamping force between the pressing portion (15) and the base portion (17); the rotary member (3) is further associated with a spring assembly (13), configured to be compressed by said rotation thereby adding additional clamping force to the pressing portion (15).



A spring biased bayonet lock

TECHNICAL FIELD

The present invention relates to a spring biased bayonet lock.

5 The present invention concerns the industry using spring biased bayonet locks for different types of applications of tool devices and also concerns the manufacture industry producing such spring biased bayonet locks.

BACKGROUND

There is a desire to provide efficient operation of fixing e.g. a first tool device to a second tool device.

10 There is a desire to provide a spring biased bayonet lock that is easy and quick to adjust in regard to the actual work piece and/or a work piece assembly to be manufactured.

There is a desire to provide a spring biased bayonet lock that is non-complex to adapt to different requirements, such as pre-determined clamping forces depending upon which type of work piece
15 that will be fixed.

There is a desire to provide a spring biased bayonet lock that is adjustable and adaptable to a modular set-up in regard to a specific tool requirement in a work-shop.

20 There is a desire to provide efficient operation of fixing e.g. a first tool arrangement to a work piece to be manufactured.

There is a desire to provide a spring biased bayonet lock that reliably could provide a pre-determined and proper clamping force.

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Current technology as published uses spring biased bayonet locks that are designed with specific features for achieving a clamping force, but they still involve extensive handling and permit no flexibility in use in a work-shop, which may imply high production cost and complex operation.

SUMMARY OF THE INVENTION

An object of the present invention is to provide a spring biased bayonet lock with reliability in functionality and cost-effective production and operation.

- 5 This has in different embodiments been achieved by means of a spring biased bayonet lock comprising a bayonet member extending in axial direction and a rotary member arranged coaxially with the bayonet member; the rotary member comprises a first guide element configured for engagement with a second guide element of the bayonet member and comprises a pressing portion configured to move toward a base portion of the bayonet member upon rotation of the rotary
- 10 member, wherein the first and second guide element interact for providing a clamping force between the pressing portion and the base portion; the rotary member is further associated with a spring assembly, configured to be compressed by said rotation thereby adding additional clamping force to the pressing portion.
- 15 Preferably, the pressing portion is configured to exert said additional clamping force in a direction toward a base portion of the bayonet member.

Suitably, the clamping force clamps the pressing portion directly on the base portion or clamps a work piece between the pressing portion and the base portion.

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Preferably, the first and second guide element interact in a helical motion about the axial direction for providing a clamping force between the pressing portion and the base portion.

Suitably, the spring assembly is configured as a modular and interchangeable spring assembly, each of which being adapted to be mountable to the rotary member or to the bayonet member.

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In such way is achieved an easy way to set a specific clamping force for a specific use thus avoiding stress in clamped articles.

In such way is achieved easy adjustment of a pre-determined clamping load value that is optimal for a specific assembly protecting work pieces from stress.

30

Suitably, the rotary member is configured to rotate about the axial direction and to move along the axial direction relative the bayonet member by the engagement of the first guide element with the second guide element during rotation of the rotary member relative the bayonet member.

5 Preferably, the bayonet member being formed with a cylindrical shaped bayonet body having a cylindrical outer envelope surface from which at least one bayonet pin extends perpendicular to the axial direction for engagement with a corresponding groove of the rotary member.

Suitably, the base portion comprises a flange extending radially from the cylindrical shaped bayonet body.

10 Preferably, the bayonet member being formed with a cylindrical shaped bayonet body having a cylindrical outer envelope surface in which at least one groove is formed for engagement with a bayonet pin of the rotary member.

Preferably, the at least one groove is formed as a helical groove on the cylindrical outer envelope surface of the cylindrical shaped bayonet body.

15 Suitably, the base portion of the bayonet member comprises an attachment surface configured to be mounted to a first member.

Preferably, the base portion extends from the cylindrical shaped bayonet body in a direction radially outward and perpendicular to the axial direction.

Suitably, the base portion is coupled to the spring assembly.

20 Preferably, the spring assembly comprises a support member (or guide member) which is configured to move along the cylindrical shaped bayonet body of the bayonet member during said rotation of the rotary member by means of that the first and second guide elements interact for providing a helical motion of the rotary member relatively the bayonet member.

Suitably, the support member comprises a first side and a second side, each extending perpendicular to the axial direction.

25 Preferably, the first side of the support member is configured to engage the spring assembly and the second side of the support member is configured to abut against the rotary member or to abut against a work-piece.

Preferably, the first side of the support member faces the base portion of the bayonet member.

Suitably, the second side of the support member faces the rotary member.

Preferably, the first side of the support member is configured to abut against the base portion of the bayonet member or to abut against a work-piece.

Suitably, the second side of the support member is configured to engage the spring assembly being coupled to the rotary member.

- 5 Preferably, the support member and the spring assembly being components of the bayonet member.

Suitably, the base portion is configured to abut against the pressing portion of the rotary member or to abut against a work piece positioned between the base portion and the pressing portion upon said rotation.

- 10 In such way is achieved a spring biased bayonet lock in a work-shop which is easy to adjust to a specific clamping force for a specific use thus avoiding stress in the clamped work piece.

Preferably, the base portion comprises said spring assembly configured to be a part of the bayonet member.

- 15 Thereby is achieved a cost-effective spring biased bayonet lock having one bayonet unit with spring assembly (the bayonet unit preferably being mounted to a first tool device). The mounting of the spring assembly to the base portion of the bayonet member involves most machining and manufacture effort and therefore it is suitably that the bayonet member is attached to the first tool device, e.g. a height adjustable pillar. Each one of a plurality of rotary members (with few parts) is mounted to a set of jig tables.

- 20 In such way is achieved that you can use different spring parts for different applications depending upon which work piece that will be fixed.

Suitably, the first and second guide elements interact for providing a helical motion of the rotary member relatively the bayonet member.

- 25 Preferably, the rotary member is configured to rotate around the axial direction and to move along the axial direction for providing a motion of the rotary member in a direction toward the base portion.

Suitably, the rotary member is configured to move along the axial direction for providing a clamping force between the pressing portion and the base portion.

Preferably, the rotary member is configured to move along the axial direction for providing a clamping force between the pressing portion and the base portion for holding a work piece between the pressing portion and the base portion.

Suitably, the pressing portion is formed as a ring-shaped separate part of the rotary member.

- 5 Preferably, the spring assembly is arranged between the pressing portion and a ring-shaped rotary body (or so called engaging part) of the rotary member, wherein an inner surface of the rotary body comprises the first guide element configured to interact with the second guide element of the cylindrical shaped bayonet body.

- 10 Suitably, the spring assembly comprises compression springs.

Preferably, the spring assembly comprises conical spring washers.

In such way is achieved an exponential clamping force.

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Suitably, the conical spring washers are stacked to each other, either according a first selection with same direction (stiffer) or a second selection with alternating direction (lower spring constant) or combinations thereof.

- 20 Such selection provides the modification of the spring constant in accordance with desired clamping force.

Preferably, the rotary member comprises said spring assembly configured to be a part of the rotary member.

25

In such way is achieved cost-effective handling of the spring biased bayonet lock.

Suitably, the bayonet member comprises a guide member that is configured to be movable in the axial direction, wherein the rotary member is associated with the spring assembly via the guide member.

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In such way is achieved a spring biased bayonet lock that can be made with a central spring assembly extending along the axial direction.

Preferably, the bayonet member comprises a base portion including an abutment flange extending radially outward from a cylindrical bar, wherein the abutment flange is configured to abut a work piece.

5 Suitably, the guide member is slidably arranged on the cylindrical bar for providing a motion of the guide member in the axial direction.

Preferably, the first guide element is provided as a pin protruding from an inner wall of a through hole of the rotary member and the second guide element is formed as a helical groove on the envelope surface of the guide member.

10 Suitably, the first and second guide elements interact for providing a helical motion of the rotary member relative the bayonet member.

Preferably, the first guide element comprises a bayonet pin and the second guide element comprises a helical groove, the bayonet pin is configured to be guided in the groove for providing a motion of the rotary member relative the bayonet member along the axial direction.

15 In such way is achieved a well-defined engagement of the first guide element relative the second guide element.

Suitably, a spring constant value of the spring assembly is adjusted by moving a spring holding element in the axial direction or by changing the spring constant value of the spring assembly.

20 In such way is achieved a flexible configuration, wherein one common spring biased bayonet lock (e.g. the bayonet member) partly mounted to a first member (e.g. a first tool) can be used in a work-shop, wherein the other part of the spring biased bayonet lock (e.g. the rotary member) can be provided in a plurality and piece by piece for a plurality of second member (e.g. second tools).

25 In such way is achieved that a need for a plurality of clamping tools each having a specific clamping property is eliminated.

This provides a cost-effective manufacture of a work pieces and will promote cost-effective and time saving assembly in a work-shop.

Suitably, the spring assembly comprises a linear and/or non-linear spring.

30

In such way there is achieved alternate clamping forces depending upon application and the spring biased bayonet lock may be tighten with different amounts.

By means of the spring biased bayonet lock there is achieved that a specific load can be set to clamp the work piece depending upon the specific use in e.g. a work-shop. The beforehand set spring force for lifting the bayonet coupling body thereby provides an additional clamping load upon the work piece related to the spring force.

The bayonet member may comprise a base portion configured to abut against the pressing portion of the rotary member or may be configured to abut against a work piece positioned between the base portion and the pressing portion upon the rotation. The bayonet member may comprise a guide element (bayonet sleeve) that is configured to be movable in the axial direction by the rotation and wherein the rotary member being associated with the spring assembly via the guide element and exerts the clamping force.

In such way is achieved a possibility for easy adjustment (compression/extension of the spring) of a pre-determined clamping load value that is optimal for a specific assembly protecting articles from stress.

Other advantages are:

Possibility to use different spring parts for different applications.

Flexible configuration; one adjustable tool can be used in work-shop instead of a plurality of clamping tools each having a specific clamping property.

This promotes cost effective and time saving assembly in a work-shop.

This has in different embodiments been achieved by means of a method of locking a first member (tool) to a second member (tool or skin) by means of a spring biased bayonet lock comprising a bayonet member extending in axial direction and a rotary member arranged coaxially with the bayonet member; the rotary member comprises a first guide element configured for engagement with a second guide element of the bayonet member and comprises a pressing portion configured to move toward a base portion of the bayonet member upon rotation of the rotary member, wherein the first and second guide element interact for providing a clamping force between the pressing portion and the base portion; the rotary member is further associated with a spring assembly, configured to be compressed by said rotation thereby adding additional clamping force to the

pressing portion, the method comprises the steps of mounting of the bayonet member to the first member; mounting of the spring assembly to the bayonet member or to the rotary member; fitting the bayonet member into the rotary member; rotating the rotary member to an end position, in which end position said clamping force and additional clamping force being exerted.

- 5 In such way is achieved a method for operating a spring biased bayonet lock that is non-complex to adapt to different requirements, such as pre-determined clamping forces depending upon which work piece that will be fixed.

Suitably, the method comprises the further step of: mounting of the rotary member to the second member.

- 10 Preferably, the mounting of the bayonet member to the first member and/or the mounting of the rotary member to the second member being achieved by means of screw bolts and/or fastening pins.

Suitably, the method comprises the further step of: securing of the rotary member to the bayonet member in said end position by means of a snap-in lock.

- 15 Preferably, the snap-in lock is arranged in the rotary member and configured for engagement with the bayonet member.

Suitably, the first member is a first tool device and the second member is a second tool device.

Preferably, the first member is a work piece to be held and the second member is a holding tool.

Suitably, the first member is a first tool device and the second member is a work piece.

- 20 Preferably, the first member comprises a reconfigurable fixture unit configured to hold work pieces during assembly.

Suitably, the first member comprises a height adjustable pillar and the second member comprises an interchangeable tool device.

- 25 In such way is achieved a work station in a work-shop whereby one interchangeable tool device of a plurality of interchangeable tool devices (such as jig tables) can be fixed to the height adjustable pillar.

Thereby is achieved that simple handling of interchangeable tool devices is provided which makes an effective and ergonomic work-station.

This is achieved by that each rotary member fixed to the respective second member being provided with same interface for fitting the bayonet member of the first member.

Preferably, the bayonet member extends in the axial direction and being cylindrical shaped and the rotary member is ring shaped and comprises a through hole having a centre axis co-linear with the axial direction, wherein the bayonet member fits into the rotary member.

Suitably, the rotary member comprises at least one first guide element or preferably three guide elements.

Preferably, the through hole of the rotary member being cylindrical and mates with the cylindrical shaped bayonet body of the bayonet member.

10 Suitably, the spring biased bayonet lock comprises at least one spring assembly.

Preferably, the spring assembly is configured to be compressed by the rotation of the rotary member relative the bayonet member, when the pressing portion abuts a base portion of the bayonet member, thereby adding additional clamping force to the pressing portion, which additional clamping force of the pressing portion in turn press toward the base portion of the bayonet member.

15 Preferably, the first member comprises an assembly fixture for assembly of aircraft work pieces.

Suitably, there is provided a pre-determined gap tolerance between the body of the cylindrical shaped bayonet body and the through hole of the rotary member.

Preferably, the rotary member is configured to be rotated to an end position, in which end position said clamping force is fully exerted.

20 Suitably, the spring biased bayonet lock comprises a catch pin configured for locking rotation of the rotary member relative the bayonet member in said end position.

Thereby is achieved further security in handling of the spring biased bayonet lock.

The present invention is of course not in any way restricted to the preferred examples described above, but many possibilities to modifications, or combinations of the described examples, thereof

25 should be apparent to a person with ordinary skill in the art without departing from the basic idea of the invention as defined in the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will now be described by way of examples with references to the accompanying schematic drawings, of which:

- 5 Figs. 1a-1b illustrate a spring biased bayonet lock according to a first example;
Fig. 2 illustrates a spring biased bayonet lock according to a second example;
Figs. 3a-3b illustrate a spring biased bayonet lock according to a third example;
Figs. 4a-4b illustrate a spring biased bayonet lock according to a fourth example;
Fig. 5 illustrates a modular spring assembly of a spring biased bayonet lock according to a fifth
10 example;
Figs. 6a-6d illustrate a spring biased bayonet lock according to a sixth example applied to a jig table
of a work station; and
Figs. 7a-7b illustrate exemplary method flow charts according to further examples.

15

DETAILED DESCRIPTION

Hereinafter, exemplary embodiments of the present invention will be described with reference to the accompanying drawings, wherein for the sake of clarity and understanding of the invention some details of no importance may be deleted from the drawings.

- 20 Figs. 1a-1b illustrate components of a spring biased bayonet lock 1 according to a first example. Fig. 1a shows a rotary member 3 (exploded diagram) comprising a through hole 5 extending in an axial direction X, into which through hole 5 a cylindrical shaped bayonet body 7 of a bayonet member 8 (shown more in detail in Fig. 1b) is to be inserted. The bayonet member 8 of the spring biased bayonet lock 1 extends in the axial direction X and is (when inserted into the rotary member 3)
25 arranged coaxially with the rotary member 3. The rotary member 3 comprises two bayonet pins 9, which are mounted in the rotary member 3 in such manner that they (when mounted) partly protrude in a direction radially inward from an inner wall of the through hole 5 of the rotary member 3 and perpendicular to the axial direction X. The respective bayonet pin 9 is configured to engage a respective groove 11 of the cylindrical shaped bayonet body 7. The cylindrical shaped bayonet body 7
30 having a cylindrical outer envelope surface in which the groove 11 is formed for engagement with the bayonet pin 9 of the rotary member 3.

The bayonet pins 9 and the grooves 11 interact for providing a helical motion of the rotary member 3 relatively the bayonet member 8 (whereby the rotary member 3 rotates around the axial direction X and moves along the axial direction X) for providing a motion of the rotary member 3 in a direction toward a base portion 17 of the bayonet member 8 and providing a clamping force between the pressing portion 15 and the base portion 17 (alternatively a work piece is clamped between the pressing portion 15 and the base portion 17).

The rotary member 3 is further associated with a spring assembly 13, configured to be compressed upon rotation of the rotary member 3 thereby adding additional clamping force to a pressing portion 15 of said rotary member 3 (when the pressing portion 15 abuts the base portion 17 of the bayonet member 8 or any work piece positioned there between) and the pressing portion 15 of the rotary member is configured by means of the spring assembly 13 to exert the clamping force in a direction toward the base portion 17 of the bayonet member 8. The spring assembly 13 is arranged between a base flange 12 (of the cylindrical shaped bayonet body 7) and a ring shaped portion 10 (movable along the cylindrical shaped bayonet body 7 in the axial direction X) of the base portion 17 of the bayonet member 8. The base portion 17 extends from the cylindrical shaped bayonet body 7 in a direction radially outward and perpendicular to the axial direction X. The base portion 17 is configured to abut with its ring shaped portion 10 against the pressing portion 15 of the rotary member 3 upon said rotation thereby providing said compression of the spring assembly 13. The bayonet member 8 may be mounted to a tool and the rotary member 3 may be mounted in a work table (not shown).

The spring assembly 13 is configured to be compressed by the rotation of the rotary member 3 relative the bayonet member 8, when the pressing portion 15 abuts the base portion 17 of the bayonet member 8, thereby adding additional clamping force to the ring shaped portion 10, which additional clamping force in turn press toward the pressing portion 15.

Fig. 2 illustrates a spring biased bayonet lock 1 comprising a cylindrical shaped bayonet body 7 according to a second example. A base portion 17 is configured to abut against a work piece 19 positioned between the base portion 17 and a pressing portion 15 of a rotary member 3 upon the rotation of the rotary member 3. The work piece 19 comprises an aperture 20 through which a stem 21 extends. The stem 21 is coupled to the base portion 17 and to the cylindrical shaped bayonet body 7. When a user (not shown) turns a handle 23 of the rotary member 3, bayonet pins 9 of the rotary member 3 will be guided by grooves 11 of the cylindrical shaped bayonet body 7 and the rotary member 3 travels toward the base portion 17. A spring assembly 13 arranged between the

pressing portion 15 and the rotary member 3 is configured to exert a clamping force in a direction toward a base portion 17 of the bayonet member 8. The bayonet pins 9 and the grooves 11 interact in a helical motion around and in the axial direction X for providing the clamping force between the pressing portion 15 and the base portion 17. The spring assembly 13 is configured to be compressed by said rotation thereby adding additional clamping force to the pressing portion 15.

Figs. 3a-3b illustrate a spring biased bayonet lock 1 according to a third example. Fig. 3a shows a rotary member 3 of the spring biased bayonet lock 1. The rotary member 3 comprises an engaging part 14 (ring-shaped rotary body) and a pressing portion 15 (a separate ring movable along the axial direction X relative the engaging part 14). A spring assembly 13 is arranged between the engaging part 14 and the pressing portion 15. The spring assembly 13 is configured to be compressed by the rotation of the rotary member 3 relative a bayonet member 8, when the pressing portion abuts a base portion (not shown, see Fig. 3b) of the bayonet member 8, thereby adding additional clamping force to the pressing portion 15, which additional clamping force in turn press toward the base portion of the bayonet member 8.

Fig. 3b shows a bayonet member 8 of the spring biased bayonet lock 1. The rotary member 3 is thus associated with the spring assembly 13, which is configured to be compressed upon rotation of the rotary member 3 when a pressing portion 15 of the rotary member 3 abuts against a base portion 17 of the bayonet member 8, thereby adding additional clamping force to the pressing portion 15 of the rotary member 3. The pressing portion 15 of the rotary member is thereby by means of the spring assembly 13 configured to exert a clamping force in a direction toward the base portion 17 of the bayonet member 8. Upon rotation of the rotary member 3, bayonet pins 9 (when mounted; partly protruding in a direction radially inward from an inner wall of a through hole 5 of the rotary member 3, see Fig. 3a) will be guided by grooves 11 of the cylindrical shaped bayonet body 7 of the bayonet member 8. The rotary member 3 is rotated to an end position E, in which end position E said clamping force is fully exerted.

Figs. 4a-4b illustrate a spring biased bayonet lock 1 according to a fourth example. Fig. 4a shows the spring biased bayonet lock 1 in a cross-sectional view. A bayonet member 8 comprises a guide member 25, constituting a cylindrical shaped bayonet body of the bayonet member 8, which guide member 25 is arranged co-axially with the bayonet member 8 and is configured to be movable in the axial direction X. The bayonet member 8 is further formed with a stem 21 and a base portion 17 radially protruding from the stem 21. The guide member 25 is slidably arranged on the stem 21

along the axial direction X and is guided in the axial direction X by inner elongated guide bars 26 which are configured to mate splines 24 formed on the stem 21. The guide member 25 is biased toward the base portion 17 by means of a compression spring 13 held by a screw 27 (spring holding element) adjustable fixed to the bayonet member 8. A rotary member 3 comprises a through hole 5 into which the guide member 25 is introduced. Upon rotation of the rotary member 3, bayonet pins 9 protruding in a direction radially inward from an inner wall of the through hole 5 will be guided by grooves 11 formed in an envelope surface of the guide member 25 thereby moving a pressing portion 15 of the rotary member 3 in a direction toward the base portion 17. The spring biased guide member 25 abuts against the compression spring 13, which thus adds a complementary pressing force to the pressing portion 15 of the rotary member 3 in a direction toward the base portion 17.

Fig. 4b shows the spring biased bayonet lock 1 in a perspective view. The number of grooves 11 can be two or three or any other number depending upon application. The guide member 25 may extend through an aperture of a work piece (not shown). The work piece will be locked between the base portion 17 and the pressing portion 15 after fulfilled rotation of the rotary member 3. The spring constant value of the compression spring 13 is adjusted by tightening or untightening the compression spring 13 by means of a nut 31.

Fig. 5 illustrates a modular spring assembly 13 of a spring biased bayonet lock (not shown) according to a fifth example. The modular spring assembly 13 comprises six conical spring washers 33 and is configured to add a complementary pressing force to the pressing portion of the rotary member in a direction toward the base portion (not shown). In Fig. 5 is shown an unloaded state of the modular spring assembly 13. A spring constant value can be adjusted by moving a spring holding element (not shown) in the axial direction or by adding or reducing the number of conical spring washers 33.

Figs. 6a-6d illustrate a spring biased bayonet lock 1 according to a sixth example applied to a jig table 61. A work piece 63 is clamped to the jig table 61 by means of clamps 65 as shown in Fig. 6a. The jig table 61 comprises a rotary member 3. The rotary member 3 is preferably fixed and screwed to the underside of the jig table 61. Fig. 6b shows the jig table 61 in a side view. The jig table 61 is mounted and locked to a height adjustable pillar 67. A bayonet member 8 of the spring biased bayonet lock 1 is mounted on top of the height adjustable pillar 67 and fits the rotary member 3 of the jig table 61. A user 66 locks the jig table 61 on the height adjustable pillar 67 by rotating the jig table 61 in place.

Fig. 6c shows a work station WS in a view from above. The work station WS has one height adjustable pillar 67 comprising a bayonet member 8, which fits a respective rotary member 3 of a plurality of jig tables 61. Thereby is achieved simple handling of jig tables 61 promoting an effective and ergonomic work station WS. Each rotary member 3 is fixed to the respective jig table 61. Each jig table 61 is thus provided with same interface for fitting the bayonet member 8 of the height adjustable pillar 67.

Fig. 6d shows a spring biased bayonet lock 1 of the type that may be used in the applications of Figs. 6a to 6c. The spring biased bayonet lock 1 comprises a rotary member 3 (part of the jig table 61) comprising a through hole 5 extending in axial direction X, into which through hole 5 a cylindrical shaped bayonet body 7 of a bayonet member 8 is to be inserted. The bayonet member 8 of the spring biased bayonet lock 1 extends in the axial direction X and is arranged coaxially with the rotary member 3.

The rotary member 3 comprises two bayonet pins 9 (only one is shown), which are mounted in the rotary member 3 in such manner that they (when mounted) partly protrude in a direction radially inward from an inner wall of the through hole 5 of the rotary member 3 and perpendicular to the axial direction X. The respective bayonet pin 9 is configured to engage a respective groove 11 of the cylindrical shaped bayonet body 7. The cylindrical shaped bayonet body 7 comprises a cylindrical outer envelope surface, in which surface the bayonet groove 11 is formed for engagement with the bayonet pin 9 of the rotary member 3 when the rotary member 3 is rotated together with the jig table 61.

The rotary member 3 is further associated with a spring assembly 13. The spring assembly 13 is arranged between a base plate 12 and a flange 10 of a base portion 17 of the bayonet member 8. The spring assembly 13 is further configured to be compressed upon rotation of the rotary member 3 thereby adding additional clamping force to the base plate 12 configured to press in the axial direction X toward a pressing portion 15 of the rotary member 3. The pressing portion 15 of the rotary member 3 is thus in turn configured by means of the spring assembly 13 to exert an additional clamping force in a direction toward the base portion 17 of the bayonet member 8. The bayonet pins 9 and the grooves 11 interact in a helical motion around the axial direction X for providing said additional clamping force in said direction toward the base portion 17 and for providing the clamping force between the pressing portion 15 and the base portion 17.

The base portion 17 extends from the cylindrical shaped bayonet body 7 in a direction radially outward and perpendicular to the axial direction X. The base portion 17 is configured to abut against

the pressing portion 15 of the rotary member 3 upon said rotation thereby providing said compression of the spring assembly 13 adding said additional clamping force. A hinge 69 is provided between the height adjustable pillar 67 and the bayonet member 8 so that the jig table 61 can be tilted.

- 5 Figs. 7a-7b illustrate exemplary method flow charts according to further examples. Fig. 7a illustrates a method of locking a first member to a second member by means of the spring biased bayonet lock comprising a bayonet member extending in axial direction; a rotary member arranged coaxially to the bayonet member; the rotary member comprises a first guide element configured for engagement with a second guide element of the bayonet member; the rotary member is further associated with a
- 10 spring assembly configured to be compressed upon rotation of the rotary member thereby adding additional clamping force to a pressing portion of said rotary member; the pressing portion of the rotary member is configured by means of the spring assembly to exert the clamping force in a direction toward a base portion of the bayonet member. The method comprises the Step 701 comprising the start of the method. In Step 702 the method is performed. In Step 703 the method is
- 15 stopped. Step 702 may comprise; mounting the bayonet member to the first member; mounting of the spring assembly to the bayonet member or to the rotary member; fitting in the bayonet member into the rotary member; rotating the rotary member to an end position, in which end position said clamping force is exerted.
- 20 Fig. 7b illustrates a method according to a further embodiment. The method comprises the Step 801 comprising the start of the method. In Step 802 mounting of the rotary member to a second member is performed. In step 803 a method corresponding with the above-mentioned exemplary Step 702 is performed. In Step 804 securing of the rotary member to the bayonet member is made in an end position by means of a snap-in lock (not shown). In Step 805 the method is stopped.
- 25 The present invention is of course not in any way restricted to the preferred examples described above, but many possibilities to modifications, or combinations of the described examples, thereof should be apparent to a person with ordinary skill in the art without departing from the basic idea of the invention as defined in the appended claims. The spring biased bayonet lock may be applied to a so called Flexapod which is a reconfigurable fixture unit (not shown) used for holding parts during
- 30 assembly and which is a parallel mechanical device consisting of a base plate, six legs and a top plate. The spring biased bayonet lock is mounted on the top plate and the rotary member mounted to a tool. The spring biased bayonet lock may also be integrated into a Box Joint system or positioned directly on the workshop floor on pedestals. Of course, the cylindrical shaped bayonet body may

comprise bayonet pins protruding in a direction radially outward from an envelope surface of the cylindrical shaped bayonet body and the respective bayonet pin is configured to engage a respective groove of an inner wall of the rotary member.

CLAIMS

1. A spring biased bayonet lock (1) comprising:
 - a bayonet member (8) extending in axial direction (X) and a rotary member (3) arranged coaxially with the bayonet member (8);
 - 5 -the rotary member (3) comprises a first guide element (9) configured for engagement with a second guide element (11) of the bayonet member (8) and comprises a pressing portion (15) configured to move toward a base portion (17) of the bayonet member (8) upon rotation of the rotary member (3), wherein the first and second guide element (9, 11) interact for providing a clamping force between the pressing portion (15) and the base portion (17);
 - 10 -the rotary member (3) is further associated with a spring assembly (13), configured to be compressed by said rotation thereby adding additional clamping force to the pressing portion (15).
2. The spring biased bayonet lock (1) according to claim 1, **wherein** the base portion (17) is
15 configured to abut against the pressing portion (15) of the rotary member (3) or to abut against a work piece (19) positioned between the base portion (17) and the pressing portion (15) upon said rotation.
3. The spring biased bayonet lock (1) according to claim 1 or 2, **wherein** the base portion (17)
20 comprises said spring assembly (13) configured to be a part of the bayonet member (8).
4. The spring biased bayonet lock (1) according to claim 1 or 2, **wherein** the rotary member (3) comprises said spring assembly (13) configured to be a part of the rotary member (3).
- 25 5. The spring biased bayonet lock (1) according to any of claims 1 to 4, **wherein** the bayonet member (8) comprises a guide member (25) that is configured to be movable in the axial direction (X), wherein the rotary member (3) is associated with the spring assembly (13) via the guide member (25).
- 30 6. The spring biased bayonet lock (1) according to any of the preceding claims, **wherein** the first guide element comprises a bayonet pin (9) and the second guide element comprises a helical groove (11), the bayonet pin (9) is configured to be guided in the helical groove (11) for

providing a motion of the rotary member (3) relative the bayonet member (8) and along the axial direction (X).

7. The spring biased bayonet lock (1) according to any of the preceding claims, **wherein** a spring
5 constant value of the spring assembly (13) is adjusted by moving a spring holding element (27) in the axial direction (X) or by changing the spring constant value of the spring assembly (13).

8. The spring biased bayonet lock (1) according to any of the preceding claims, **wherein** the
10 spring assembly (13) comprises a linear and/or non-linear spring.

9. A method of locking a first member (61) to a second member (67) by means of a spring biased
15 bayonet lock (1) comprising:

-a bayonet member (8) extending in axial direction (X) and a rotary member (3) arranged
coaxially with the bayonet member (8);

15 -the rotary member (3) comprises a first guide element (9) configured for engagement with a
second guide element (11) of the bayonet member (8) and comprises a pressing portion (15)
configured to move toward a base portion (17) of the bayonet member (8) upon rotation of
the rotary member (3), wherein the first and second guide element (9, 11) interact for
providing a clamping force between the pressing portion (15) and the base portion (17);

20 -the rotary member (3) is further associated with a spring assembly (13), configured to be
compressed by said rotation thereby adding additional clamping force to the pressing portion
(15); the method being **characterized by the steps of:**

-mounting of the bayonet member (8) to the first member (61);

-mounting of the spring assembly (13) to the bayonet member (8) or to the rotary member (3);

25 -fitting the bayonet member (8) into the rotary member (3);

-rotating the rotary member (3) to an end position, in which end position said clamping force
and additional clamping force being exerted.

10. The method according to claim 9, **wherein** the method comprises the further step of:

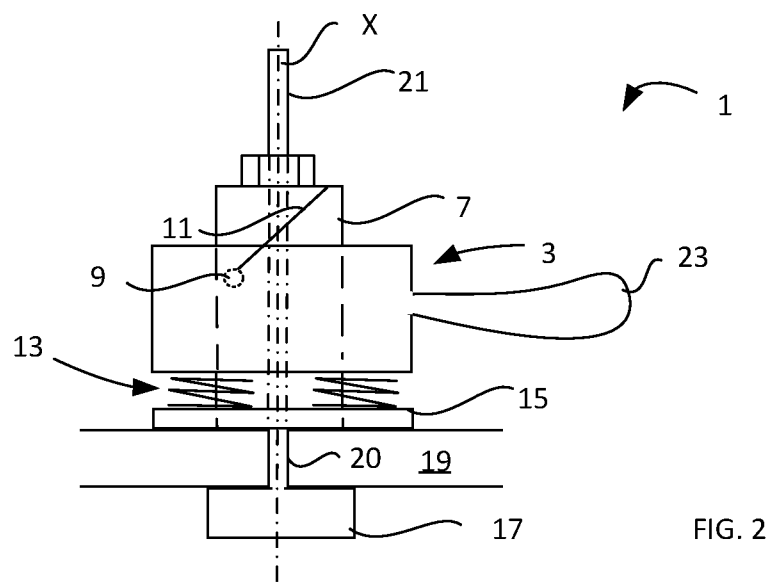
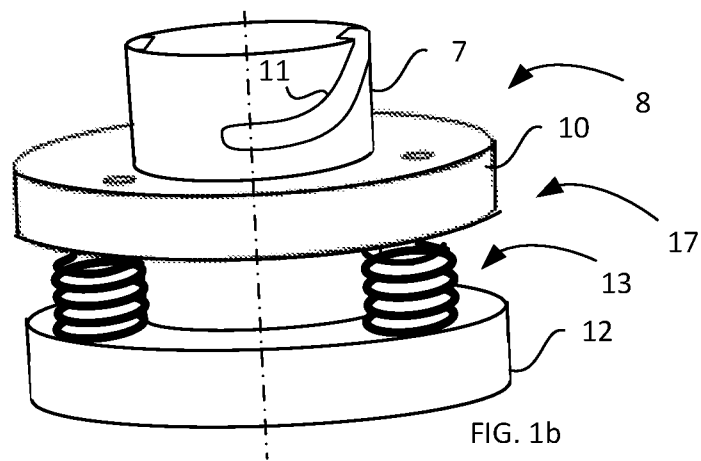
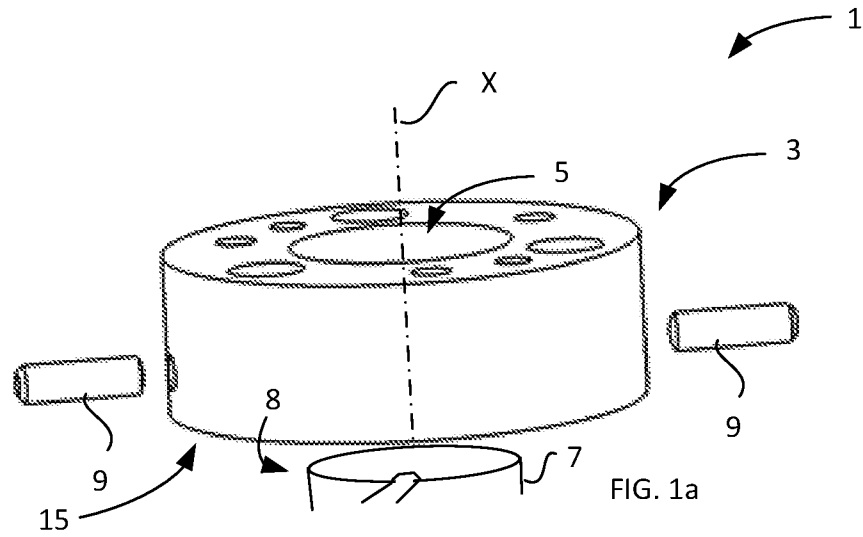
30 -mounting of the rotary member (3) to the second member (67).

11. The method according to claims 9 or 10, **wherein** the method comprises the further step of:

-securing of the rotary member (3) to the bayonet member in said end position by means of a
snap-in lock.

12. The method according to any of claims 9 to 11, **wherein** the first member (61) is a first tool device and the second member (67) is a second tool device.
- 5 13. The method according to any of claims 9 to 11, **wherein** the first member (61) comprises a reconfigurable fixture unit configured to hold work pieces during assembly.
14. The method according to any of claims 9 to 11, **wherein** the second member (67) comprises a height adjustable pillar and the first member (61) comprises an interchangeable tool device.
- 10 15. The method according to any of claims 9 to 11, **wherein** the first member (61) comprises an assembly fixture for assembly of aircraft work pieces.

1/5



2/5

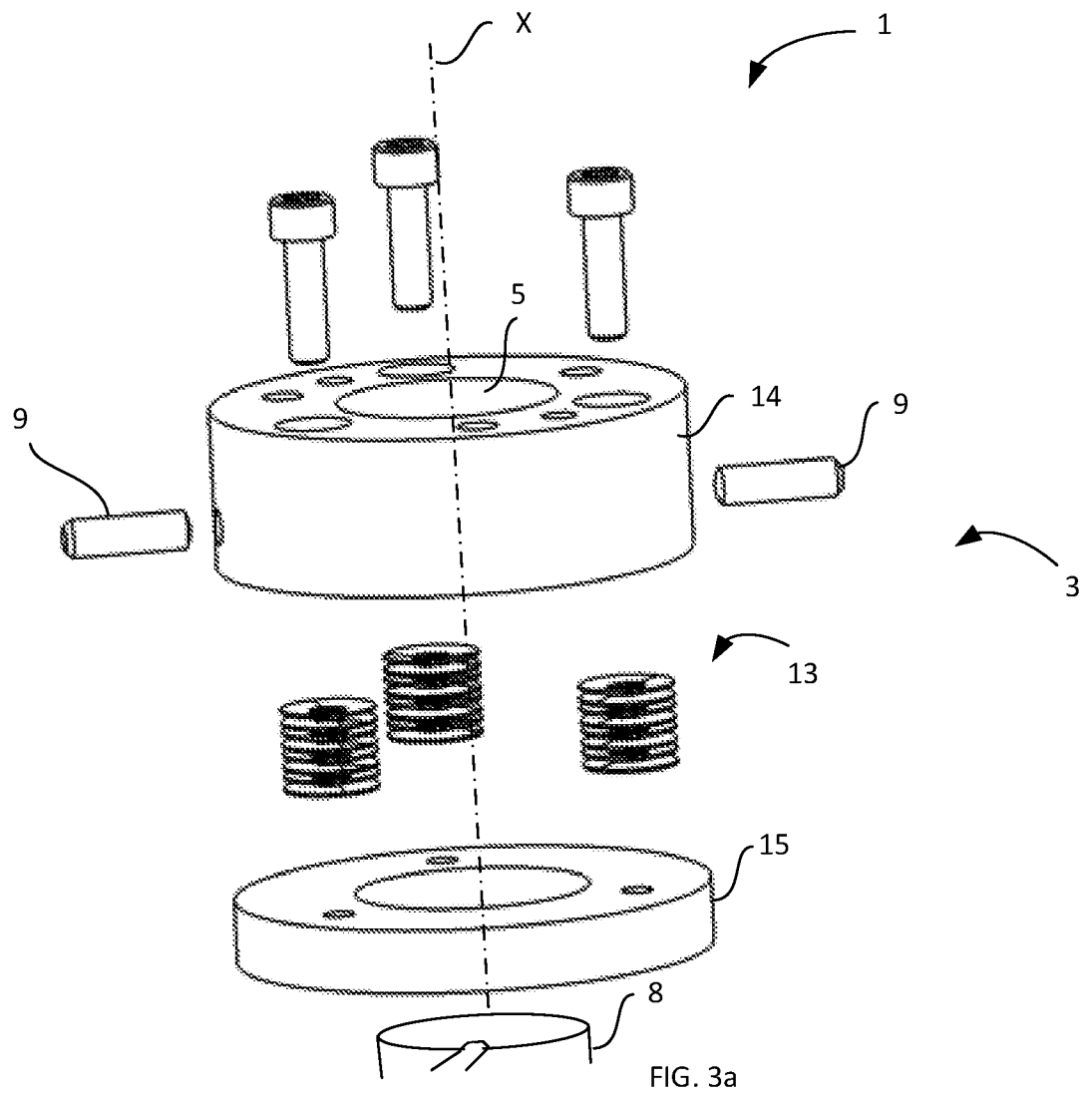


FIG. 3a

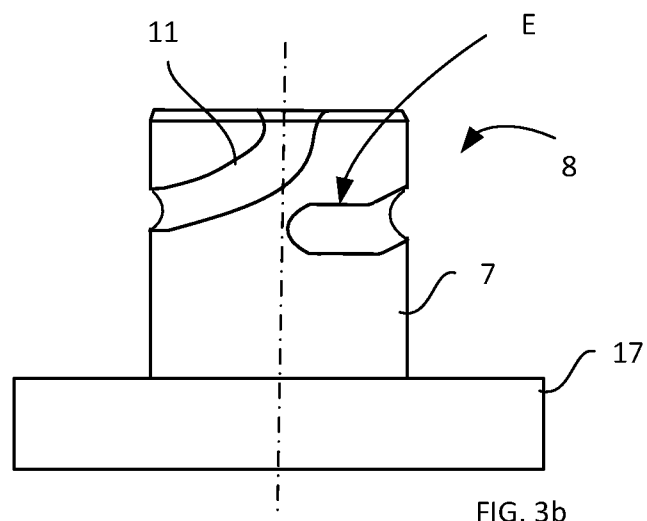
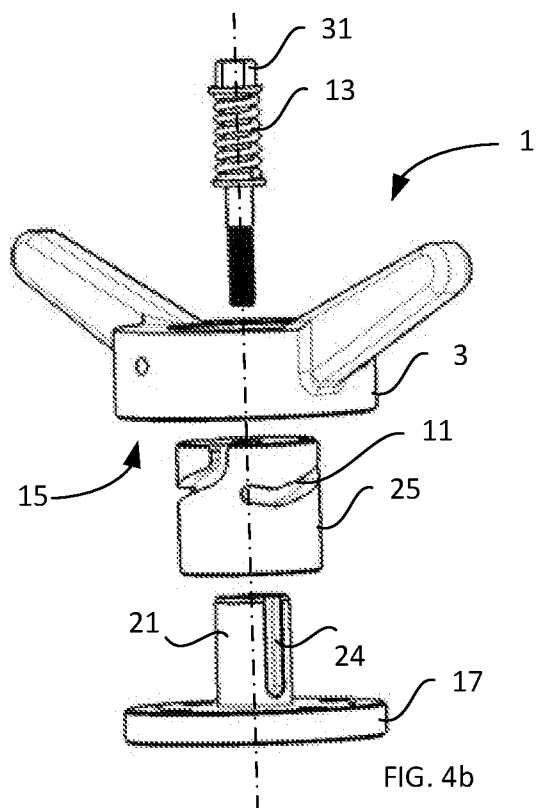
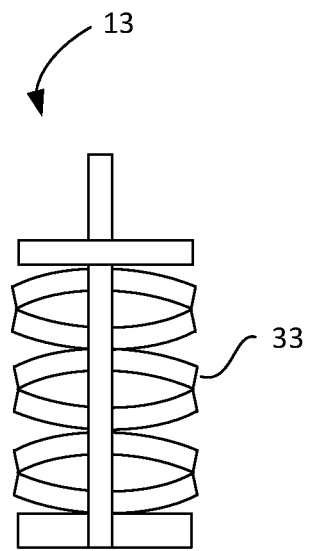
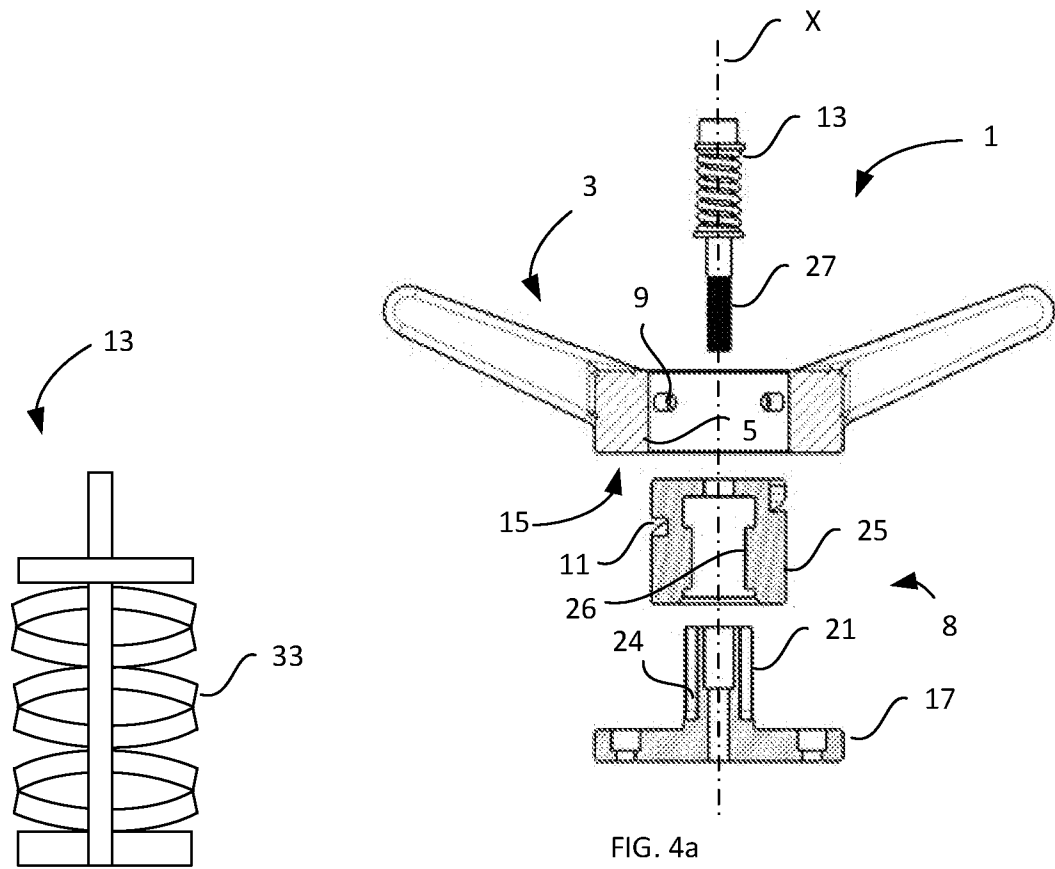


FIG. 3b

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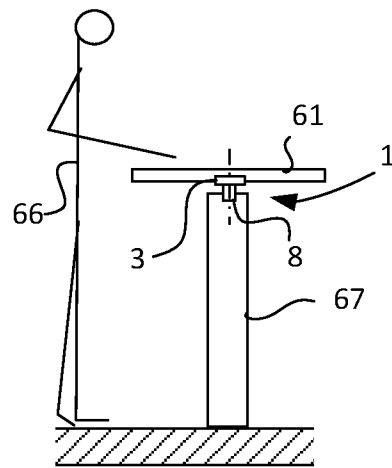


FIG. 6b

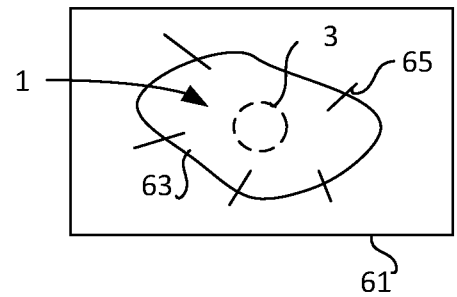


FIG. 6a

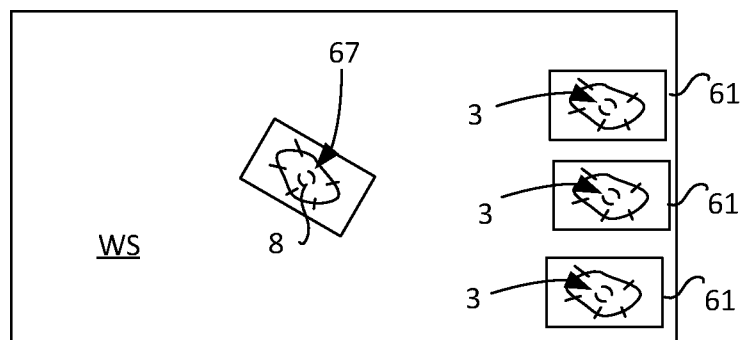


FIG. 6c

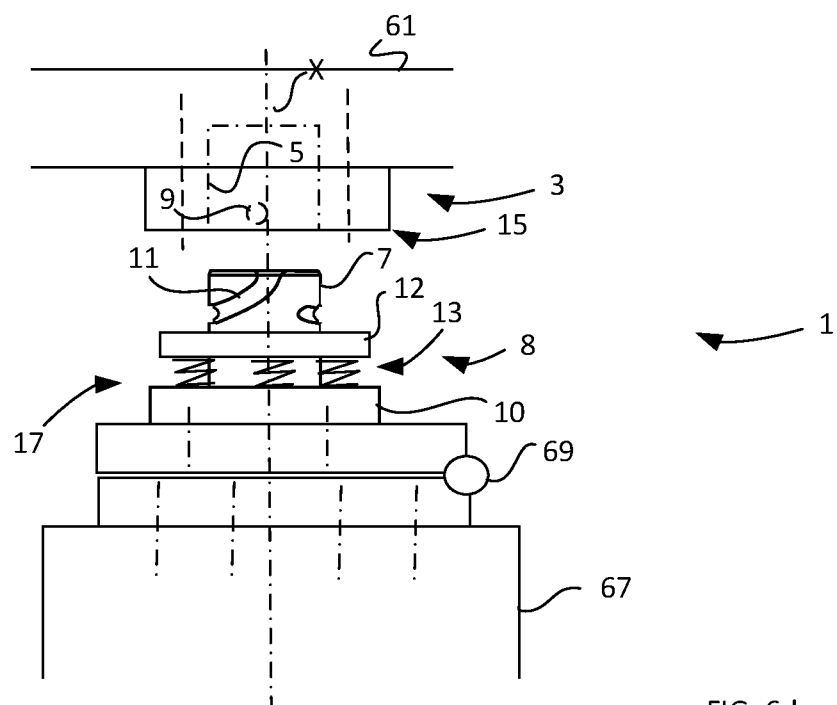


FIG. 6d

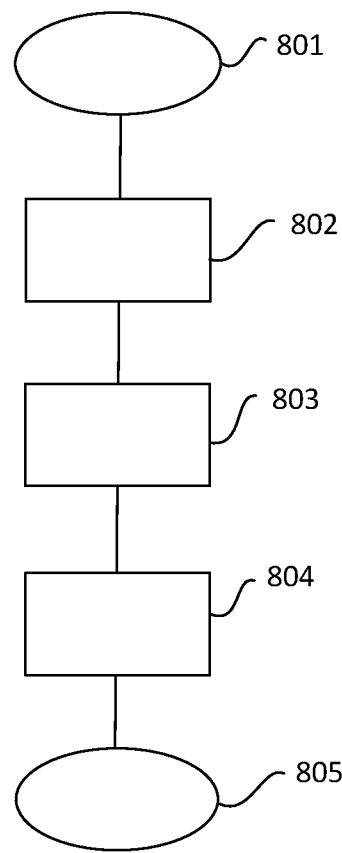


FIG. 7b

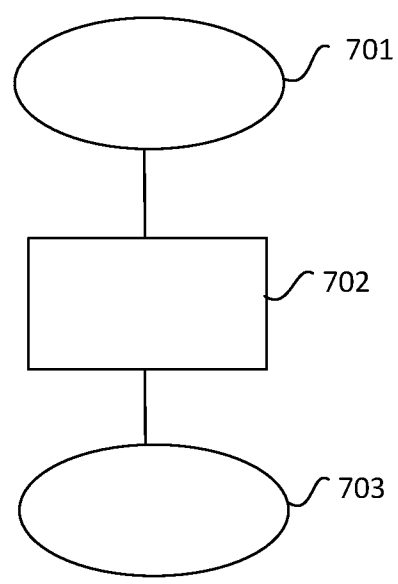


FIG. 7a

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE2017/050830

A. CLASSIFICATION OF SUBJECT MATTER

IPC: see extra sheet

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)

IPC: A47B, F16B

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

SE, DK, FI, NO classes as above

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

EPO-Internal, PAJ, WPI data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6379076 B1 (REINHOLD STEVE U ET AL), 30 April 2002 (2002-04-30); abstract; column 1, line 44 - line 63; column 2, line 26 - column 4, line 11; figures 1-6 --	1-15
A	EP 0334704 A1 (ECIA EQUIP COMPOSANTS IND AUTO), 27 September 1989 (1989-09-27); abstract; figures 1-3 --	1-15
A	EP 0791758 A1 (ECIA EQUIP COMPOSANTS IND AUTO), 27 August 1997 (1997-08-27); abstract; figures 1-3 --	1-15
A	EP 0469939 A2 (AEROSPATIALE), 5 February 1992 (1992-02-05); abstract; figures 1-6 --	1-15



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

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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

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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

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

"&"

document member of the same patent family

Date of the actual completion of the international search

27-04-2018

Date of mailing of the international search report

27-04-2018

Name and mailing address of the ISA/SE

Patent- och registreringsverket

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE2017/050830

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Continuation of: second sheet

International Patent Classification (IPC)

F16B 21/04 (2006.01)

F16B 7/20 (2006.01)

F16B 12/42 (2006.01)

A47B 13/00 (2006.01)

INTERNATIONAL SEARCH REPORT

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International application No.

PCT/SE2017/050830

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