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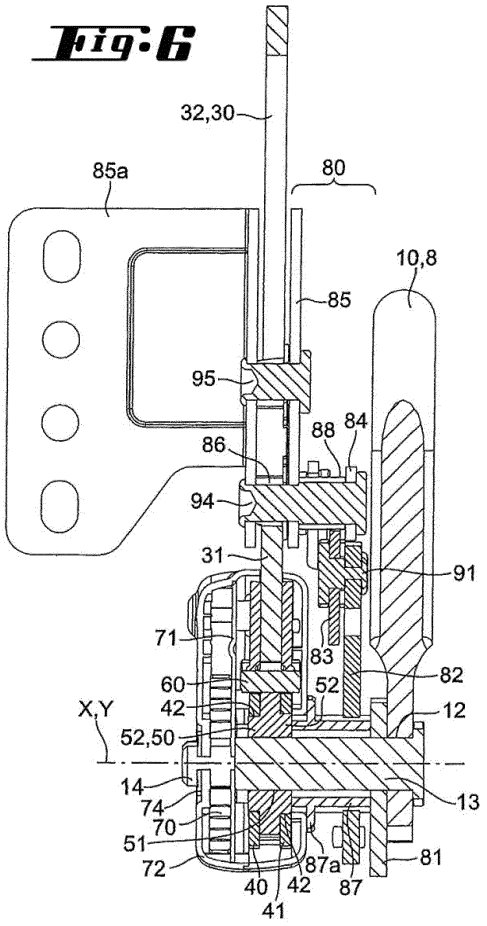
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(54) ANGLE ADJUSTMENT DEVICE AND SOFA WITH THE SAME

(57) [TOPIC] The provision of an angle adjustment tool enabling maintenance of the beautiful flat surfaces of the upholstery stretched all the time, without the generation of slackened creases in the upholstery, even in reclining furniture providing (Reclining) rest means.

[SOLUTION] An angle adjustment tool (8) comprised of a support member (10), and an assembled swinging member (30) enabling swinging via the main axis (13) fixed to one terminal means of said support member (10), characterized by being an angle adjustment tool (8) disposing the swinging surface of said support member (10) intersecting with the axial centers of the center axes (X and Y) of said main axis (13), and the swinging surface of said swinging member (30) intersecting with an axial center (X,Y) of the main axis (13), possibly provided by axial centers (X and Y) which might be disposed in parallel preferably providing a specific gap there between, and not only enabling swinging to the upright direction (Direction A) of said swinging member (30), but also regulating the swinging to the inclined direction (Direction B) of said swinging member (30), in addition to enabling the holding thereof at the desired inclined angle, in a configuration providing a sliding mechanism (80) having a sliding member (85) returnably displaced along said swinging member (30), in correspondence with the swung angle of said swinging member (30).

Fig:6



EP 3 262 985 A1

Description

TECHNICAL FIELD

[0001] The present invention relates to an angle adjustment tool employed in furniture such as sofas or chairs.

PRIOR ART

[0002] Conventionally, angular adjustment tools enabling reclining of the headrest, armrest, footrests and the like provided on furniture such as sofas or chairs were widely employed. For example, there are angular adjustment tools, on the one hand, wherein swinging to the angular direction was inhibited while enabling swinging to the upright direction of the reclining locations, in addition to, enabling holding at multiple stages of the specific reclined angles of the angular positions (Refer to patent reference 1).

PRIOR ART REFERENCES

[Patent references]

[0003] Patent reference 1: Japanese Granted Patent 4296223

SUMMARY OF THE INVENTION

PROBLEMS TO BE SOLVED BY THE INVENTION

[0004] However, as the furnitures using the conventional angular adjustment tool, for example, as represented in figure 41 appended to this patent application, there is a sofa 1 which provides two sets of seats surface means 3 and the back support means 4 in parallel between a pair of leg means 2, 2. Then, the headrest means 5 attached to the upper terminus of the back support means 4 when erected to the upright direction (direction A) from the inclined posture, it is easy for wrinkles to be generated in the slackened upholstery positioned between the back support means 4 and the headrest means 5. In particular, in regard to being upholstered in extravagant leather upholstery employing thick leather as the upholstery, it is easy for wrinkles to be generated in the slackened upholstery. The same kind of slackened wrinkles 9 may also easily occur in the footrest means 6, and in the armrest means 7. When these types of slackened wrinkles 9 occur, not only is the usage sensation (seated feeling) poor, there are problems with the complete loss of the design.

[0005] The present invention has as its object the provision of an angle adjustment tool enabling the sustenance of a beautiful smooth surface in the stretched upholstery all the time, without the occurrence of slackened wrinkles in the upholstery, even in furniture provided with reclining rest means (parts that can be reclined).

SUMMARY OF THE INVENTION

[0006] The angle adjustment tool of the present invention which should resolve the issues described above, is comprised of a support member, and an assembled swinging member enabling swinging via a main axis fixed to one terminal means of said support member,
disposing the swinging surface of the support member intersecting with the axial center of said main axis, and the swinging surface of said swinging member intersecting with the axial center of said main axis disposed in parallel providing a specific gap there between, and not only enabling swinging to the upright direction of said swinging member, but also regulating the swinging to the inclined direction of said swinging member, in addition to enabling the holding thereof at the desired inclined angle, in a configuration providing a sliding mechanism having a sliding member returnably displaced along said swinging member, in correspondence with the swinging angle of said swinging member.

EFFECTS OF THE INVENTION

[0007] By means of the present invention, the slide member of the sliding mechanism is displaced along the swinging member in correspondence with the swung angle of the swinging member. For example, when the swinging member of the present invention which is included in the headrest means is erected to the erected direction from the inclined state, the sliding member is slidably displaced along the swinging member in correspondence with the erected angle. For this reason, there is the application of an appropriate tensile force to the upholstery covering the headrest means. As a result, there is no generation of slackened wrinkles in the upholstery covering the headrest means. Moreover, by means of the present invention, even when the headrest means is inclined, the sliding member is slidably displaced along the swinging member. As a result, because there is no tightening of the upholstery, the headrest means may be easily inclined.
In addition, by means of the present invention, the swinging member supported in a swingable manner via the main axis on the support member swings about the axial center of said main axis. For this reason, the outer shape dimensions of the diameter direction of the peripheral vicinity of the main axis need only be of the minimum required size. As a result, when the vicinity of the periphery of the main axis of the angle adjustment tool of the present invention is incorporated into sofas and the like, because a large storage space is not required, the assembly operation is facilitated.

[0008] As an embodiment of the present invention, the sliding mechanism may be disposed between said support member and said swinging member.
By means of this embodiment, contact of the upholstery of the furniture to the sliding mechanism cannot easily occur, enabling the derivation of furniture of a beautiful

appearance.

[0009] As another embodiment of the present invention, the sliding mechanism may be disposed on the outer facing surface side of said swinging member.

By means of this embodiment, the selection of the disposal of the sliding mechanism is enabled, widening the degrees of freedom in the design, facilitating the design thereof.

[0010] As yet another embodiment of the present invention, said sliding mechanism may have a configuration comprised of said sliding member, and plural movable ring members driving said sliding member.

By means of this embodiment, an angle adjustment tool may be derived enabling variation in the displaced distance of the sliding member by varying the shape of the multiple movable ring members as required.

[0011] In a different embodiment of the present invention, said support member is enabled in an L shaped bend, in addition to, embodying in a rod member enabling insertion in a removable manner to a tube shaped attachment tool.

By means of this embodiment, the support member may be fitted on in a removable manner to the tube shaped attachment tool. For this purpose, the support member may be separated from the tube shaped attachment tool at the time of packaging or for transport thereof, enabling a saving in storage space.

[0012] The sofas of the present invention configure the earlier described angle adjustment tool to sofas, in particular, incorporated in the headrest means, the armrest means and the footrest means.

[0013] By means of the present invention, by adapting the earlier described angle adjustment tool to the headrest means, there is no generation of slackened wrinkles. For this reason, the usage feeling is good, and there is the benefit that the derivation of sofas with high designability is enabled.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014]

Figure 1: A schematic perspective drawing representing the situation where the first embodiment of the angle adjustment tool of the present invention is adapted to a sofa.

Figure 2: A perspective drawing representing the first embodiment of the angle adjustment tool of the present invention.

Figure 3: A perspective drawing representing the first embodiment of the angle adjustment tool of the present invention viewed from a different angle.

Figure 4: An exploded perspective drawing of the angle adjustment tool represented in figure 2.

Figure 5: An exploded perspective drawing of the angle adjustment tool represented in figure 3.

Figure 6: A horizontal cross section drawing of the angle adjustment tool represented in figure 2.

Figure 7: A vertical cross section perspective drawing of the angle adjustment tool represented in figure 2.

Figure 8: A partially enlarged frontal drawing of the angle adjustment tool represented in figure 2.

Figure 9: Figure 9 (A) to Figure 9 (F) represent an enlarged drawing of the main parts in the operation of the floating wedge member.

Figure 10: A rear surface drawing in order to explain the operation of the angle adjustment tool of the first embodiment.

Figure 11: A rear surface drawing in continuity from figure 10.

Figure 12: A rear surface drawing in continuity from figure 11

Figure 13: A rear surface drawing in continuity from figure 12

Figure 14: A rear surface drawing in continuity from figure 13

Figure 15: A frontal drawing in order to explain the operations of the angle adjustment tool of the first embodiment.

Figure 16: A frontal drawing in continuity from figure 15.

Figure 17: A frontal drawing in continuity from figure 16.

Figure 18: A frontal drawing in continuity from figure 17

Figure 19: A frontal drawing in continuity from figure 18.

Figure 20: A perspective drawing representing the second embodiment of the angle adjustment tool of the present invention.

Figure 21: A perspective drawing representing the second embodiment of the angle adjustment tool of the present invention as seen from a different angle.

Figure 22: A perspective drawing representing the third embodiment of the angle adjustment tool of the present invention.

Figure 23: A partial perspective drawing representing the third embodiment of the angle adjustment tool of the present invention as seen from a different angle.

Figure 24: An exploded perspective drawing of the angle adjustment tool represented in figure 22.

Figure 25: An exploded perspective drawing of the angle adjustment tool represented in figure 23.

Figure 26: A horizontal cross section drawing of the angle adjustment tool represented in figure 22.

Figure 27: A vertical cross section perspective drawing of the angle adjustment tool represented in figure 22.

Figure 28: A partially expanded frontal drawing of the angle adjustment tool represented in figure 22.

Figure 29: A frontal drawing in order to explain the operations of the angle adjustment tool of the third embodiment.

Figure 30: A frontal drawing in continuity from figure

29.
Figure 31: A frontal drawing in continuity from figure 30.
Figure 32: A frontal drawing in continuity from figure 31.
Figure 33: A frontal drawing in continuity from figure 30.
Figure 34: A a rear surface drawing in order to explain the operations of the angle adjustment tool of the third embodiment.
Figure 35: A rear surface drawing in continuity from figure 34.
Figure 36: A rear surface drawing in continuity from figure 35.
Figure 37: A rear surface drawing in continuity from figure 36.
Figure 38: A rear surface drawing in continuity from figure 37.
Figure 39: A perspective drawing representing the fourth embodiment of the angle adjustment tool of the present invention.
Figure 40: A perspective drawing representing the fourth embodiment of the angle adjustment tool of the present invention as seen from a different angle.
Figure 41: A perspective drawing in order to explain a prior art embodiment.

[0015] The embodiments of the angle adjustment tool of the present invention are explained in accordance with the attached drawings from figure 1 to figure 40.
As illustrated from figure 1 to figure 19, the angle adjustment tool 8 of the first embodiment is attached via the attachment tool 20 to the headrest means 5, and the armrest means 7 of the sofa 1.

[0016] As illustrated in figure 1, the sofa 1 has a configuration disposing two sets of seating surface means 3 and the back support means 4 between a pair of erect leg means 2, 2. Moreover, the platform seating means 2a are both disposed on the outer side of said leg means 2. Then, the armrest means 7 enabling swinging motion centered on the swinging axis X is disposed on the upper terminus of the leg means 2 via the angle adjustment tool 8. Furthermore, the leg means 2 and the armrest means 7 are covered by a continually stretched upholstery such as leather.
The footrest means 6 enabling swinging centered on the swinging axis center is disposed on the upper terminal means of said seating surface means 3 via the angle adjustment tool (not illustrated in the figure). Furthermore, the headrest means 5 enabling swinging centered on the swinging axis center Y is provided on the upper terminals of said back support means 4 via the angle adjustment tool 8.
Then, the headrest means 5, the back support means 4, the seat surface means 3 and the footrest means 6 are covered by continuous upholstery such as leather or fabric upholstery.

[0017] The angle adjustment tool 8, as illustrated in figure 6, disposes the slide mechanism 80 between the swinging member 30 and the support member 10 connected via the main axis 13 of the angular shaped cross-section surface of the main axis 13. The sliding mechanism 80, for example, when the headrest means 5 is swung in the upright direction A, suppresses the generation of slackened creases in the upholstery of the sofa 1. For that reason, the sliding mechanism 80 is termed the surface covering creases generation prevention mechanism.

[0018] The support member 10, as illustrated in figure 4, is a circular rod material which is bent in a substantially L shape, and can be assembled with the later mentioned attachment tool 20. Then, the support member 10 has the narrow necked means 11 for use in prevention of the slipping off from the lower terminal means thereof. Moreover, the support member 10 has the hexagonal shaped cross-section surface 6 of the main axis 13 inserted into the hexagonal shaped through holes 12 provided in the flat terminal means thereof and is fixed therein. The main axis 13 provides the removal prevention axis 14 protruding through that same axial center. The removal prevention axis 14 provides the slit 15 in the tip terminal surface thereof.

[0019] The attachment tool 20, as illustrated in figure 3, is formed from the tube shaped attachment tool main member 21, and the nut 23 is screwed on to the threaded means 21a formed on the outer surface of the attachment tool main member 21, and the removal prevention pin 25 locked into the cut-out means 21c is provided in the attachment tool main member 21. Then, the annular rib 21b is formed in unison with the upper terminus aperture edge means of the attachment tool main member 21. For that purpose, the annular rib 21b, can fix the attachment tool 20 to the sofa 1 by means of sandwiching the seat material of the sofa 1 (not illustrated in the figure) between the seat metal 24 and the nut 23. Then, the support member 10 of the angle adjustment tool 8 is inserted into the attachment tool main member 21 of the attachment tool 20, and the removal prevention of the support member 10 is enabled by locking the removal prevention pin 25 into the cut-out means 21c.
Therefore, in this embodiment, the angle adjustment tool 8 is assembled in a removable manner on the attachment tool 20. For that reason, if said attachment tool 20 is employed, the angle adjustment tool 8 may be separated on the occasion of packaging and transport. As a result, the storage space is saved, with the benefit that an easy-to-use angle adjustment tool 8 is enabled.

[0020] The swinging member 30, as illustrated in figure 4, forms the swinging member main body 31, and a pair of wall members 40 and 41 which are each fixed on the front and back surfaces of one terminal means of the swinging member main body 31, and the gear member 50 sandwiched between said wall members 40 and 41, also penetrating through the penetration hole 42 provided in the wall members 40 and 41, and the floating wedge member 60 fitted on to the wedge-shaped window means

43 provided in said wall members 40 and 41.

[0021] The swinging member main body 31 not only provides the guide groove 32 along the long direction thereof, but also provides the closure hole 33 which becomes the swinging fulcrum in the vicinity of the edge means of one terminal side of said guide groove 32. The wedge-shaped window means 43 is positioned between said closure hole 33, and the through hole 42 provided in said wall members 40 and 41. Moreover, as illustrated in figure 8, the position determining the protrusions 34 and 35 in order to determine the position of the leaf spring 36 are provided in the tip terminal means of one terminal side of the swinging member main body 31. The leaf spring 36 is pressed into contact with the contact surface 61 of the later described floating wedge member 60, biasing the floating wedge member 62 to the gear member 50.

[0022] The wall members 40 and 41 not only have the through holes 42 there through which enable the fitting on of the gear member 50, but also provide the wedge shaped window means 43 in the vicinity of said through hole 42. The wedge-shaped window means 43, as illustrated in figure 9A, has a circular arch shaped wedge surface 43a. Said wedge surface 43a is formed so as to gradually approach the gear means 53 of the later described gear member 50. Moreover, said wedge shaped window means 43 has the avoidance space 43b in order to store the retrieved state of the floating wedge member 60 from the gear means 53. Then, said wedge shaped window means 43 forms the induction sloped surface 43c connected to said avoidance space 43b. In addition, the wall members 40 and 41, as illustrated in figure 8, provide the cut out means 44 for determining the positions along the outer peripheral edge means thereof. This is for determining the positions of the later described covers 72 and 73.

[0023] The gear member 50, as illustrated in figure 7, has a hexagonal shaped axial hole 51 through which the main axis 13 penetrates. Moreover, the gear member 50 forms an annular stepped means 52 along the aperture periphery means of said axial hole 51. Furthermore, the gear member 50, as illustrated in figure 8, forms the gear means 53 in an arc shaped outer peripheral means, for example, in the range of the center angle of 100° ~ 120°. Then, there is the provision of a protruding means 54 for use in pressing down on the initial terminal means of said gear means 53. Furthermore, there is the provision of a protrusion means 55 for use in pressing upwards on the end terminal means of said gear means 53.

Then, the gear member 50, as illustrated in figures 6 and 7, by fitting on the annular stepped means 52 and 52 formed on the front and back surfaces thereof to the perforating holes 42 and 42 of the wall members 40 and 41, is sandwiched in a swingable manner by the pair of wall members 40 and 41. In addition, by the insertion of the main axis 13 which is integral with the support member 10 through the axial hole 51, the gear member 50 swings in unison with the support member 10.

[0024] The floating wedge member 60, as illustrated in figure 8, has the contact surface 61 on one surface side, and has the toothed surface 62 on the other surface side. Said contact surface 61, as illustrated in figure 9, contacts with the wedge surface 43a of the wedge-shaped window means 43 formed in the wall members 40 and 41. Moreover, teeth are formed in said toothed surface 62. For this reason, the contact surface 61 contacts with the wedge surface 43a, in addition to, when the toothed surface 62 meshes with the gear means 53 of the gear member 50, the inhibition of swinging of the swinging member 30 to the inclined direction is enabled by means of the wedge effect.

[0025] Now, in figure 9, for the convenience of the explanation, the illustrated gear means 53 of the gear member 50 which meshes with the floating wedge member 60 has five teeth in the toothed surface 62. However, for example, there may be the formation of 13 ~ 20 teeth in the toothed surface 62 of the floating wedge member 60, and more than 40 teeth may be formed in the gear member 50, and more preferably 45 ~ 65 teeth may be formed therein. By this means, and angular adjustment means with more than 40 stages is enabled.

[0026] The return spring 70, as illustrated in figure 4, is a spiral spring having a long dimensioned belt like spring material wound in a spiral shape. Then, the return spring 70 not only locks one terminal means 70a thereof into the slit 15 of the main axis 13, but also locks the other terminal means 70b on to the later described protrusion means 73b for use in locking on the cover 73. For this reason, as a result of the tensile force of the return spring 70, the return moment operates all the time on the swinging member 30.

Now, as a result of this embodiment, because a spiral spring is employed as the return spring 70, a smaller outer shape dimension of the direction along the axial center of the main axis 13 is enabled. As a result, there is the benefit that a more compact angle adjustment tool may be derived.

[0027] Moreover, there is the disposition of a separation plates 71 between the wall member 40 and the return spring 70. This is to prevent the contact of the return spring 70 with the floating wedge member 60, so as to enable the smooth operation of the floating wedge member 60. Now, the removal prevention axis 14 of the main axis 13 and the protrusion means 73b for use in locking of the cover 73 are inserted through said separation plate 71.

[0028] Said wall members 40 and 41 and the return spring 70 are covered by a pair of cover 72 and 73 which fit mutually thereto. There are the position determining protrusions 72a (figure 4) and 73a (figure 8) formed on the inner peripheral surface edge of the cover 72 and 73 four locking with the cut out means 44 of said wall members 40 and 41.

Moreover, the cover 73 provides the protrusion means 73b protruding from the inner facing surface thereof for use in locking, which fits into the inner facing surface of

the cover 72.

[0029] As illustrated in figure 4, the sliding mechanism 80 is configured from the fixing ringing member 81, and the first movable ring member 82, and the second movable ring member 83, and the third movable ring member 84, and the slide member 85 supported in a slidably displaceable manner along the guide groove 32 of the swinging member main body 31.

[0030] The fixing ringing member 81 is a hexagonal shape through hole 81a through which the main axis 13 is inserted. Then, by having the main axis 13 inserted through the through hole 81a, the fixing ring member 81 is sandwiched by the tube shaped spacer 87 provided with the flange 87a and the support member 10 (figure 7). Then, one terminal means of the first movable ring member 82 is swingably connected via the closure member 92 to the through hole 81b provided in the vicinity of said through hole 81a.

The first movable ring member 82 has a substantially S-shaped folded back shape. Then, the other terminal means of the first movable ring member 82 is connected in a swingable manner via the closure member 81 to the intermediate means of the second movable ring member 83. Said second movable ring member 83 has a playing card shape. Then, one terminal means of that second movable ring member 83 is swingably connected via the spacer 89 (figure 5) and the closure member 92 to the closure hole 33 of the swinging member main body 31, and the other terminal means thereof is swingably connected via the closure member 93 to one terminal means of the third movable ring member 84. That third movable ring member 84 is arc shaped, and the other terminal means thereof is swingably connected via the spacer 88 and the closure member 94 to the sliding member 85. In particular, the closure member 94 perforates through the later described buffer member 86, in addition to, to being slidably displaceable along the guide groove 32 of the swinging member main body 31.

[0031] The sliding member 85 has an inverted U-shaped cross section which can fit-on to the swinging member main body 31, and the attachment means 85a extends in the lateral directions from the lower terminal edges of those sides. Then, the sliding member 85 is assembled so as to sandwich the buffer member 86 fitted on to the guide groove 32 of the swinging member main body 31. Furthermore, the sliding member 85 is assembled in a slidably displaceable manner to the swinging member main body 31 via a pair of closure members 94 and 95.

Now, in this embodiment, an explanation was provided of the situation where there is swingable connection via closure members, but other connection means, not limited to closure members, for example, fixing via a nut and bolt are also possible. In addition, it goes without saying that the use of both a closure member and other connection means is also possible.

[0032] The buffer member 86 reduces the frictional resistance between the swinging member main body 31 and the slidable member 85, and is for the purposes of enabling the smooth slidable displacement of the sliding member 85. Furthermore, the buffer member 86 reduces the generation of the frictional noise on the occasion of the slidable displacement of the sliding member 85, and eliminates the rattling between the swinging member main body 31 and the sliding member 85.

[0033] The second embodiment of the angle adjustment tool of the present invention, as illustrated in figures 20 and 21, is very similar to the first embodiment, and the point of difference is that it is configured in axial symmetry with the first embodiment. For that reason, the same reference numerals are applied to the same parts as in embodiment 1 and the further explanation thereof is dispensed with here.

Now, the angle adjustment tool 8 of the first and second embodiments, as illustrated in figure 1, may be attached in a symmetrical manner to the left and right of both side terminal means of the headrest means 5 and the armrest means 7.

[0034] Next, the method of use of the earlier described angle adjustment tool 8 is explained in accordance with the attached drawings of figure 9 to figure 19. Now, for the convenience of the explanation, of the angle adjustment tool 8 represented in figure 1, the explanation focuses on the angle adjustment tool 8 (the first embodiment) positioned on the right side of the headrest means 5.

Now, because the same operations of the angle adjustment tool 8 of the first embodiment apply to the angle adjustment tool 8 (the second embodiment) located on the left side of the headrest means 5, the operations and the explanations of the operations and the movements of the angle adjustment tool 8 of the second embodiment is dispensed with here.

[0035] Firstly, in the event that the headrest means 5 is inclined to the final inclined state, the upholstery covering the headrest means 5 is in an appropriately stretched state. For this reason, there is no generation of slack creases between the back support means 4 and the headrest means 5, and the upholstery covering the surface of the headrest means 5 defines a beautiful smooth curved line. On that occasion, as illustrated in figure 10, the sliding member 85 included in the angle adjustment tool 8 in the interior of the headrest means 5 is in the most proximal location to the main axis 13.

Moreover, while the return spring 70 is in the most relaxed state, the return spring 70 biases the swinging member 30 to the inclined direction so that the swinging member 30 can be held in the final inclined position. Then, as illustrated in figure 9A, the toothed surface 62 of the floating wedge member 60 meshes with the gear means 53 of the gear member 50. Then, when the user sits down on the sofa 1, the upholstery of the seating surface means 3 sinks down, and the upholstery of the back support means 4 is tensioned to the seating surface means 3 side, causing a tensile force in the upholstery covering the headrest means 5. However, the twisting moment

based on the spring force of the return spring 70 suppresses the swinging of the headrest means 5 to the upright direction A, enabling the continued holding of the headrest means 52 in the final inclined position.

[0036] Next, when the user pulls up the headrest means 5 from the final inclined position to the upright direction (direction A), by a desired angle only, in opposition to the twisting moment based on the spring force of the return spring 70, the gear member 50 of the swinging member 30 swings. For that purpose, as illustrated in figures 9B to figures 9D, the floating wedge member 60 biased by the biasing spring 36 is pushed back to the opposite direction to the biased direction. As a result, the meshed state of the gear means 53 of the gear member 50 with the toothed surface 62 of the floating wedge member 60 is released (figure 9C). Then, the toothed surface 62 of the floating wedge member 60 generates a clicking noise with the gear means 53 of the gear member 50, while riding over them. Next, when the pulling-up operations of the headrest means 5 are halted, because the floating wedge member 60 is biased to the gear means 53 side of the gear member 50 by the spring force of the biasing spring 36, the toothed surface 62 of the floating wedge member 60 mesh with the gear means 53 of the gear member 50. Next, when the headrest means 5 is pressed to the inclined direction, the contact surface 61 of the floating wedge member 60 contacts with the wedge surfaces 43a of the wedge-shaped window means 43 provided in the wall members 40 and 41, and the headrest means 5 can be held at the desired inclined angle, without inclining to the flattened direction, by means of the wedge effect.

[0037] As already described, in tandem with the pushing up to the upright direction of the headrest means 5, the swinging member 30 swings. As illustrated in figures 10 to 19, for this purpose, the first movable ring member 82 connected to the fixed ring member 81 swings, driving the second movable ring member 83. As a result, the second movable ring member 83 swings, driving the third movable ring member 84. The result is that because the third movable ring member 84 pushes out the sliding member 85, the sliding member 85 is slidably displaced along the guide grooves 32 of the sliding member main member 31. Then, the headrest means 5 attached to the attachment means 85a of the sliding member 85 by being simultaneously slidably displaced, the upholstery covering that headrest means 5 is stretched.

Therefore, the start of the slackening of the upholstery covering the headrest means 5 as a result of the headrest means 5 being pulled up to the upright direction giving rise to slackened creases therein would have occurred in the prior art embodiment. However, by means of this embodiment, with the erection of the headrest means 5, the sliding member 85 is slidably displaced to the tip terminal side of the sliding member main member 31 along the guide groove of the sliding member main member 31. As a result, the headrest means 5 is pulled up along the sliding member main member 31 by means of the sliding member 85. This results in the appropriate stretching of the upholstery covering the headrest means 5 and the back support means 4, and there is no generation of slackened creases between the headrest means 5 and the back support means 4. Therefore, when the user has the headrest means 5 pulled up to the upright direction (direction A) to a desired angle, the erection of the headrest means 5 is enabled, without generating slackened creases.

[0038] Then, when the headrest means 5 is pulled up beyond the desired angle, as illustrated in figure 9E, the protrusion means 54 for use in pushing down the gear member 50 swinging in unison with the swinging member 30 presses down the floating wedge member 60. As a result, the floating wedge member 60 retreats to the withdrawals space 43b along the induction slope surface 43c, and the mesh state of the gear means 53 of the gear member 50 with the toothed surface 62 of the floating wedge member 60 is released. As a result, the positional constraint of the floating wedge member 60 with respect to the swinging member 30 is eliminated. As a result, by means of the twisting moment based on the springing force of the return spring 70, the headrest means 5 automatically returns to the final inclined position thereof.

Moreover, when the headrest means 5 returns to the final inclined position, the sliding means 85 of the sliding mechanism 80 is slidably displaced along the guide grooves 32 of the sliding member main member 31, returning to the original position.

As a result, when the headrest means 5 returns to the final inclined position, there is no protruding out of the upholstery positioned between the headrest means 5 and the back support means 4. Therefore, the headrest means 5 is automatically returned smoothly to the final inclined position. As a result, as illustrated in figure 9F, the protrusion means 55 for use in pressing up of the gear member 50 pushes up the floating wedge member 60 which is withdrawn into the withdrawals space 43b to the induction slope surface 43c. On this occasion, the biasing spring 36 always biases the floating wedge member 60 to the gear member 50 side. Because of this, the toothed surface 62 of the floating wedge member 60 once more meshes with the gear means 53 of the gear member 50, returning to the state represented in figure 9A. Then, even if the headrest means 5 which is in the final inclined position is pressed to the inclined direction, the contact surface 61 of the floating wedge member 60 is pressed to the wedge surface 43a of the wedge-shaped window means 43. The result is that the headrest means 5 is not further inclined by means of the wedge effect of the floating wedge member 60.

[0039] Even if there is the operation of erecting the headrest means 5 to the upright direction, the sliding member 85 of the sliding mechanism 80 is slidably displaced along the guide groove 32 of the swinging member main body 31. As a result, because the upholstery positioned between the headrest means 5 and the back support means 4 is appropriately stretched, there is no gen-

eration of slackened creases.
Thereafter, the headrest means 5 may be adjusted to the optimal angle as a result of the repeat of the earlier mentioned operations, without generating slackened creases.

[0040] As is apparent from the explanation above, when the swinging member 30 is swung to the upright direction, the sliding member 85 is slidably displaced in parallel along the center of the guide groove 32, distally displacing it from the main axis 13. As a result, because the sliding member 85 appropriately stretches the upholstery positioned between the headrest means 5 and the back support means 4, there is no generation of slackened creases. In particular, because the sliding member 85 is slidably displaced in parallel along the guide groove 32, there is no contact with the upholstery, and there is no expansion of the upholstery.
Furthermore, even if the swinging member 30 is slid in the inclined direction, the sliding member 85 is slidably displaced in parallel along the axial center of the guide grooves 32, to approach the main axis 13. As a result, the sliding member 85 slackens the tensile force on the upholstery positioned between the headrest means 5 and the back support means 4, so that the upholstery is not overstretched. As a result, the smooth inclination of the headrest means 5 is enabled.

[0041] The angle adjustment tool 8 of the third embodiment, as illustrated in figures 22 to 40, has basically almost the same configuration as the already described embodiment 1. The biggest difference between the two is that the sliding mechanism 80 is disposed on the outer facing surface side of the sliding member 30 (figure 26).

[0042] The support member 10, as illustrated in figure 24, in a similar manner to embodiment 1, has a circular rod member bent into a substantially letter L shape, enabling assembly with the later described attachment tool 20. Then, the support member 10 has a narrow neck means 11, for use in preventing removal, on the lower terminal means thereof. Moreover, the support member 10 has the hexagonal cross section shaped main axis 13 inserted into the star-shaped perforation hole 12 (figure 24) provided in the flat terminal means thereof, and is unified there with by welding. The main axis 13 has a screw hole 16 perforating through a long the axial center thereof.

[0043] The attachment tool 20, as illustrated in figure 22, is the same as in embodiment 1. For that reason, the same reference numerals are applied to the same parts as in embodiment 1, and the further explanation thereof is dispensed with here.

[0044] The swinging member 30, as illustrated in figure 24, is formed from the swinging member main body 31, and the gear member 50 integrated with one terminal means of the swinging member main body 31, and a pair of wall members 40 and 41 sandwiching the front and rear surfaces of said gear member 50, as well as fitting-on to the axial hole 51 of the gear member 50, and the floating wedge member 60 fitting in to the wedge-shaped window means 43 provided in said wall members 40 and 41, and the return spring 70.

[0045] The swinging member main body 31 not only provides the guide groove 32 along the long dimensioned direction thereof, it also provides a closure hole 33 to serve as the swinging fulcrum in the vicinity of the terminal means of one terminal side of said guide groove 32.

[0046] The gear member 50, as illustrated in figures 24 and 25, has the axial hole 51 perforated through the main axis 13. Moreover, the gear member 50, as illustrated in figure 24, has a gear means 53 formed in an arc shaped outer peripheral edge means, for example in the central angles of 100° to 120°, in one terminus thereof. Then, the protrusion means 54 for use in pressing down is provided in the initial terminal means of said gear member 53. Furthermore, protrusion means 55 for use in pressing up is provided in the end terminal means of said gear means 53.

[0047] As illustrated in figures 24 and 25, the wall members 40 and 41 not only have the hexagonal shaped through holes 42 which can penetrate through the main axis 13, but also the wedge-shaped window means 43 is provided in the vicinity of said through holes 42.
The wedge-shaped window means 43, as illustrated in figure 28, have an arc shaped wedge surface 43a. Said wedge surface 43a are formed so as to gradually approach the gear means 53 of the gear member 50 which is described later. Moreover, said wedge-shaped window means 43 has the withdrawal space 43b for the purposes of storage of the separated state of the floating wedge member 60 from the gear means 53. Then, said wedge shaped window means 43 forms the induction sloped surface 43c in continuity with said withdrawal space 43b.
Moreover, wall members 40 and 41, as illustrated in figures 26 at 27, provide each of the annular ribs 45 and 45 on the aperture edge means of the opposite surface sides of said two holes 42. The annular ribs means 45 and 45 have an outer shape enabling the fitting in thereof to the axial hole 51 of the gear member 50.
In addition, the wall members 40 and 41 provide the protrusion machined protrusions 41a and 41b and the position determining the protrusions 40a and 40b for the purposes of determining the position of the leaf spring 36 in the opposing faces thereof.

[0048] The leaf spring 36, as illustrated in figure 20, figure 25 and figure 28, has a belt-shaped spring material formed bent in a substantially letter U shape. Then, by assembling the leaf spring 36 to the position determining protrusions 40a (41a) on the wall member 40 (41), one terminal means thereof not only locks to the position determining protrusions 40b (41b), but also presses the other terminal means thereof to the contact surface of the floating wedge means 60. As a result, the leaf spring 36 biases the floating wedge member 62 to the gear means 53 side of the gear member 50.

[0049] The floating wedge member 60, as illustrated in figure 28, is almost the same as in embodiment 1. Then, the floating wedge member 60 has the contact

surface 61 on one surface side thereof, and has the toothed surface 62 on the other surface side thereof. Said contact surface 61, just as in embodiment 1, and as illustrated in figure 9 and figure 28, contacts with the wedge surface 43a of the wedge-shaped window means 43 formed in the wall members 40 and 41. Moreover, teeth are formed in said toothed surface 62. As a result, when the contact surface 61 contacts with the wedge surface 43a, in addition to, when the toothed surface 62 meshes with the gear means 53 of the gear member 50, the swinging to the inclined direction of the swinging member 30 with respect to the support member 10 is prevented by means of the wedge effect.

[0050] Said wall members 40 and 41, as illustrated in figure 24, are covered by a pair of covers 72 and 73 which mutually fit on thereto. Then, the cover 73 is inserted through the main axis 1 of the support member 10, followed by, after being inserted through the swinging member 30, the cover 72 is assembled to the cover 73. Then, by screwing in the screw 96 to the screw hole 16 of the main axis 13, the cover 72 and 73 are united with the main axis 13. As a result, the hexagonal cross section shaped main axis 13 fits into the hexagonal shaped through holes 42 and 42 of the wall members 40 and 41. As a result, the support member 10 and the wall members 40 and 41 swing in unison all the time.

[0051] The return spring 70 is a coil spring formed by winding a long dimensioned linear spring material in a spiral shape. Then, as illustrated in figure 26, the return spring 70 is fitted on to a cylindrical shaped nut 75 welded to one terminal surface of the main axis 13. In addition, by screwing screw 77 into nut 75 via the seat metal 76, the release of the return spring 70 from not 75 is prevented. Next, the return spring 70 while having one terminal means 70a thereof locked to the support member 10, the other terminal means 70b of the return spring 70 is locked to the swinging member main body 31. As a result, the twisting moment of the springing force of the return spring 70 acts on the swinging member 30 all the time. Now, the axial center of said nut 75 is positioned on the same line as the axial center of said main axis 13.

[0052] The sliding mechanism 80, as illustrated in figure 24, is configured from the first movable ring member 82, the second movable ring member 83, the third movable ring member 84, and the sliding member 85 supported on the guide groove 32 of the swinging member main body 31 in a slidably displaceable manner.

[0053] The first movable ring member 82 has a shape which is bent into a substantially C shape. Then, the first movable ring member 82 has one terminal means connected in a swingable manner via the closure member 90 to cover 72, as well as the other terminal means being connected in a swingable manner via the closure member 91 to the intermediate means of the second ring member 83.

The second movable ring member 83 has a playing card shape. Then, the second movable ring member 83 has one terminal means connected in a swingable manner via the spacer 88 and the closure means 92 two the closure hole 33 of the swinging member main body 31, and the other terminal means is connected in a swingable manner via the closure means 93 to one terminal means of the third movable ring member 84. The third movable ring member 84 is art shaped, and the other terminal means thereof is connected in a swingable manner by the closure means 94 to the slide member 85. In particular, that closure means 94 penetrates through the slide member 85, in addition to, being slidably displaced along the guide groove 32 of the swinging member main body 31.

[0054] The slidable member 85 has a cross-section shape which enables sitting astride the swinging member main body, and the attachment means 85a extends to both side directions from the lower terminal edge means of those sides. Then, the slider member 85 is assembled so as to sandwich the swinging member main body 31, and is assembled in a slidably displaceable manner to the swinging member main body 31 via a pair of closure members 94 and 95.

Now, in this embodiment, an explanation was provided in relation to the situation where there was a swingable connection by means of a closure member, but other connection means are possible, not limited to closure means, for example, may be fixed using a bolt and nut. Moreover, it goes without saying that there may be use of both the closure member and other connection means at the same time.

[0055] The fourth embodiment of the angle adjustment tool 8 of the present invention, as illustrated in figures 39 and 40, is almost the same as the third embodiment, and the point of difference is that it is configured in linear symmetry with respect to the third embodiment. For that reason, the same reference numerals are applied to the same parts as in the third embodiment and the further explanation thereof is dispensed with here.

[0056] The method of use of the angle adjustment tool 8 of this embodiment, as illustrated in figures 29 to 38, is displaced in almost the same manner as the earlier described embodiment 1.

For example, when the armrest means 7 incorporating the angle adjustment tool 8 of the third embodiment is swung to the erect direction (direction A) and to the inclined direction (direction B), the swinging member 30 swings with respect to the support member 10. For that reason, just as in embodiment 1, as illustrated in figure 9, the floating wedge member 60 is deformed by the wedge-shaped window means 43 of the wall members 40 and 41. Then, the first, second and third movable ring members 82, 83 and 84 of the sliding mechanism are driven in correspondence with the swinging operation of the swinging member 30. As a result, the sliding member 85 is returnably displaced along the swinging member main body 31 in tandem with the swinging of the swinging member 30. Therefore, because the armrest means 7 incorporating the swinging member 30 is return of the displaced along the swinging member main body 31,

slackened creases are not generated in the upholstery covering the armrest means 7. As a result, the usage feeling thereof is good, and there is the benefit that a sofa is enabled with a high designability.

Because the rest is the same as in the earlier described embodiment 1, the same reference numerals are applied to the same parts and the description thereof is dispensed with here.

[0057] In the third and fourth embodiments, the first movable ring member 82 is arc shaped, and the distance between the fulcrum points of the fulcrum of swinging located in both termini is short, for this reason, an angle adjustment tool 8 may be derived with a short displacement distance of the sliding member 85. As a result, there is the benefit that the provision of an angle adjustment tool with different displacement distances in correspondence with the rest means where it is adapted is enabled.

[0058] In the earlier described embodiment, as illustrated in figures 10 and 34, the surface intersected by the axial center of the horizontal part of the support member 10, and the surface intersected by the axial center of the swinging member 30 are located on the same surface. For this reason, even when the angle adjustment tool 8 employees a L shaped support member 10, the height dimension Z of the swinging member 30 is small. As a result, the required attachment dimensions in order to attach the swinging member main body 31 of the present embodiment to the headrest means 5 or the armrest means 7 are smaller. Therefore, there is the benefit that the headrest means 5 or the armrest means 7 and the like incorporating the angle adjustment tool 8 of the present invention may be made thinner.

[0059] In the earlier described embodiments, an explanation was provided in relation to an angle adjustment tool enabling adjustment of the inclined angle by combining a floating wedge member and a gear member. However, there is no necessity to be limited to the earlier described embodiments, and the swinging operation of the swinging member is possible, while adapting another angle adjustment tool enabling maintenance of the desired inclined angle of the swinging member.

[0060] In the earlier described embodiments, an explanation was provided of the situation employing a bar member bent into a substantially L shape as the support member, but there is no necessity to be limited thereto, and a straight bar member may also be used.

Moreover, the support member is not limited to the situation where it is comprised of a bar material, and it may be formed by a plate shaped material with a substantially L shape or a straight card shaped plate type material.

In the earlier described embodiments, an explanation was provided of a situation wherein the support member is attached to the padding material of the sofa and the like via a tube shaped attachment tool, but it is not necessarily limited thereto, and it may be attached directly. For example, a male screw means may be formed in bar shaped support member, and the padding material of the sofa and the like may be attached directly via the seat metal, or nut. Moreover, it goes without saying that the support member comprised of sheet shaped material may be directly screwed to the padding material.

INDUSTRIAL UTILITY

[0061] The angle adjustment tool of the present invention may be adapted not only to the earlier described sofas, but may also be adapted to furniture such as chairs, and foldable beds. Moreover, it goes without saying that it may be adapted to not only headrest means, armrest means but also to footrest means.

REFERENCE NUMERALS

[0062]

1	sofa
3	seated surface means
4	back support means
5	headrest means (rest means)
6	footrest means (rest means)
7	armrest means (rest means)
8	angular adjustment tool
10	support member
11	narrow necked means
12	through hole
13	main axis
16	screw hole
20	attachment tool
30	swinging member
31	swinging member main member
32	guide groove
40	wall member
42	through hole
43	wedge-shaped window means
43a	wedge surface
43b	withdrawal space
43c	induction sloped surface
50	gear member
53	gear means
54	protrusion means for use in pushing down
55	protrusion means for use in pushing up
60	floating wedge member
61	contact surface
62	toothed surface
70	return spring
70a	one terminal means
70b	other terminal means
71	separation plate
72	cover
73	cover
80	sliding mechanism
81	fixed ring member
82	first movable ring member
83	second movable ring member
84	third movable ring member
85	sliding member

86 buffer member
A erect direction
B inclined direction
X axial center of the main axis (swinging axial center)
Y axial center of the main axis (swinging axial center)

Claims

1. An angle adjustment tool (8) comprised of a support member (10), and an assembled swinging member (30) enabling swinging via the main axis (13) fixed to one terminal means of said support member (10), **characterized by** being an angle adjustment tool (8) disposing the swinging surface of said support member (10) intersecting with the axial centers of the center axes (X and Y) of said main axis (13), and the swinging surface of said swinging member (30) intersecting with an axial center (X, Y) of the main axis (13), possibly provided by axial centers (X and Y) which might be disposed in parallel, preferably providing a specific gap there between, and not only enabling swinging to the upright direction (Direction A) of said swinging member (30), but also regulating the swinging to the inclined direction (Direction B) of said swinging member (30), in addition to enabling the holding thereof at the desired inclined angle, in a configuration providing a sliding mechanism (80) having a sliding member (85) returnably displaced along said swinging member (30), in correspondence with the swung angle of said swinging member (30).

2. The angle adjustment tool (8) claimed in claim 1 **characterized by** the disposition of the sliding mechanism (80) between said support member (10) and said swinging member (30).

3. The angle adjustment tool (8) claimed in claim 1 **characterized by** the disposition of the sliding mechanism (80) on the outer facing surface side of said swinging member (30).

4. The angle adjustment tool (8) claimed in any one of claims 1 ~ 3 **characterized by** said sliding mechanism (80) being comprised of said sliding member (85), and plural moveable ring members (82, 83, 84) driving said slide member (85).

5. The angle adjustment tool (8) claimed in any one of claims 1 ~ 4 **characterized by** said support member (10) being comprised of bar material bent into an L shape, in addition to enabling insertion in a detachable manner to a tube-shaped attachment tool.

6. A sofa (1) including the angle adjustment tool (8) claimed in any one of claims 1 ~ 5.

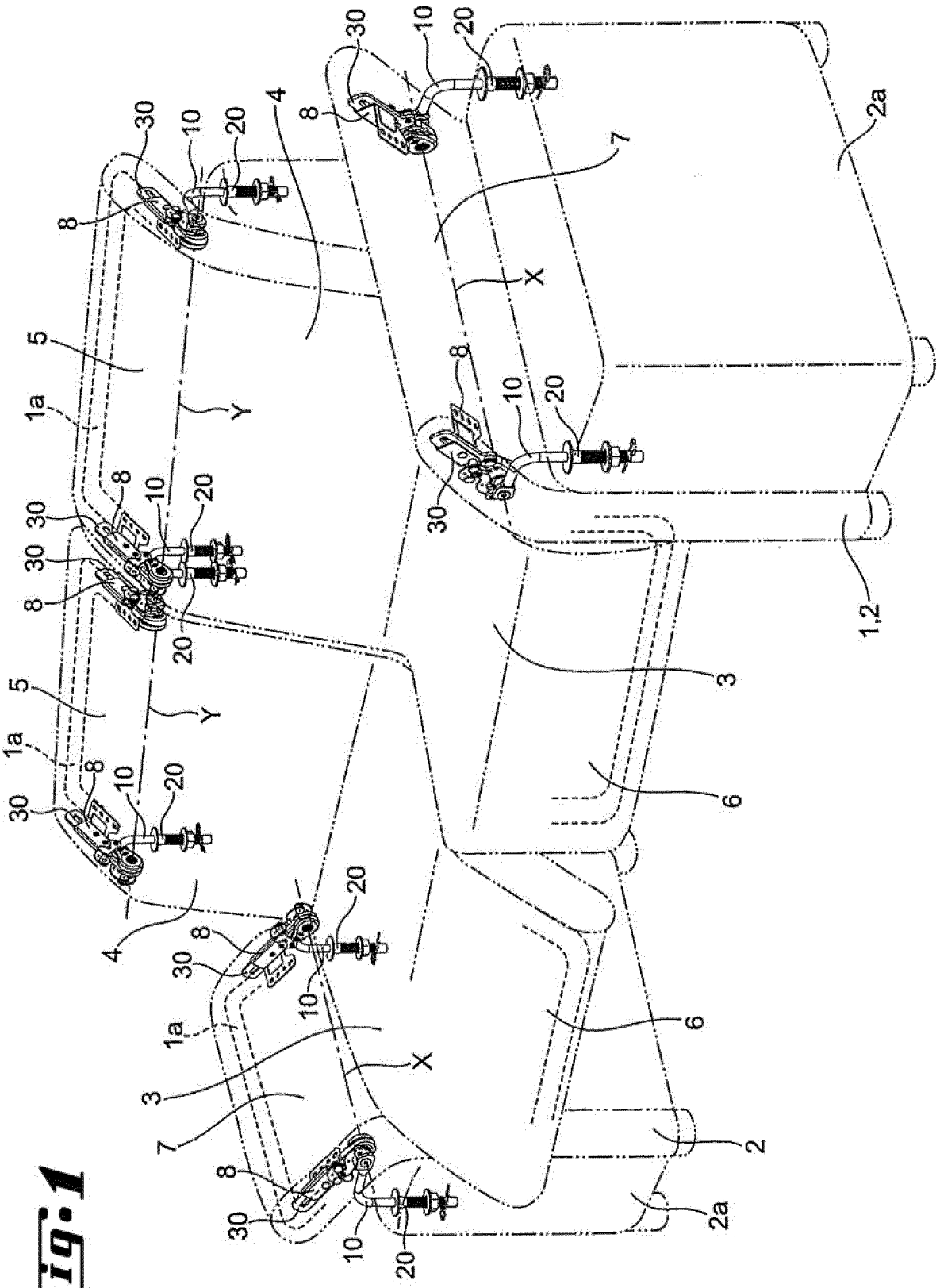


Fig:1

Fig: 2

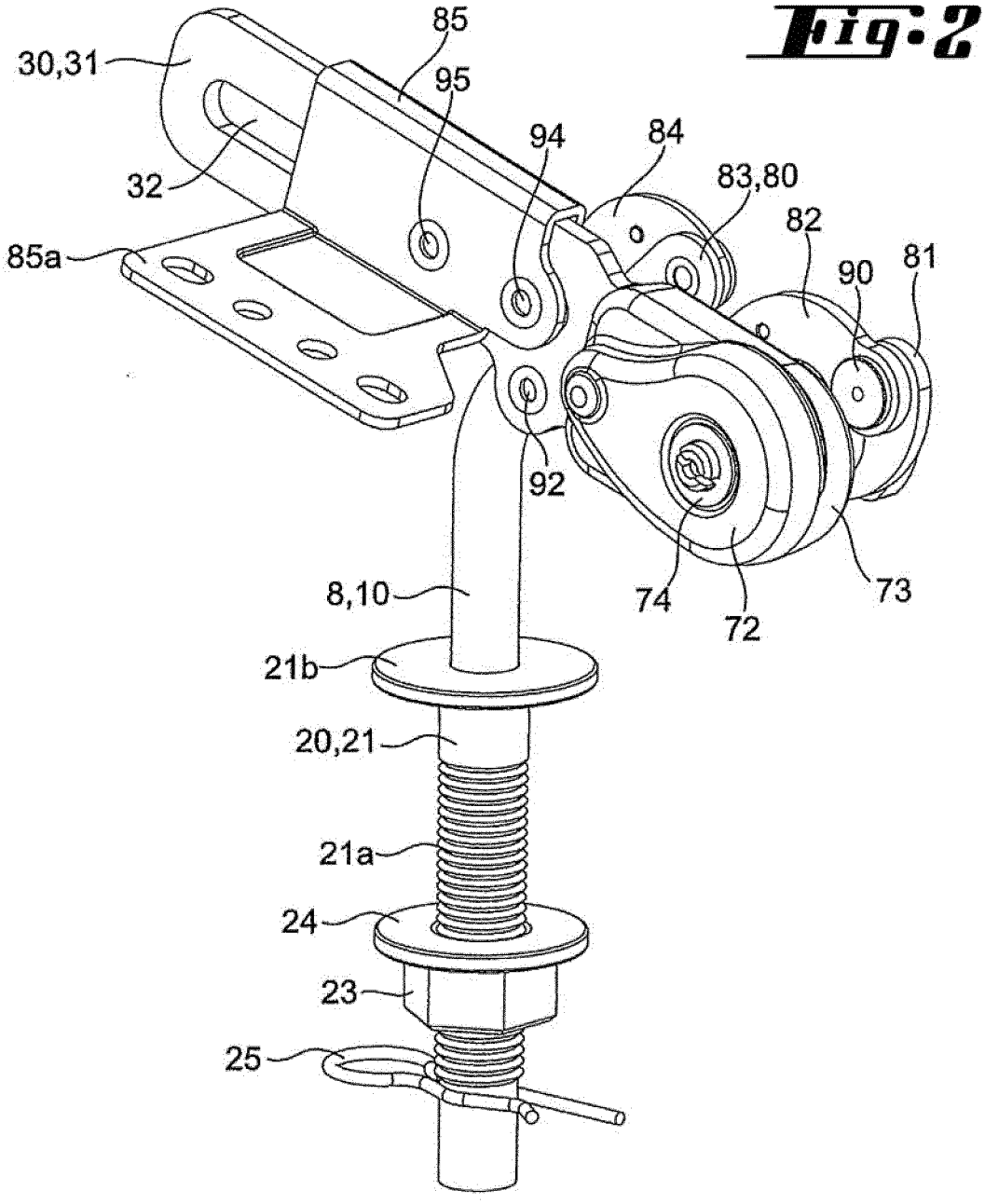
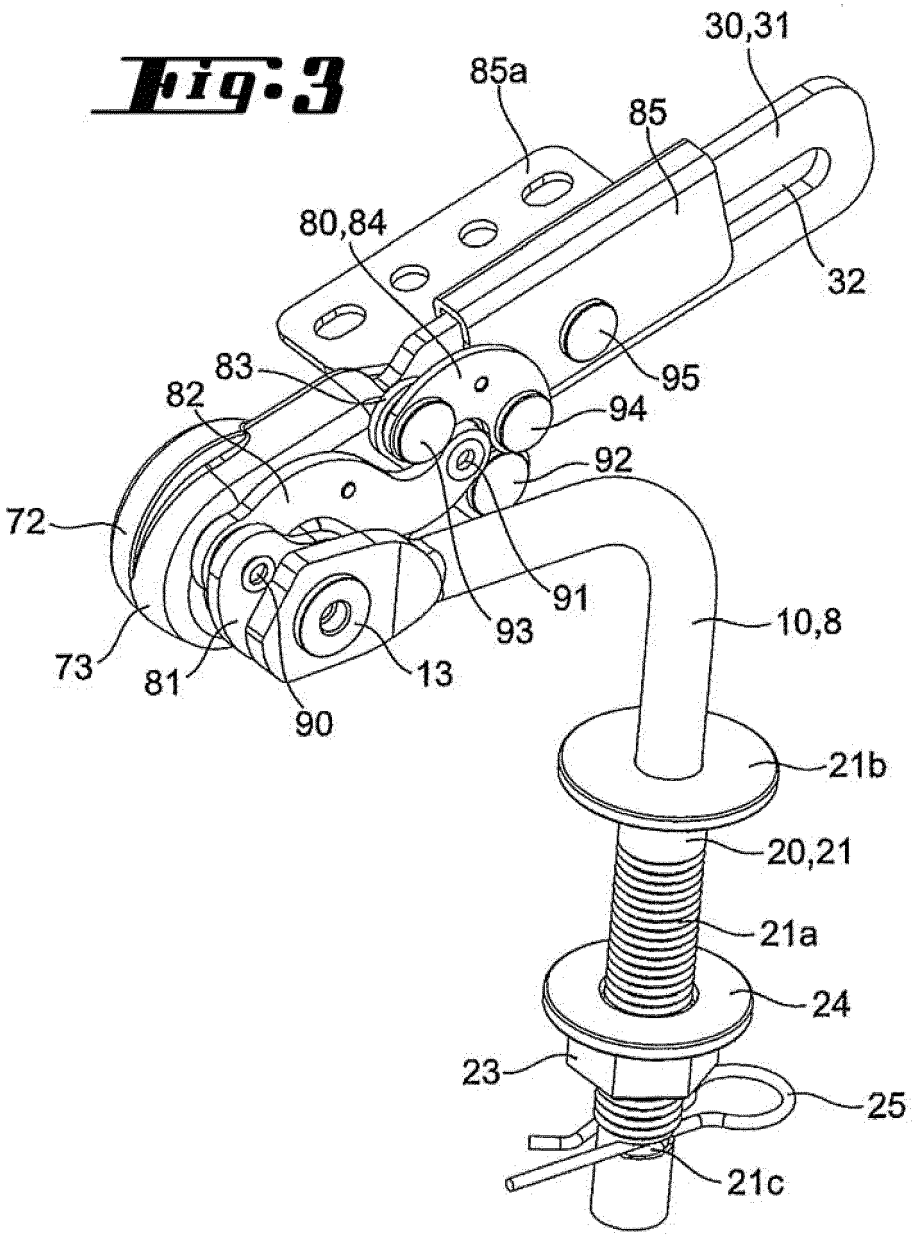

30,31
85
95
94
84
83,80
82
81
90
32
85a
92
8,10
74
72
73
21b
20,21
21a
24
23
25

Fig: 3


30,31
85a
85
80,84
32
83
82
95
94
92
72
91
10,8
93
73
81
13
90
21b
20,21
21a
24
23
25
21c

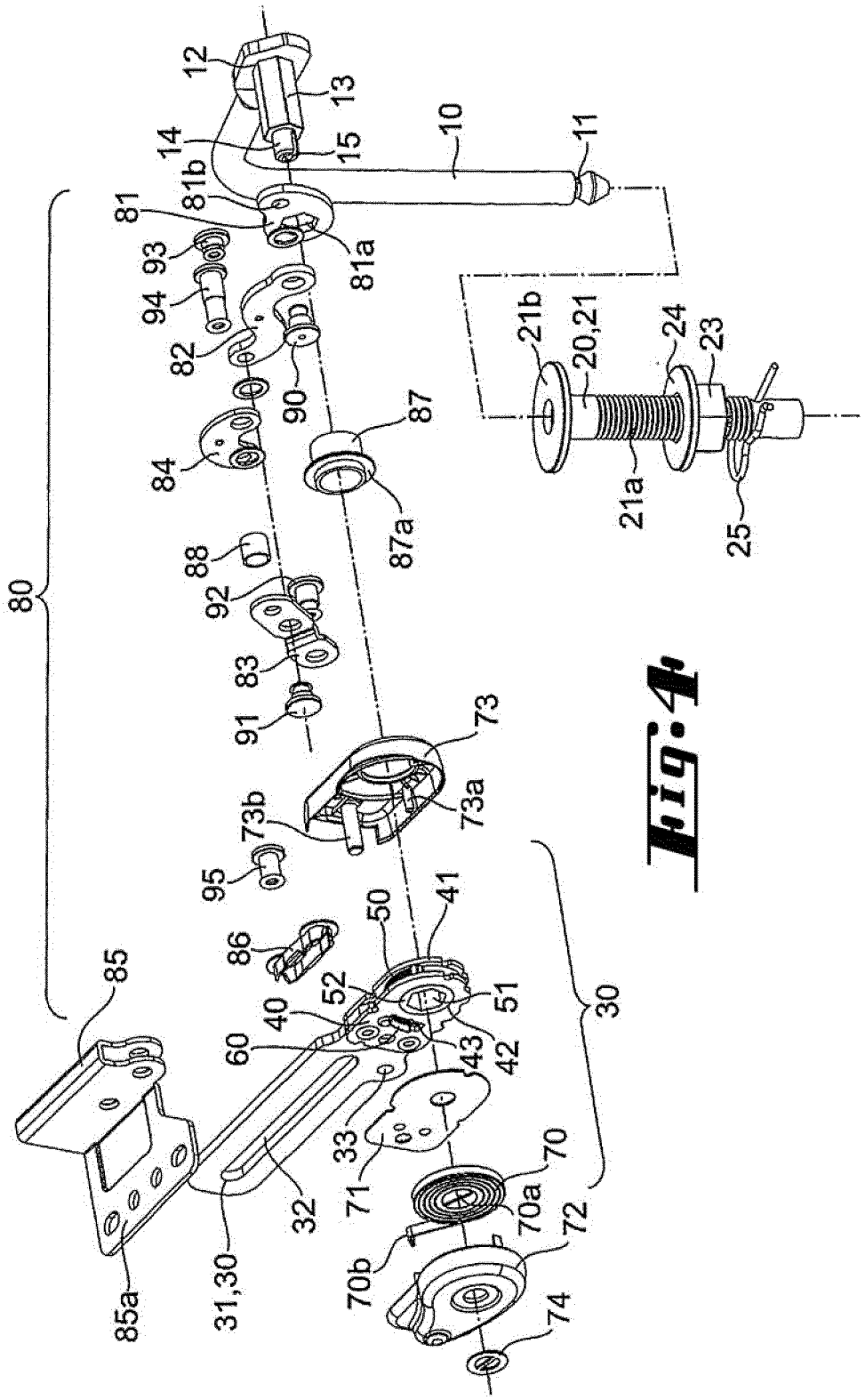

12
13
14
15
10
11
81
81b
81a
93
94
82
90
87
87a
84
88
92
83
91
80
73
73a
73b
95
41
50
86
52
51
40
60
43
42
33
71
70
70a
72
70b
74
32
31,30
85
85a
30
21b
20,21
24
23
21a
25

Fig.4

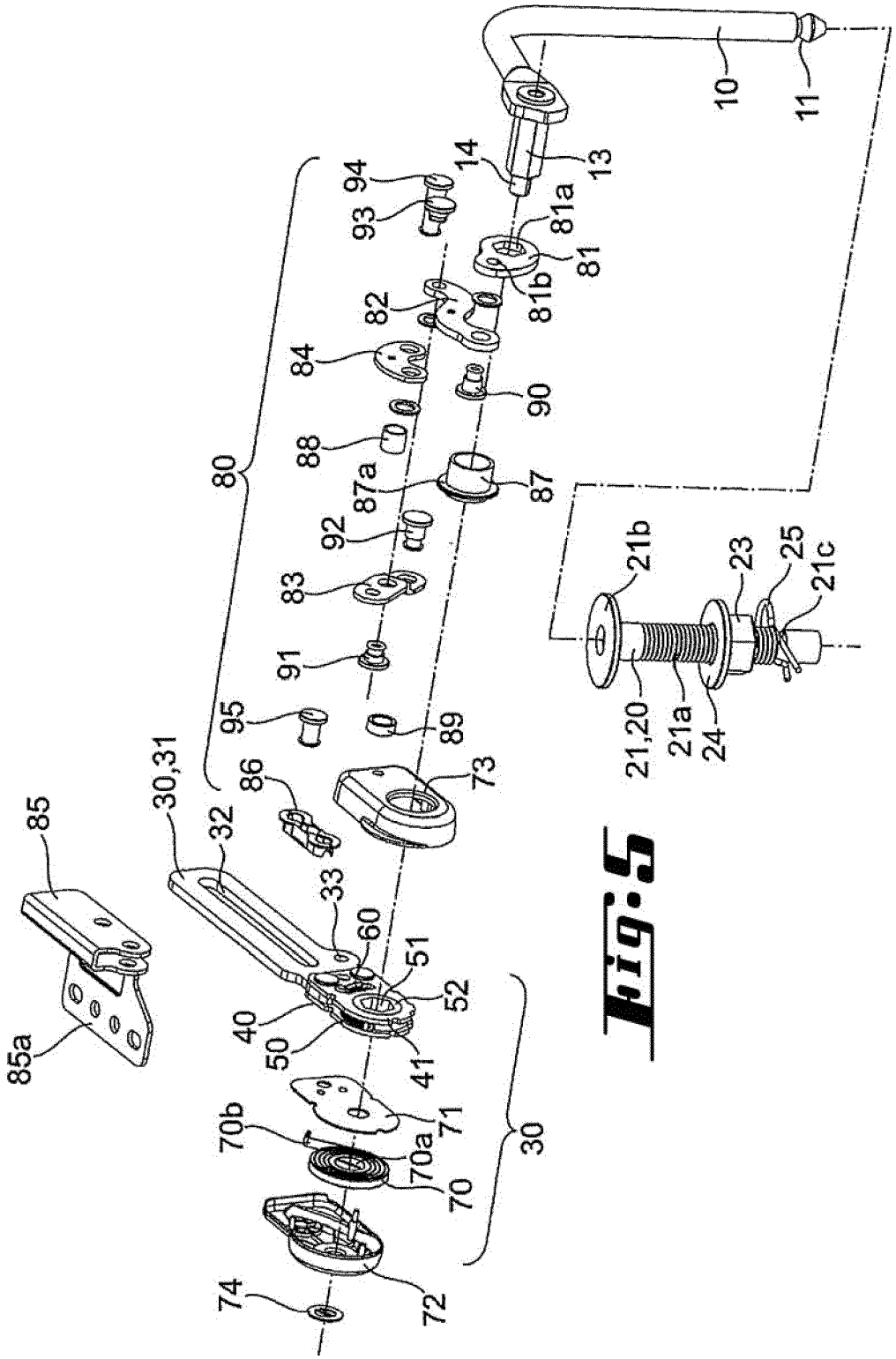
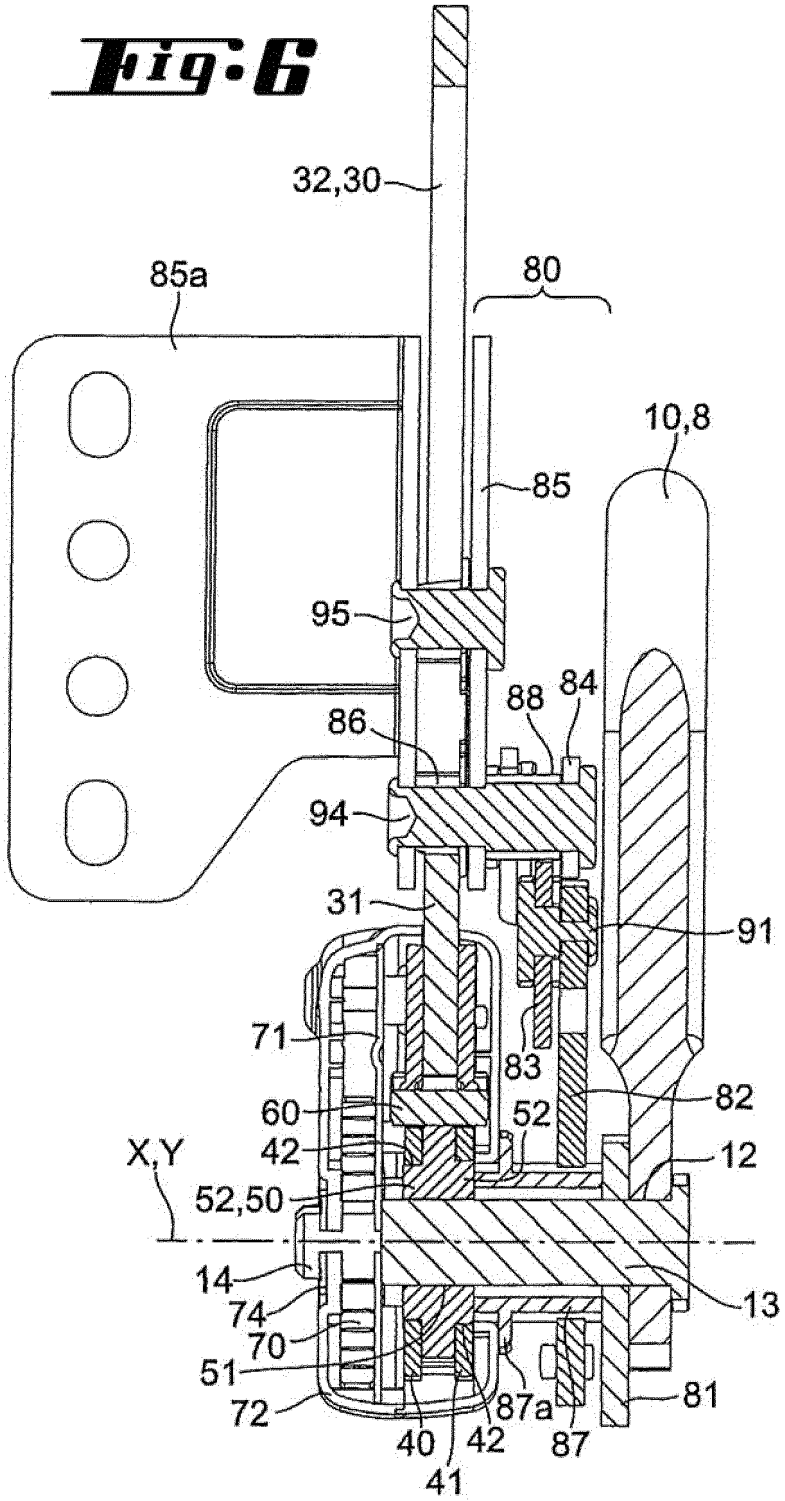

10
11
14
13
94
93
81a
81
81b
82
84
90
88
87a
87
80
92
83
91
95
89
30,31
86
73
32
85
33
60
51
52
40
50
41
85a
70b
71
70a
70
30
74
72
21b
23
25
21c
21,20
21a
24

Fig.5

Fig: 6


32,30
85a
80
10,8
85
95
88
84
86
94
31
91
71
83
82
60
52
X,Y
42
12
52,50
14
13
74
70
51
72
87a
81
40
42
87
41

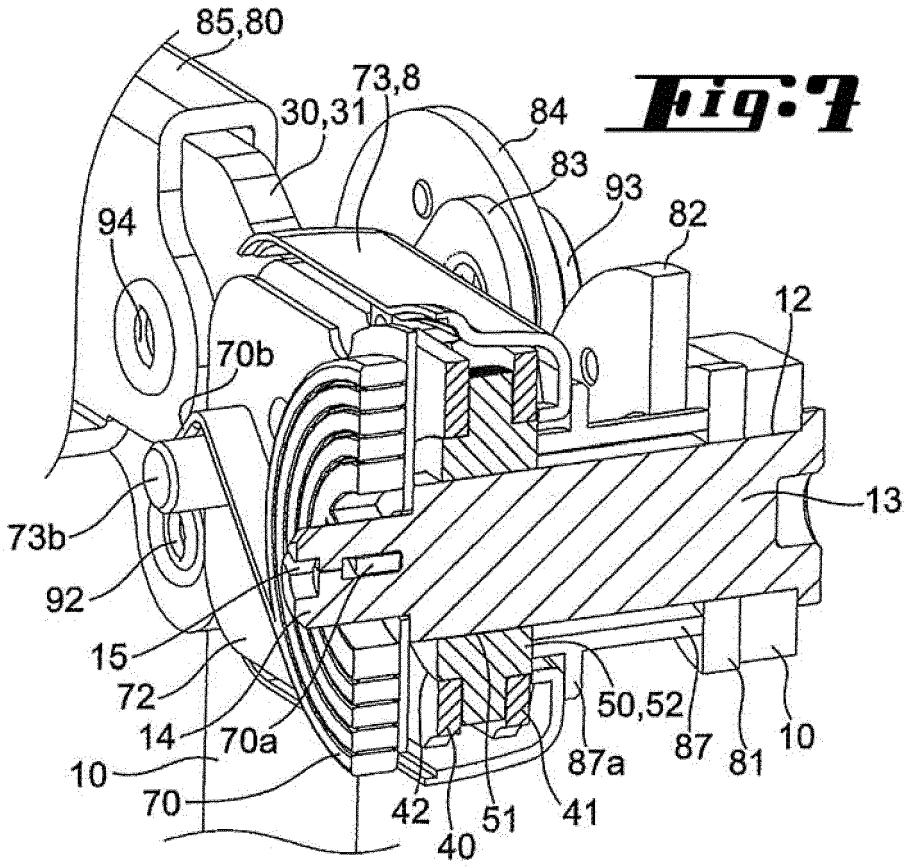

85,80
73,8
30,31
84
83
93
82
94
12
70b
13
73b
92
15
72
14
70a
10
70
42
40
51
41
87a
50,52
87
81
10

Fig: 7

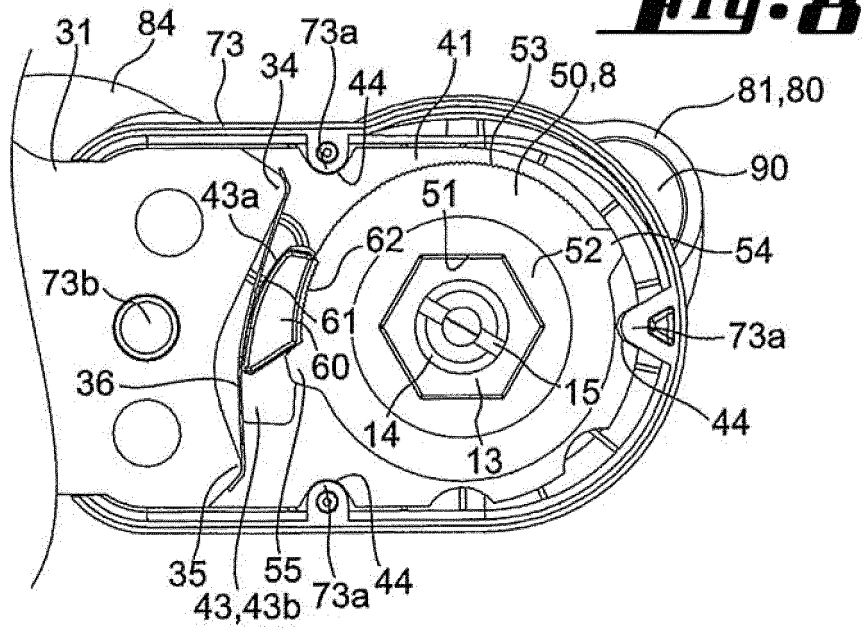

31
84
73
73a
34
44
41
53
50,8
81,80
90
43a
51
62
52
54
73b
61
73a
60
36
15
44
14
13
35
55
73a
44
43,43b

Fig: 8

Fig. 9

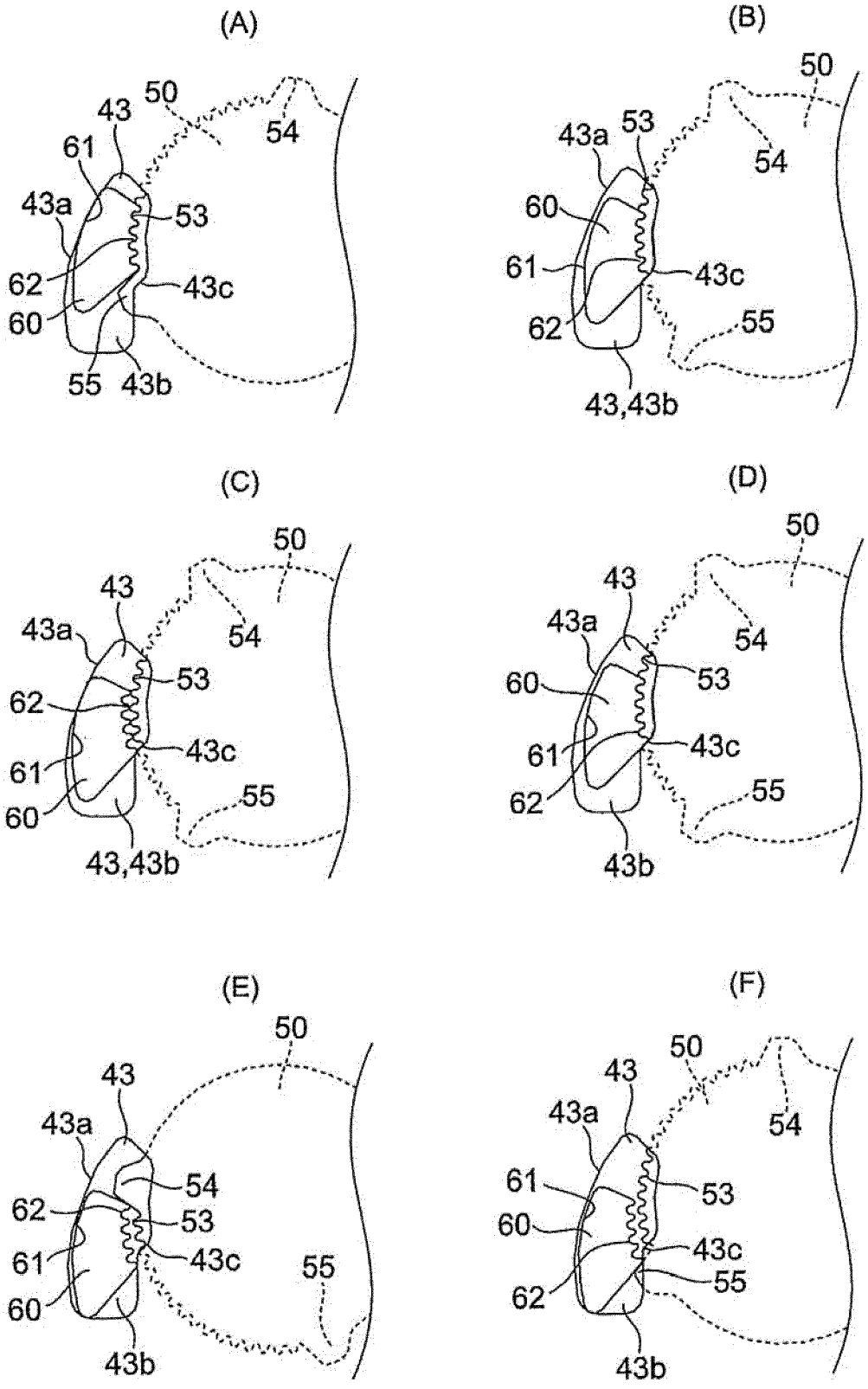

(A)
50
43
61
54
43a
53
62
43c
60
55
43b
(B)
50
43a
53
54
60
61
43c
62
55
43,43b
(C)
50
43
43a
54
53
62
43c
61
55
60
43,43b
(D)
50
43
43a
54
60
53
61
43c
62
55
43b
(E)
50
43
43a
54
62
53
61
43c
55
60
43b
(F)
50
43
43a
54
61
53
60
43c
55
62
43b

Fig. 10

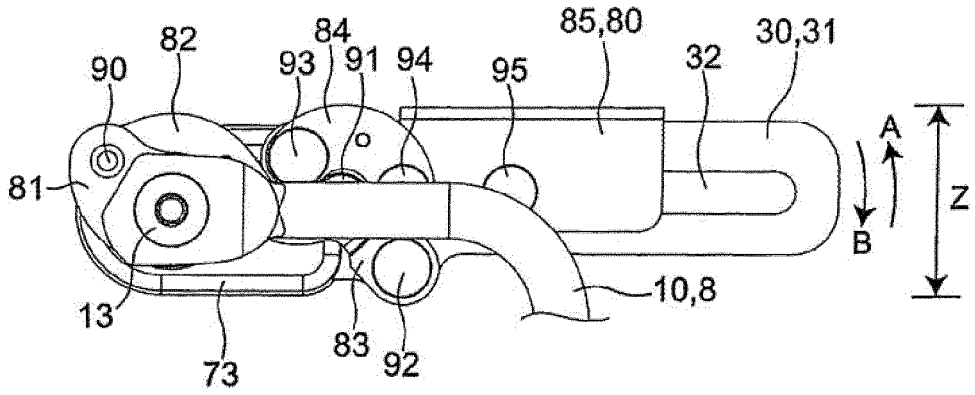


Fig. 11

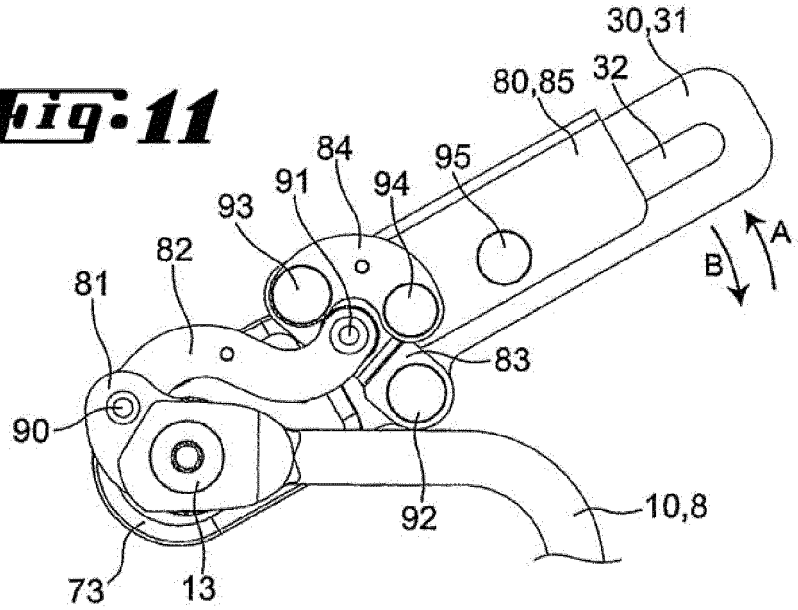
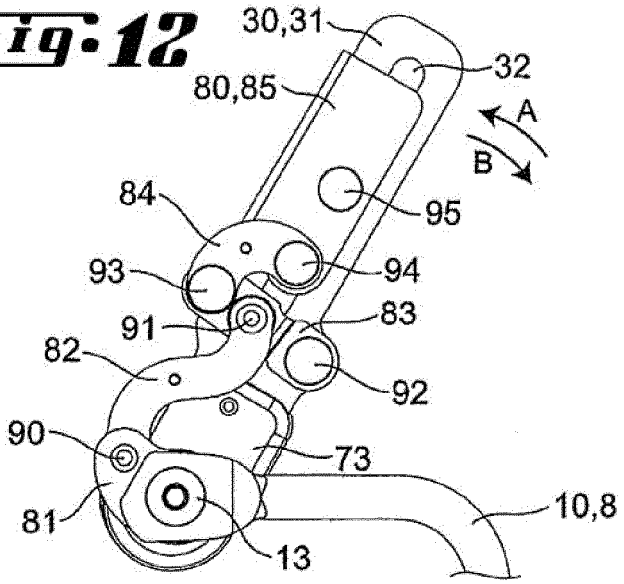


Fig. 12



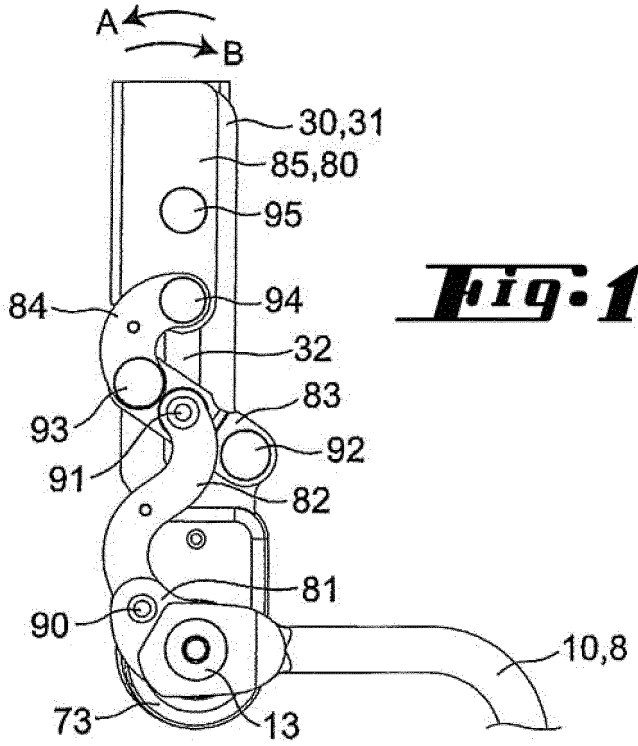

A
B
30,31
85,80
95
84
94
32
83
93
92
91
82
81
90
10,8
73
13

Fig: 13

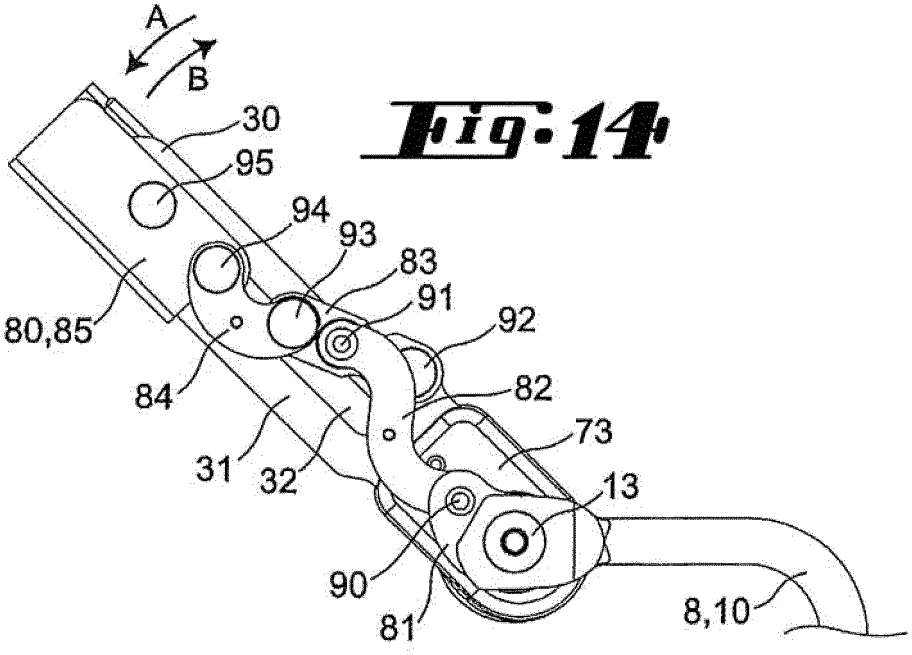

A
B
30
95
94
93
83
91
92
80,85
84
82
73
31
32
13
90
81
8,10

Fig: 14

Fig: 15

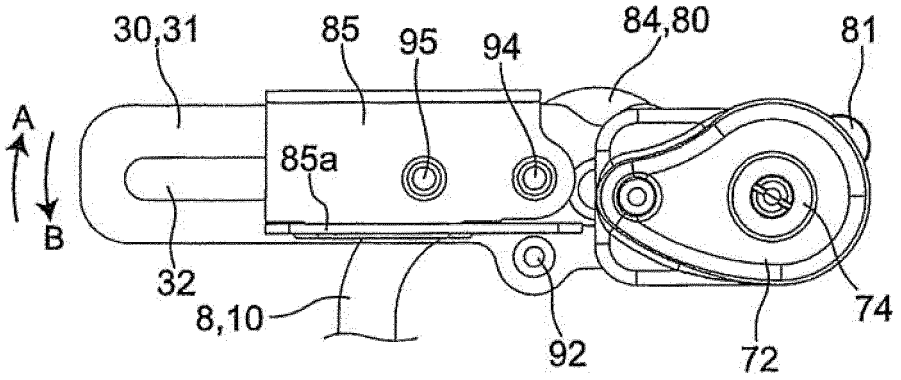

30,31
85
95
94
84,80
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A
B
85a
32
8,10
92
72
74

Fig: 16

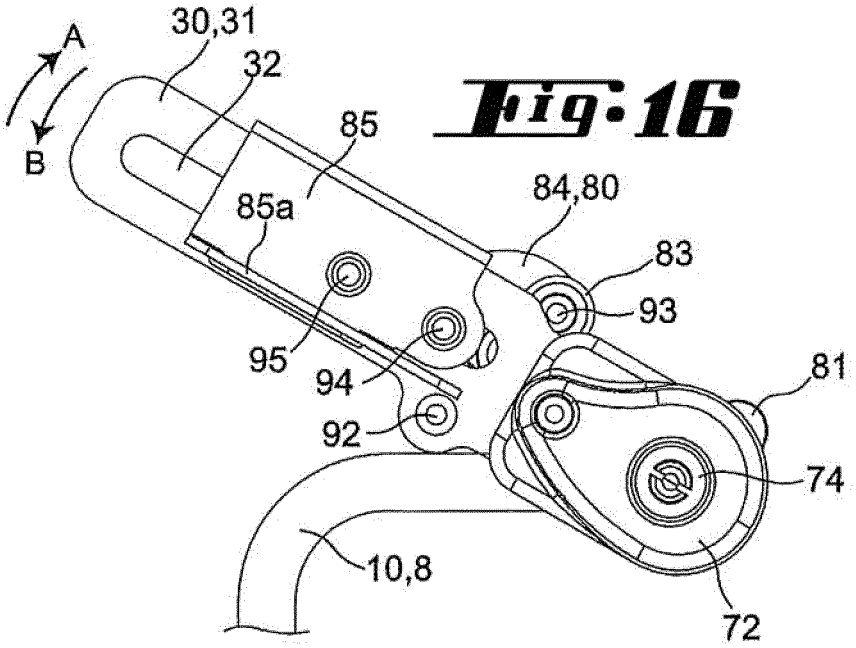

A
B
30,31
32
85
85a
84,80
83
93
95
94
92
81
74
10,8
72

Fig: 17

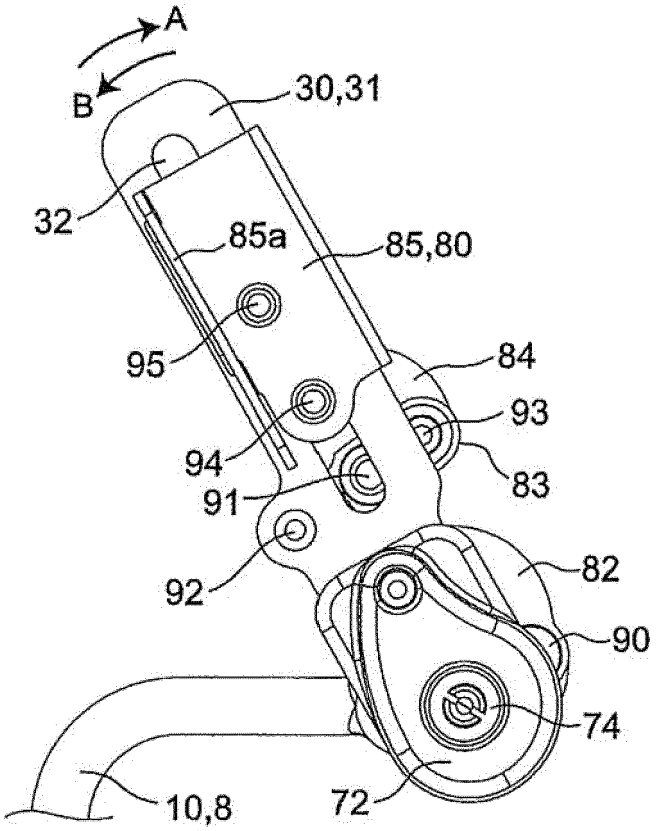

A
B
30,31
32
85a
85,80
95
84
93
94
83
91
92
82
90
74
10,8
72

Fig: 18

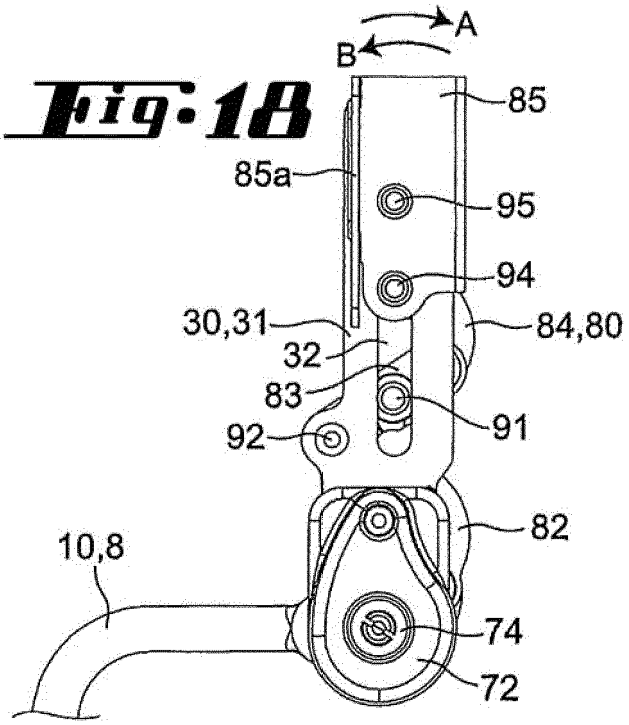

A
B
85
85a
95
94
30,31
84,80
32
83
91
92
82
10,8
74
72

Fig: 19

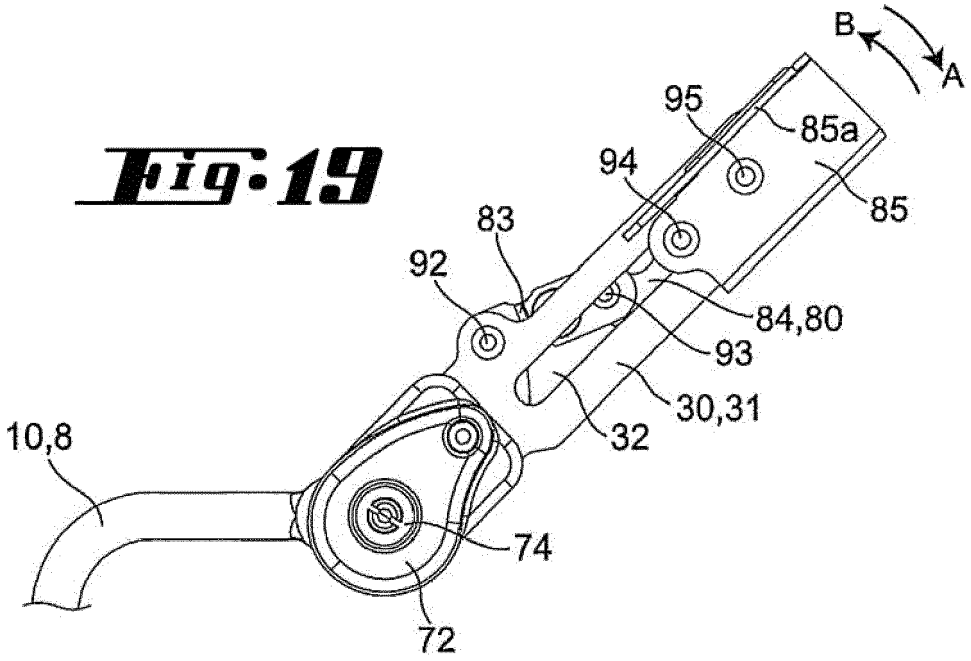

B
A
95
85a
94
85
83
92
84,80
93
30,31
32
10,8
74
72

Fig: 20

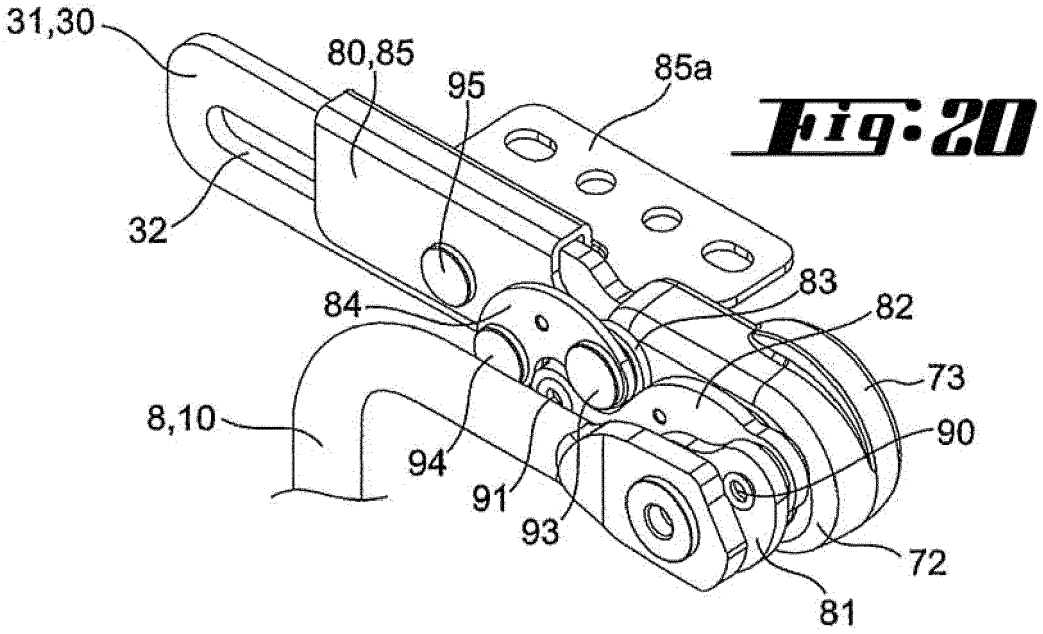
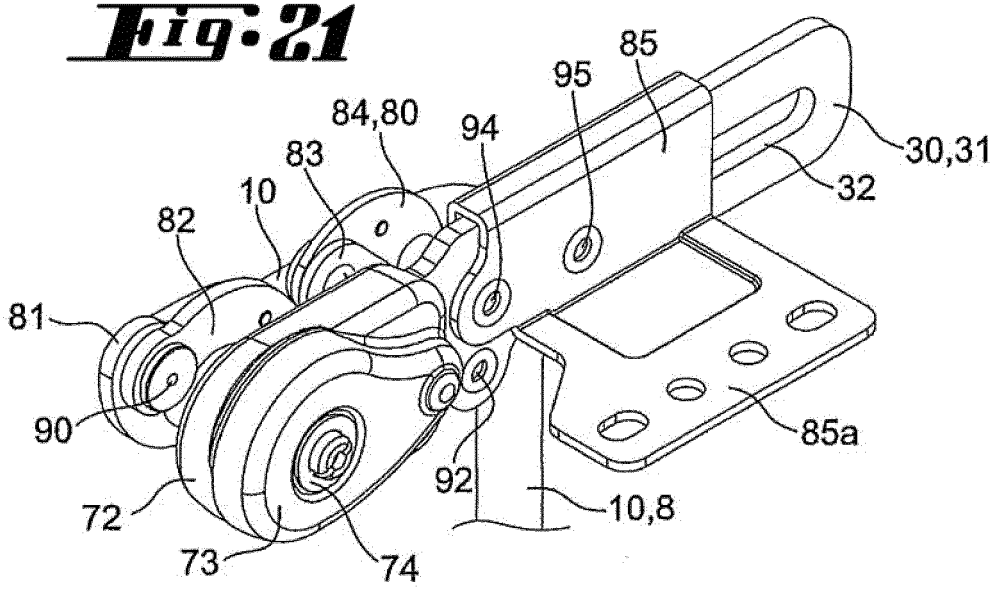

31,30
80,85
95
85a
32
84
83
82
73
8,10
90
94
91
93
72
81

Fig: 21


85
95
84,80
94
30,31
83
10
32
82
81
90
85a
92
10,8
72
73
74

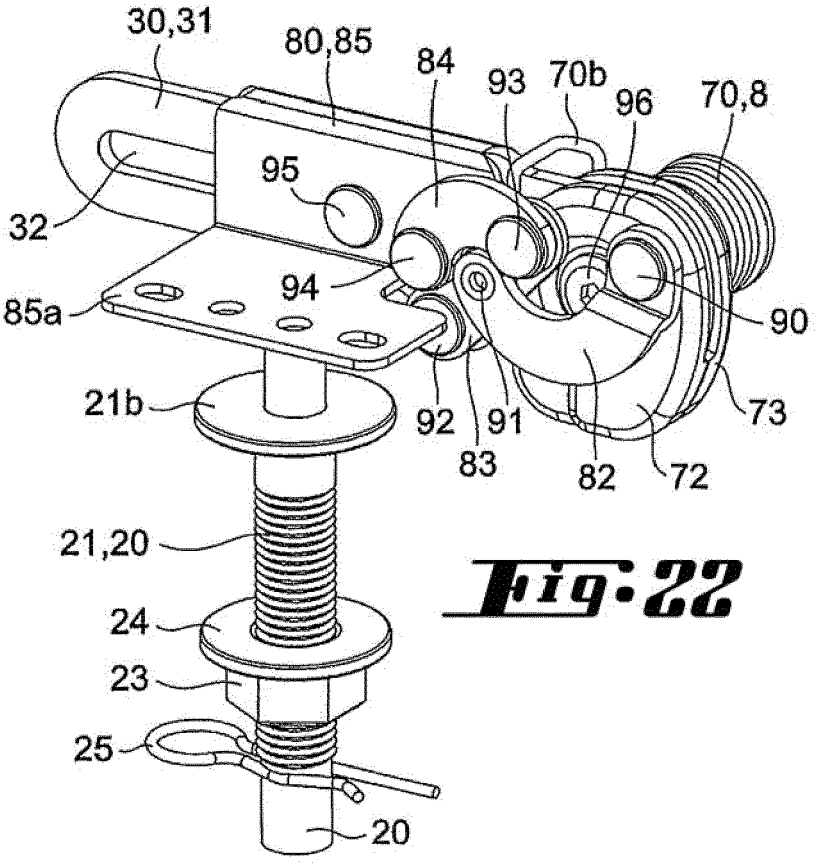
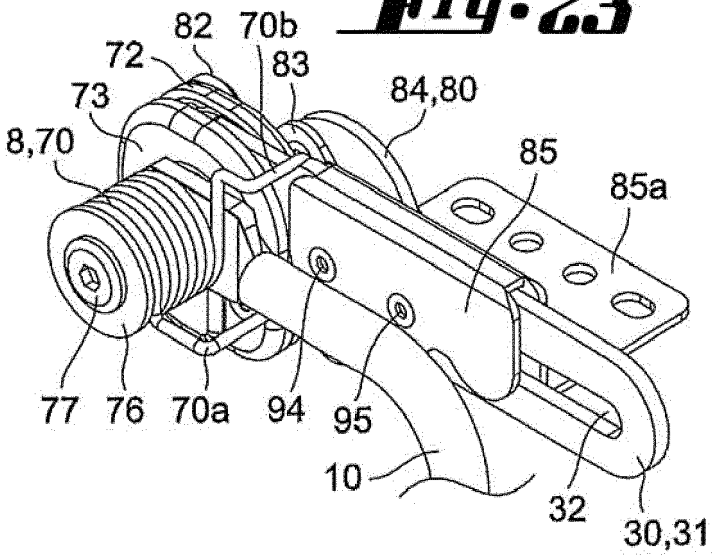

30,31
80,85
84
93
70b
96
70,8
95
32
94
85a
90
21b
92
91
73
83
82
72
21,20
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23
25
20

Fig: 22

Fig: 23



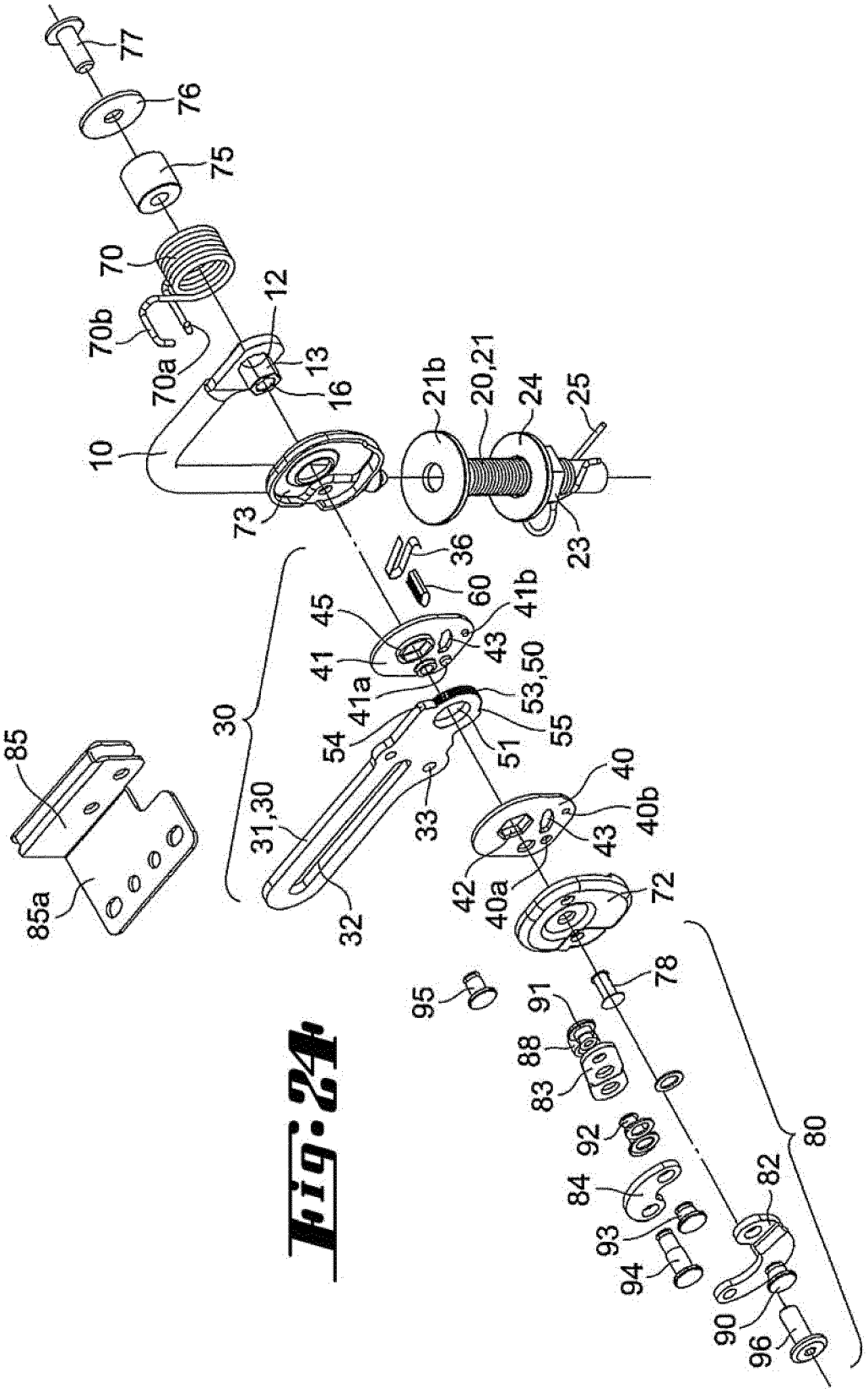

77
76
75
70
70b
70a
12
13
16
10
73
21b
20,21
24
25
23
36
60
45
41b
41
43
41a
53,50
54
55
51
30
31,30
33
32
85
85a
40
40b
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40a
72
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88
83
92
84
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94
82
80
90
96

Fig. 24

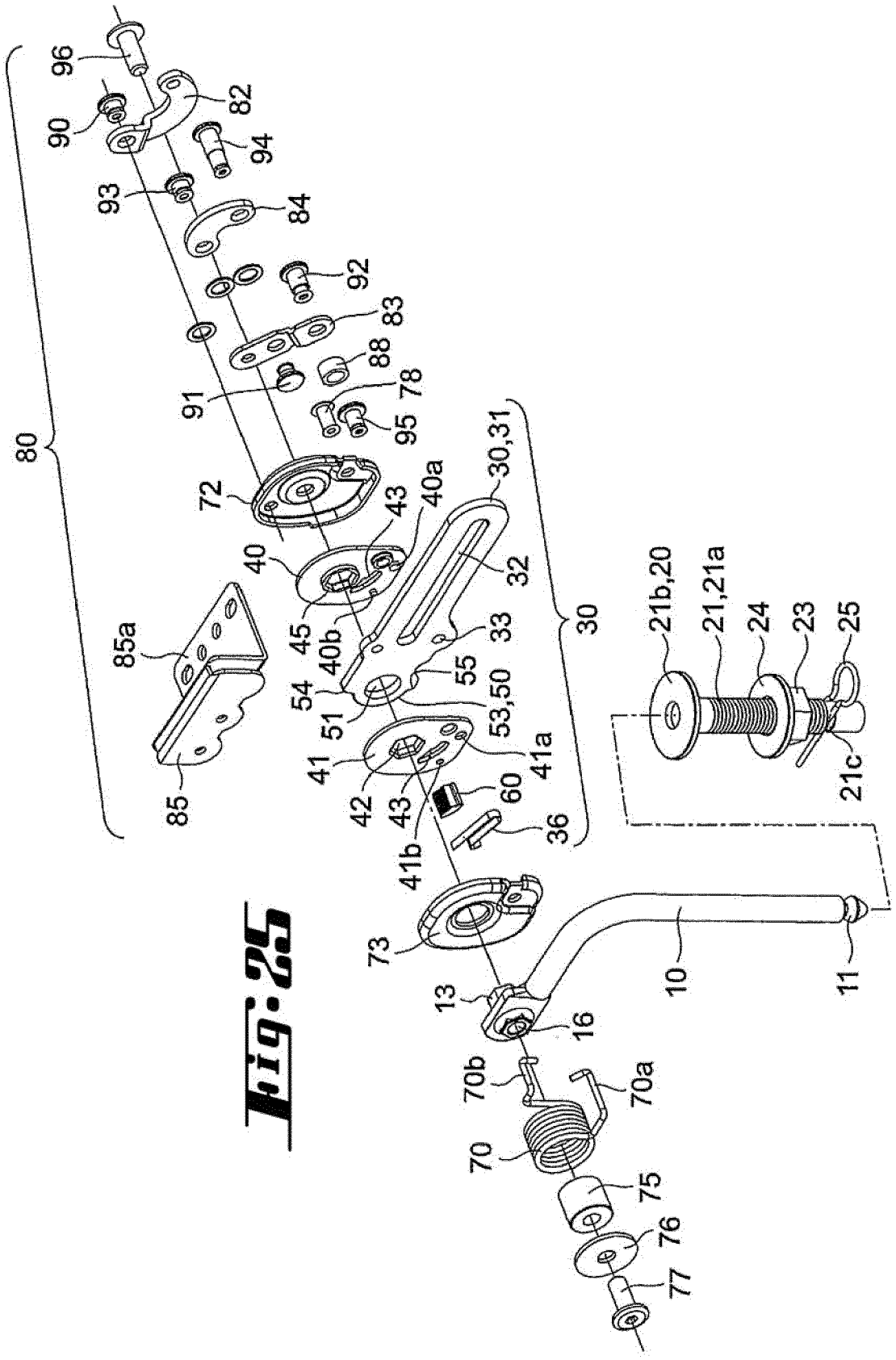

80
96
90
82
94
93
84
92
83
88
91
78
95
72
43
40a
30,31
40
32
45
40b
33
30
85a
54
55
51
53,50
41
41a
42
43
60
36
85
41b
21b,20
21,21a
24
23
25
21c
73
13
10
11
16
70b
70a
70
75
76
77

Fig: 25

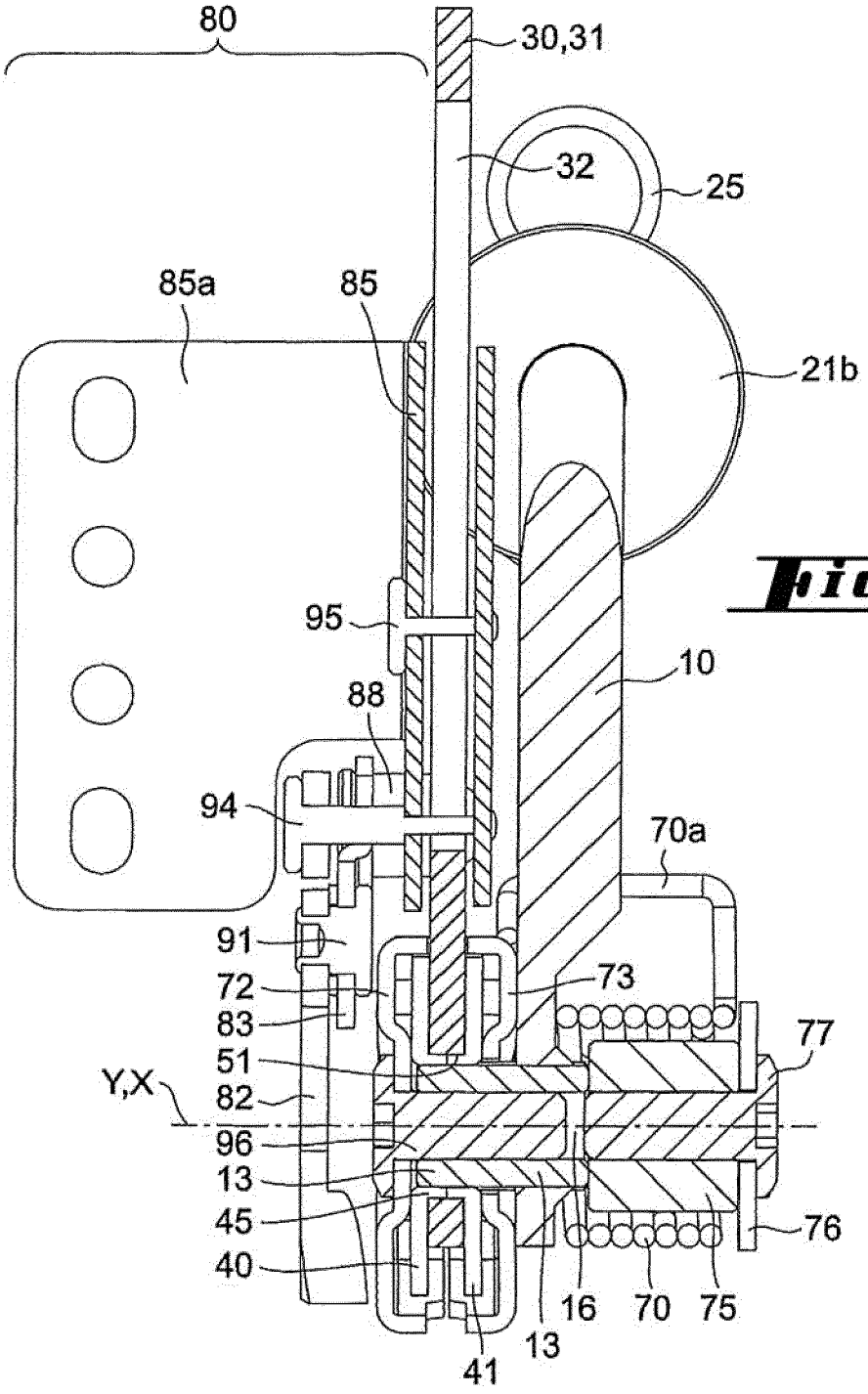

80
30,31
32
25
85a
85
21b
95
10
88
94
70a
91
72
73
83
77
51
Y,X
82
96
13
45
76
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75
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41

Fig: 26

Fig: 27

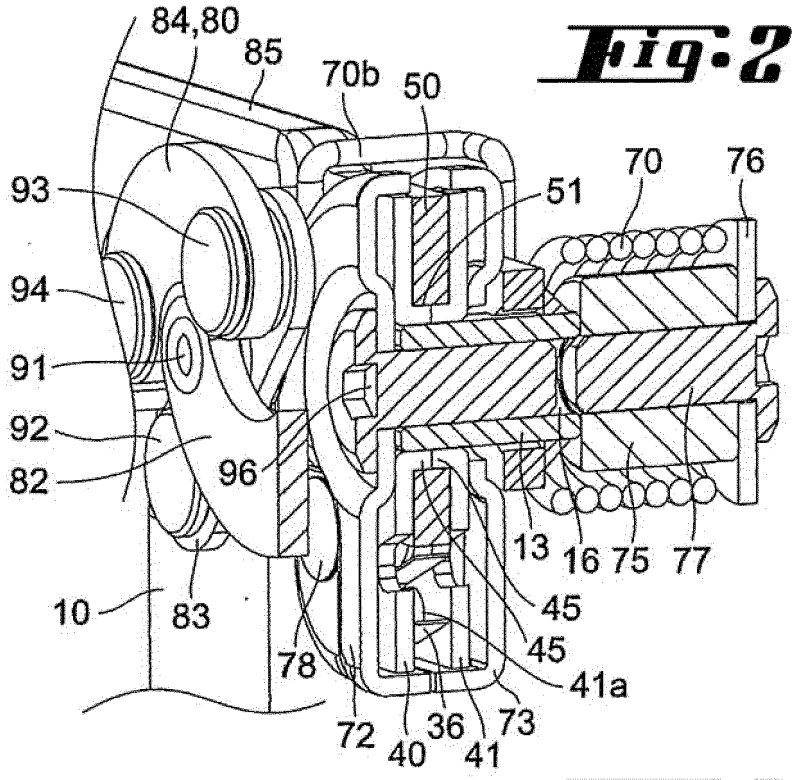

84,80
85
70b
50
70
76
93
51
94
91
92
82
96
13
16
75
77
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83
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45
78
41a
72
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36
41
73

Fig: 28

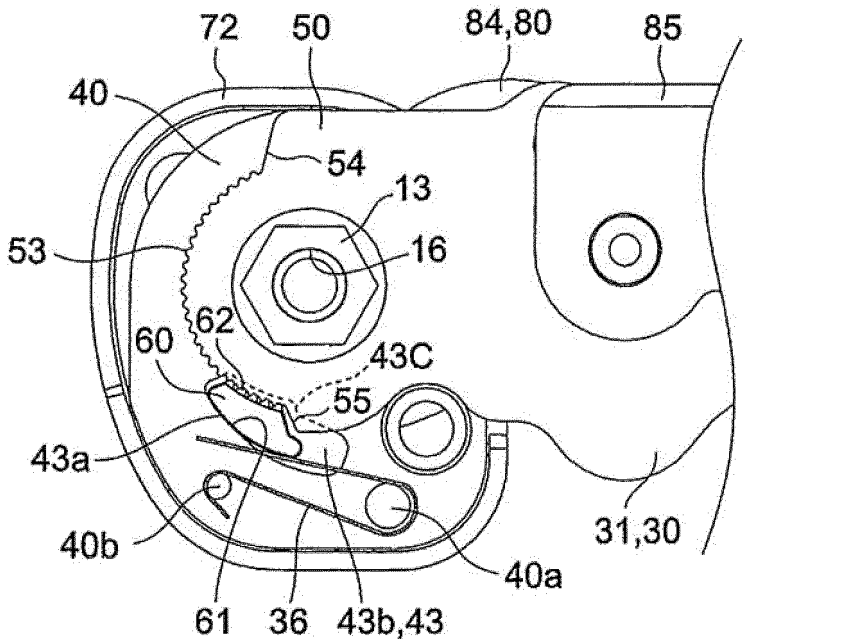

72
50
84,80
85
40
54
13
53
16
62
60
43C
55
43a
40b
31,30
40a
61
36
43b,43

Fig: 29

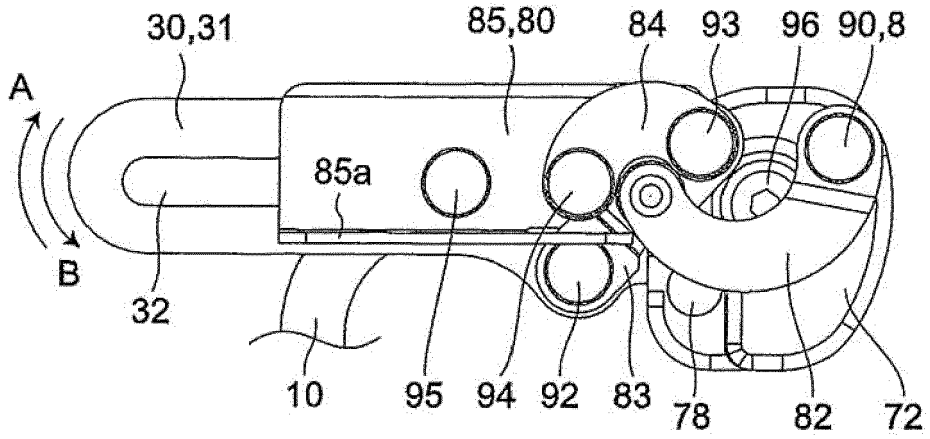

30,31
85,80
84
93
96
90,8
A
B
85a
32
10
95
94
92
83
78
82
72

Fig: 30

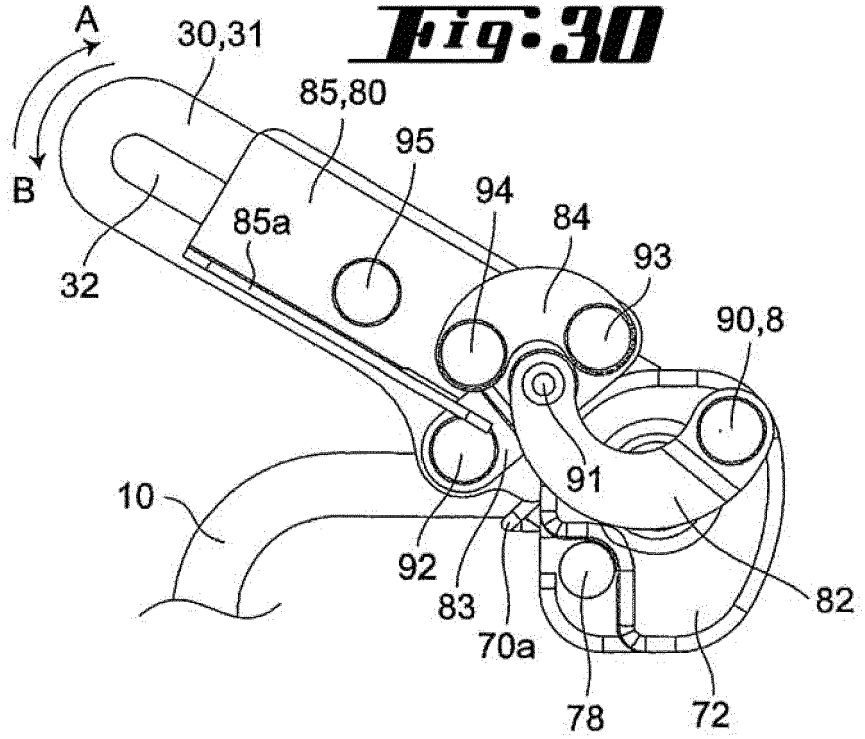

A
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Fig: 31

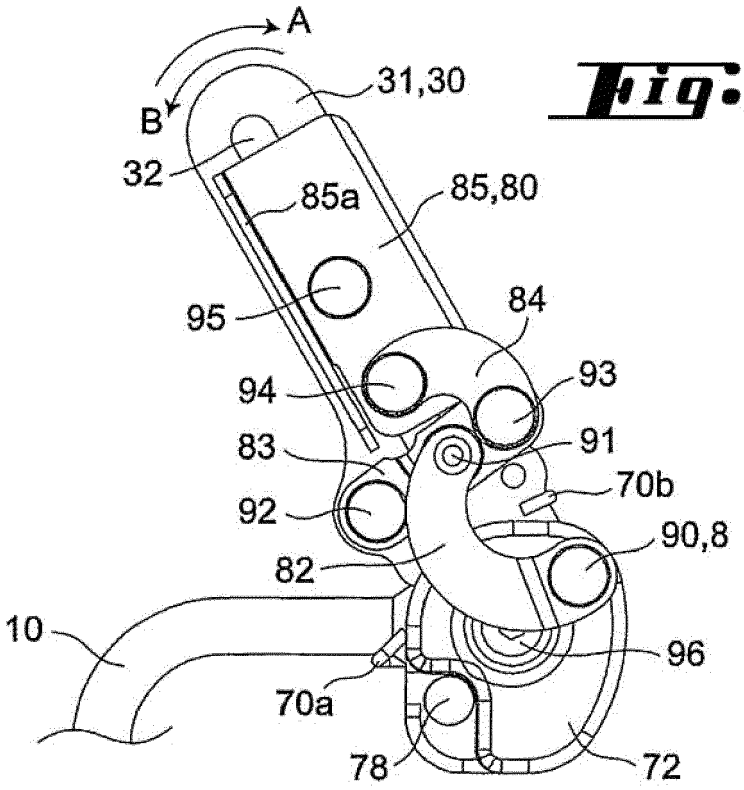

A
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85a
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Fig: 32

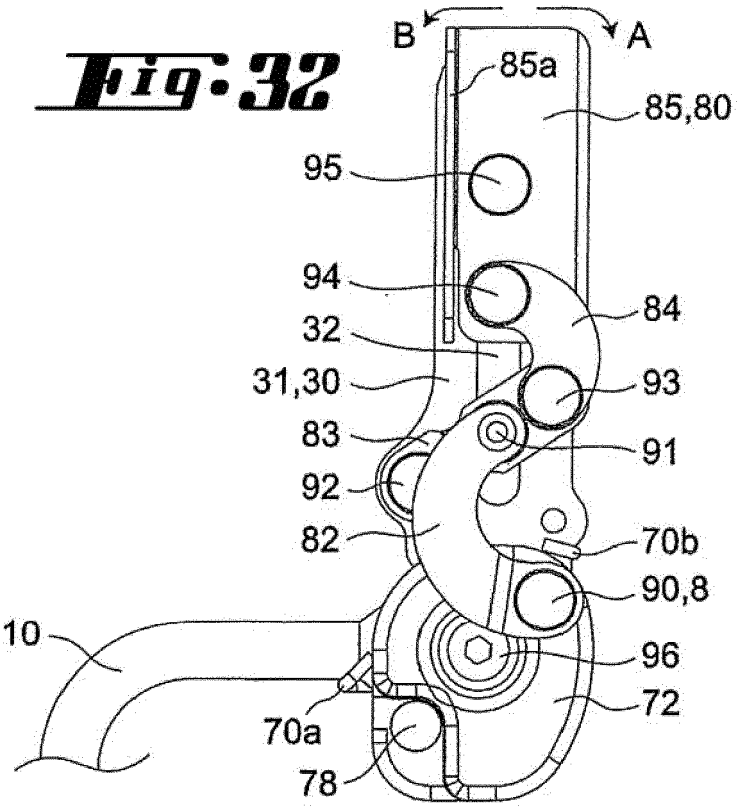

B
A
85a
85,80
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83
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70b
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70a
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Fig: 33

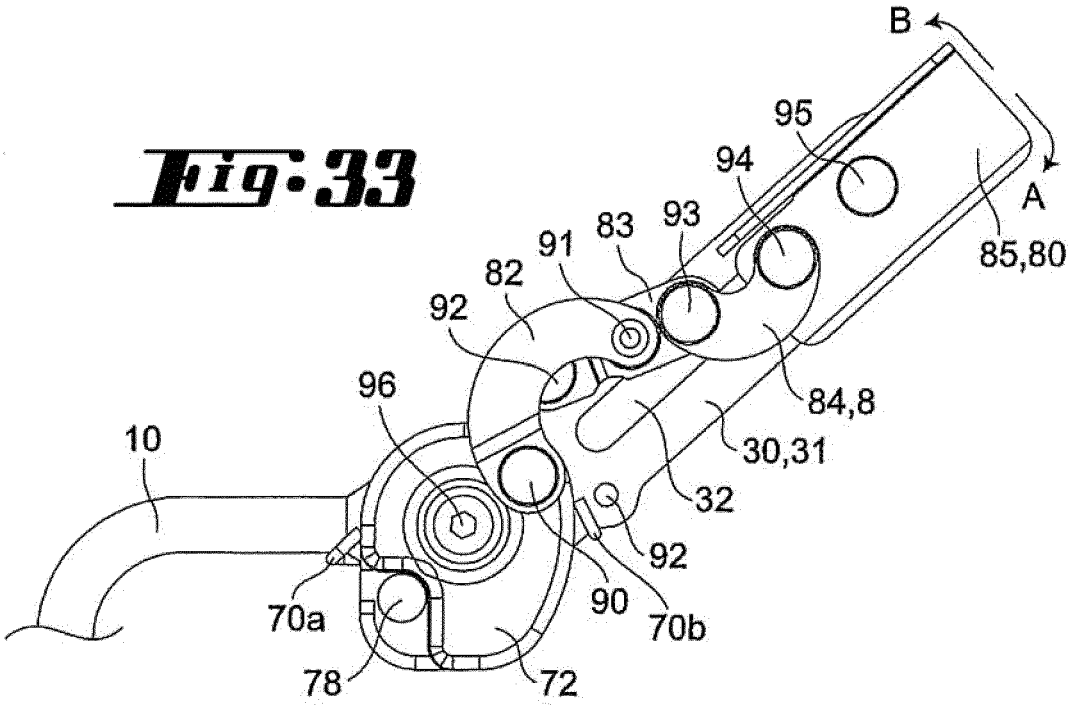

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A
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Fig: 34

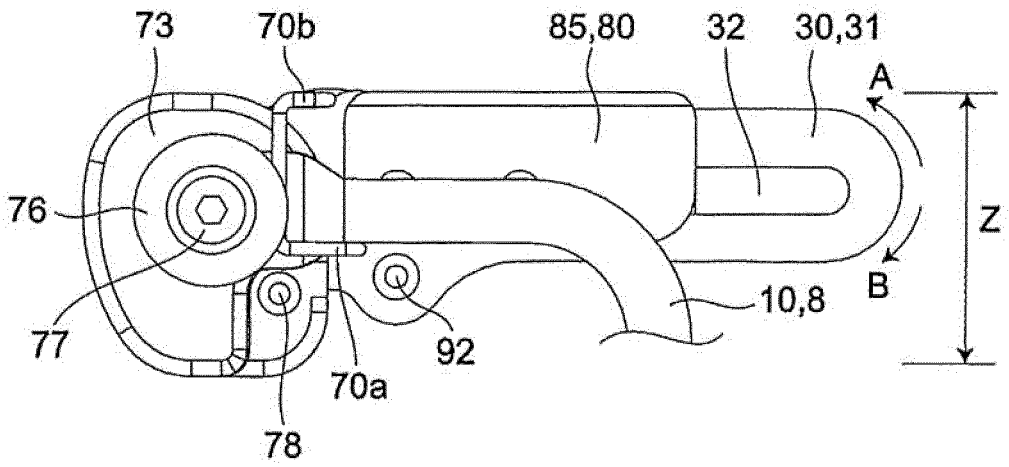

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70b
85,80
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30,31
A
76
Z
B
10,8
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70a
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Fig: 35

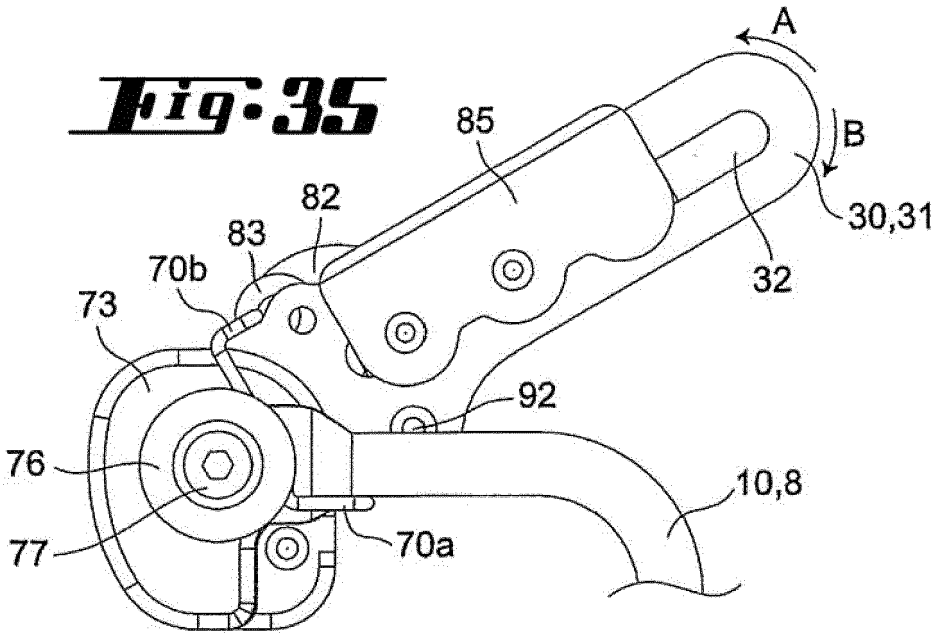
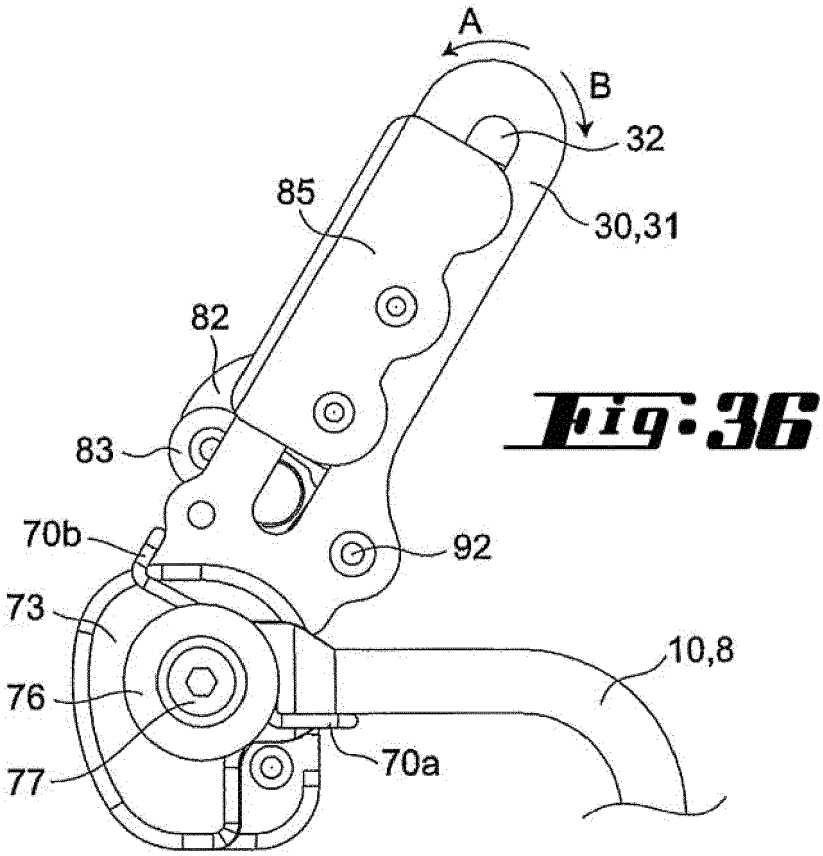

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70b
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Fig: 36


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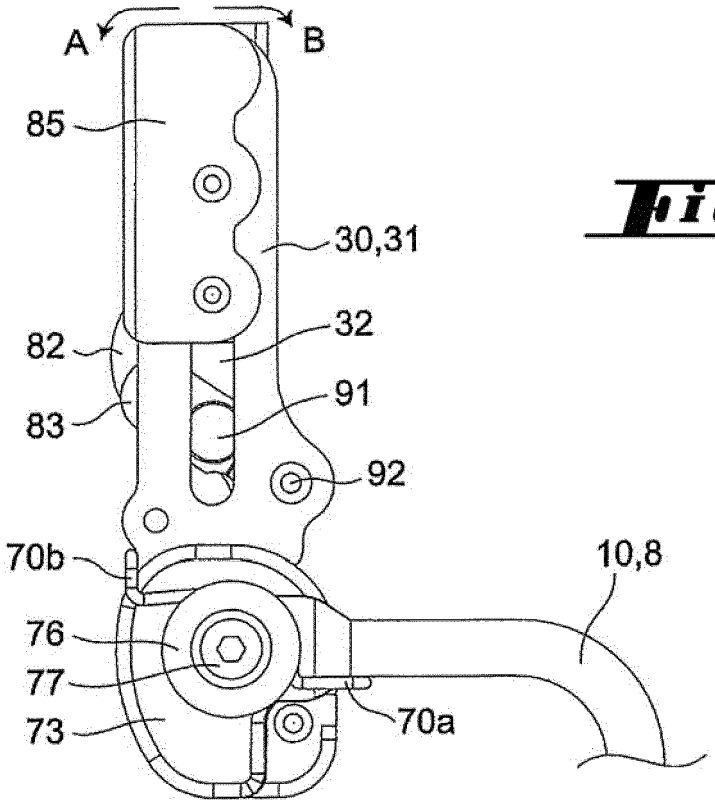

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Fig: 37

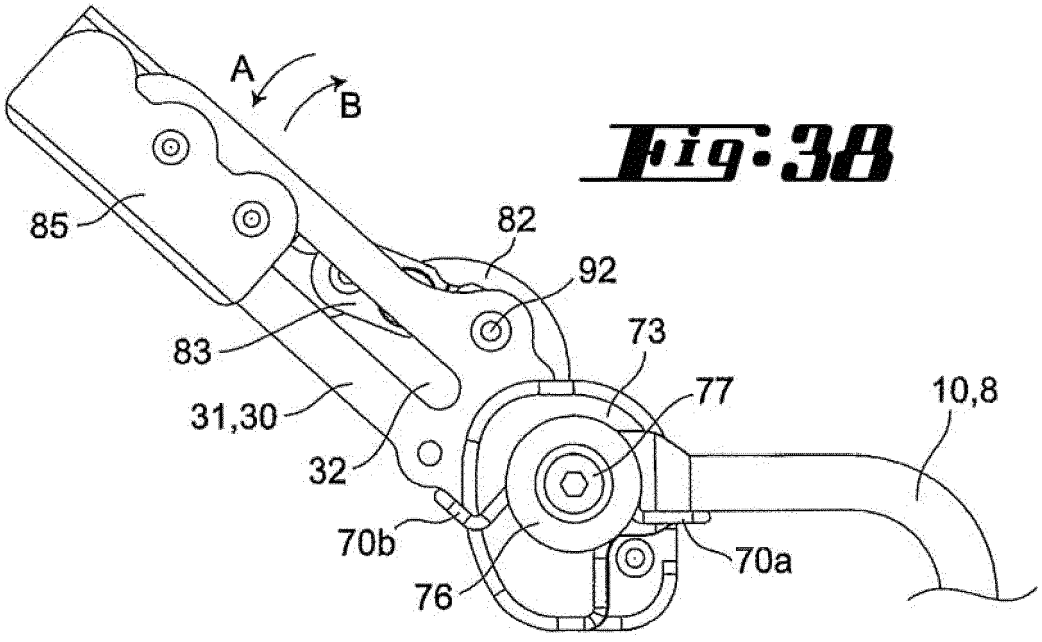

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Fig: 38

Fig: 39

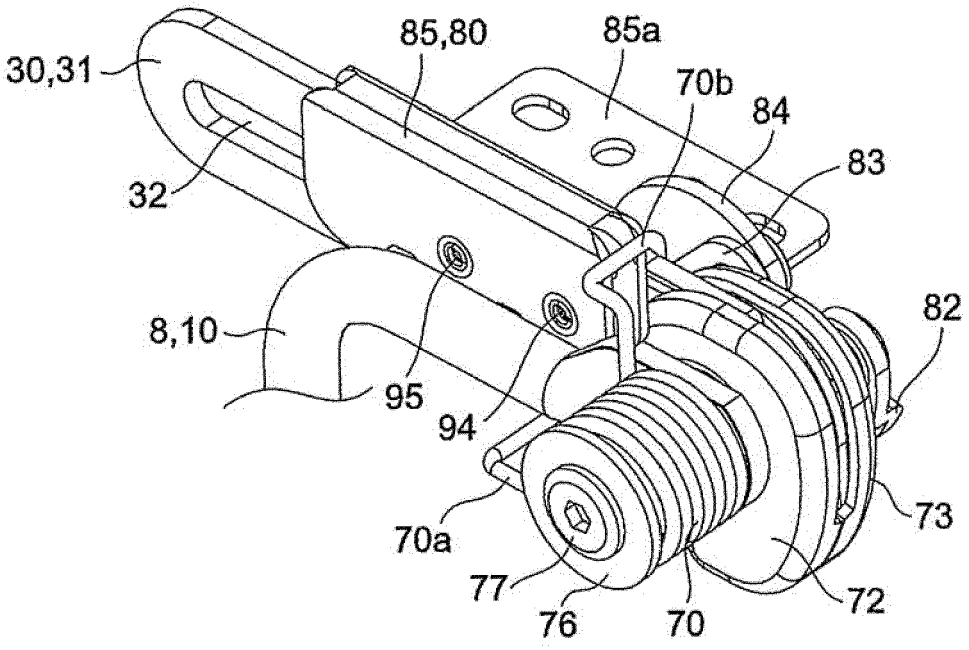

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Fig: 40

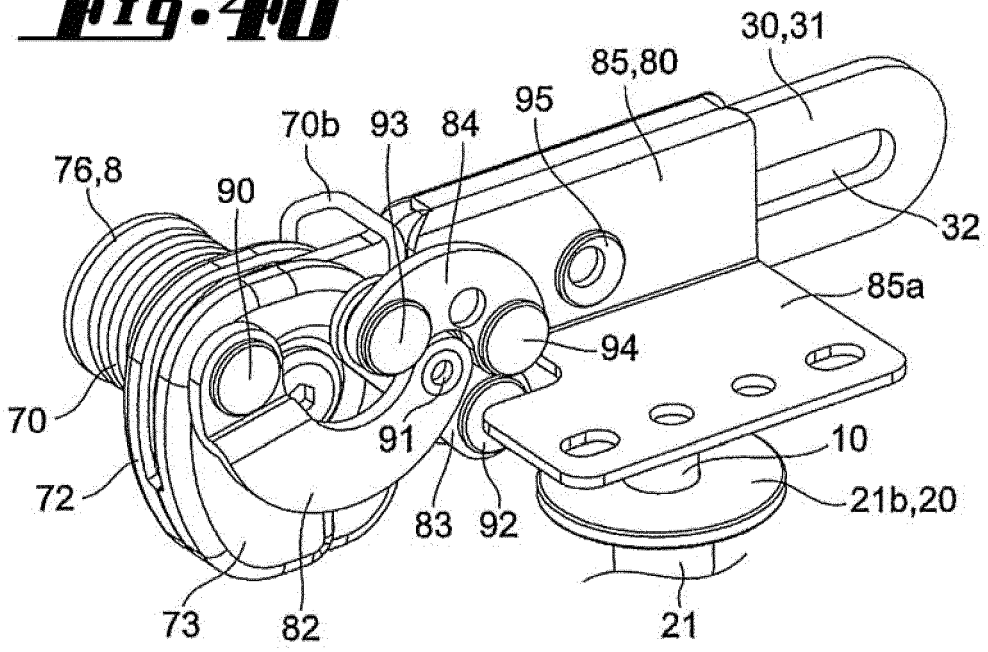
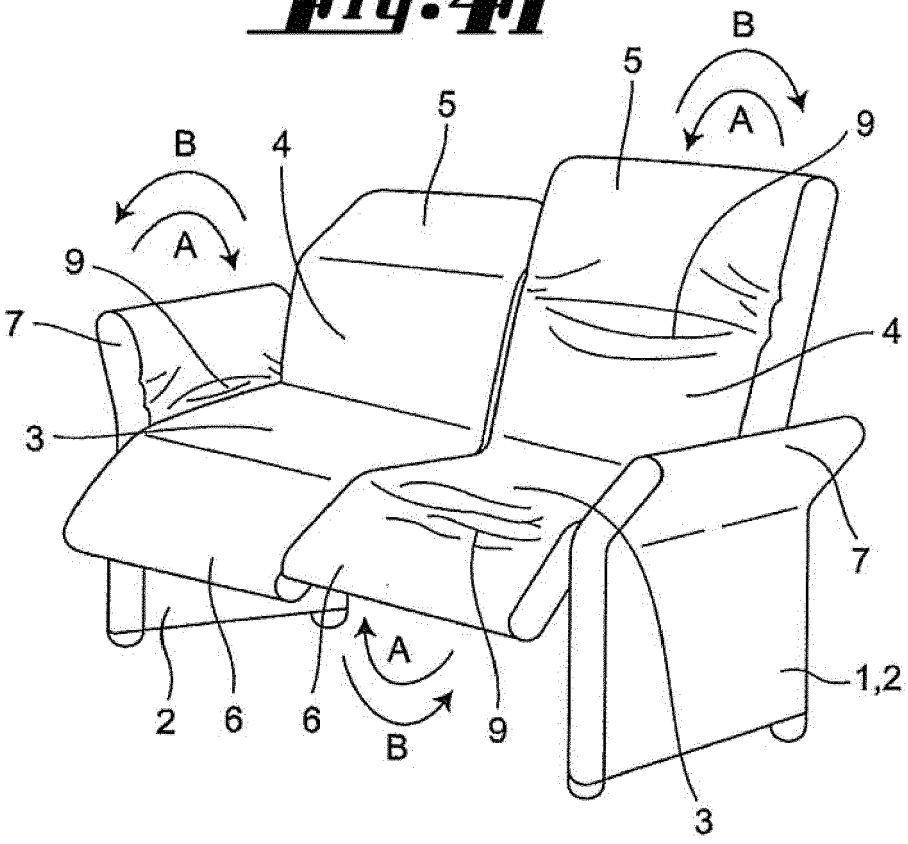

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Fig. 41



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EUROPEAN SEARCH REPORT

Application Number
EP 17 17 7867

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 200 05 850 U1 (LUSCH GMBH & CO KG FERD [DE]) 20 July 2000 (2000-07-20) * page 1, line 2 - page 5, line 29; figures 1-3 *	1-3,5,6	INV. A47C7/38 A47C7/40
X	DE 20 2007 016435 U1 (LUSCH GMBH & CO KG FERD [DE]) 7 February 2008 (2008-02-07) * paragraph [0004] - paragraph [0053]; figures 1-8 *	1-6	
X	DE 20 2007 017997 U1 (LUSCH GMBH & CO KG FERD [DE]) 20 March 2008 (2008-03-20) * paragraph [0005] - paragraph [0027]; figures 1-3 *	1-3,5,6	

TECHNICAL FIELDS SEARCHED (IPC)

A47C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	24 October 2017	Kohler, Pierre

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24-10-2017

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 20005850 U1	20-07-2000	NONE	
DE 202007016435 U1	07-02-2008	NONE	
DE 202007017997 U1	20-03-2008	NONE	

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