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(54) **CONNECTOR ARRANGEMENT**

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(57) **ABSTRACT**

A connector arrangement for detachably interconnecting sections of an operating table. The arrangement includes a first component (1) for associating with a first section of the operating table and a second component (3) for associating with a second section of the operating table. The first component (1) includes a housing (5) having an aperture (17) therein, and a latch assembly (7) having a latch member (18) biased to extend into the aperture (17). The second component (3) includes a projecting leg (9) adapted to be received within the aperture (17). The leg (9) includes a restraining surface (33) engageable with the latch member (19). The second component (3) further includes a release mechanism (13) for moving the latch member (19) between a locked position in which the latch member (19) engages with the restraining surface (33) to prevent withdrawal of the projecting leg (9), and an unlocked position in which the latch member (19) is disengaged from the restraining surface (33) thereby enabling separation of the components (1, 3).

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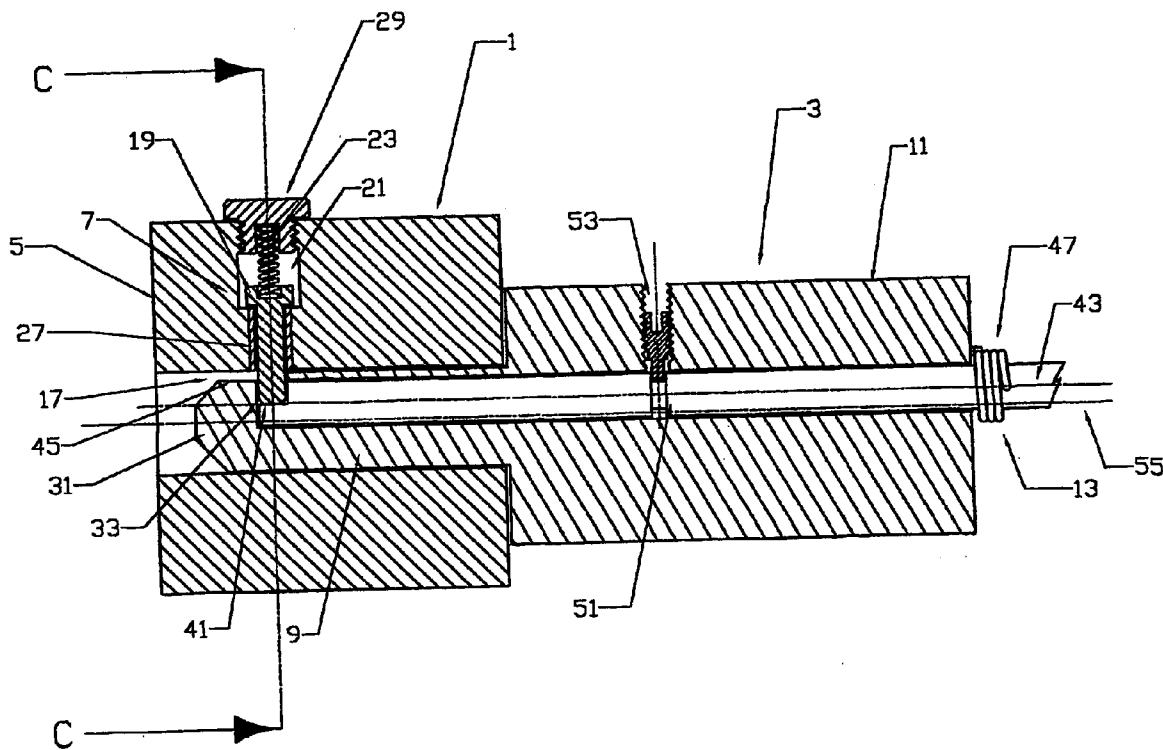
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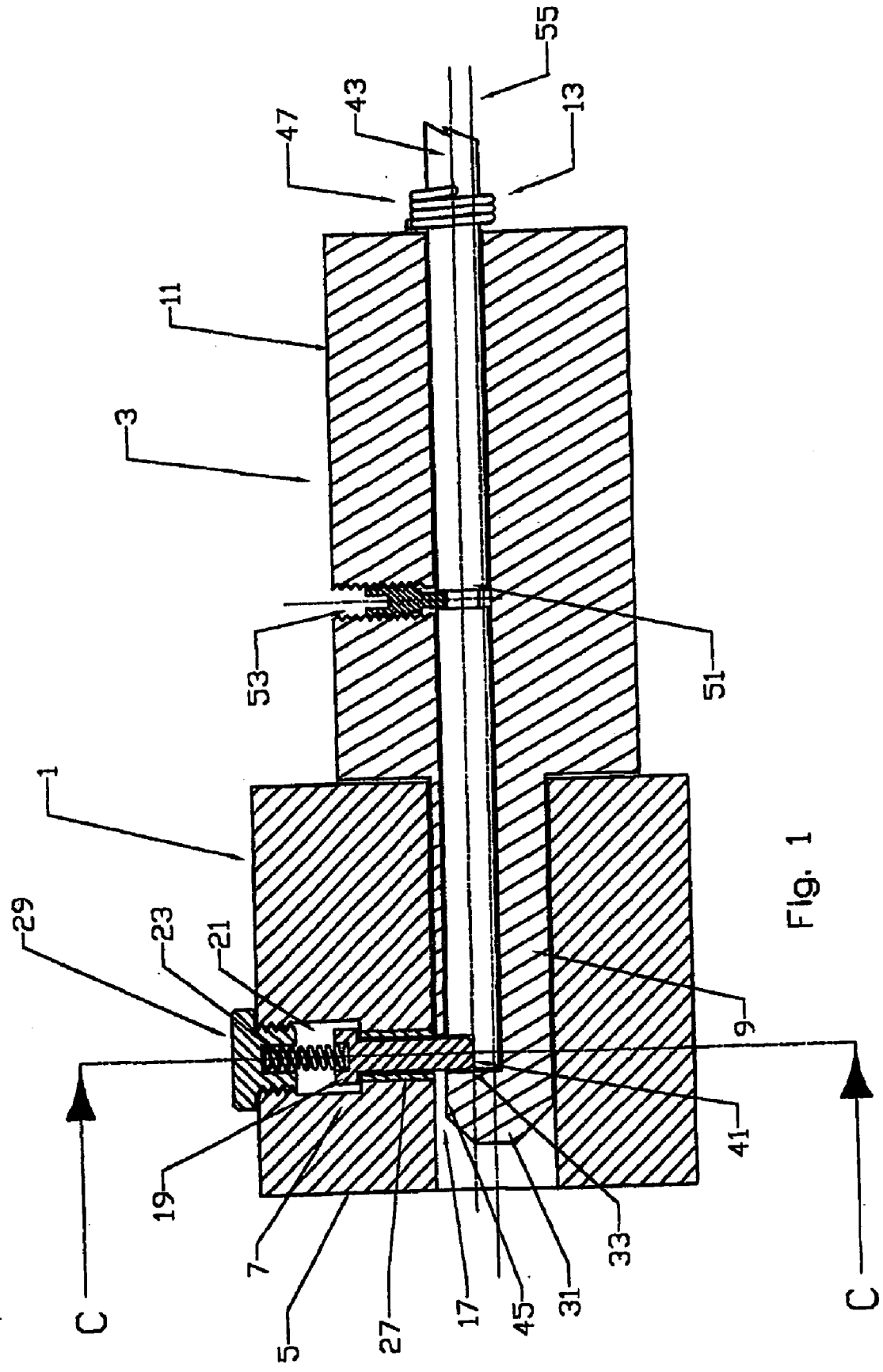
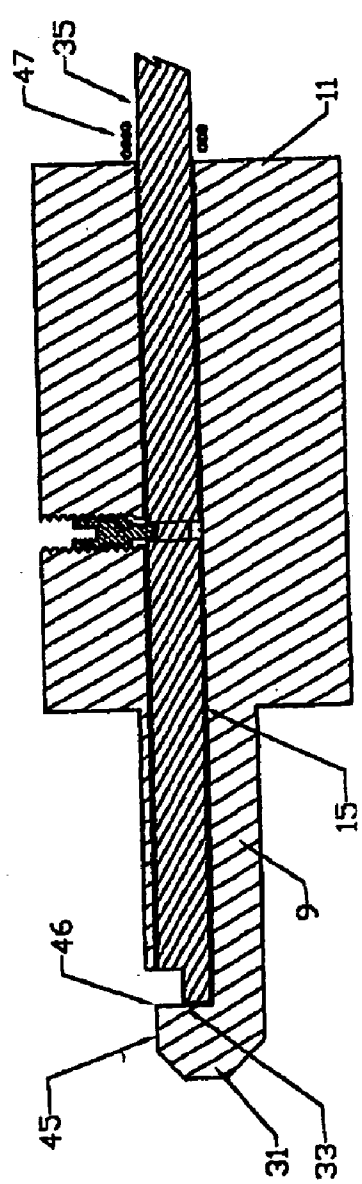
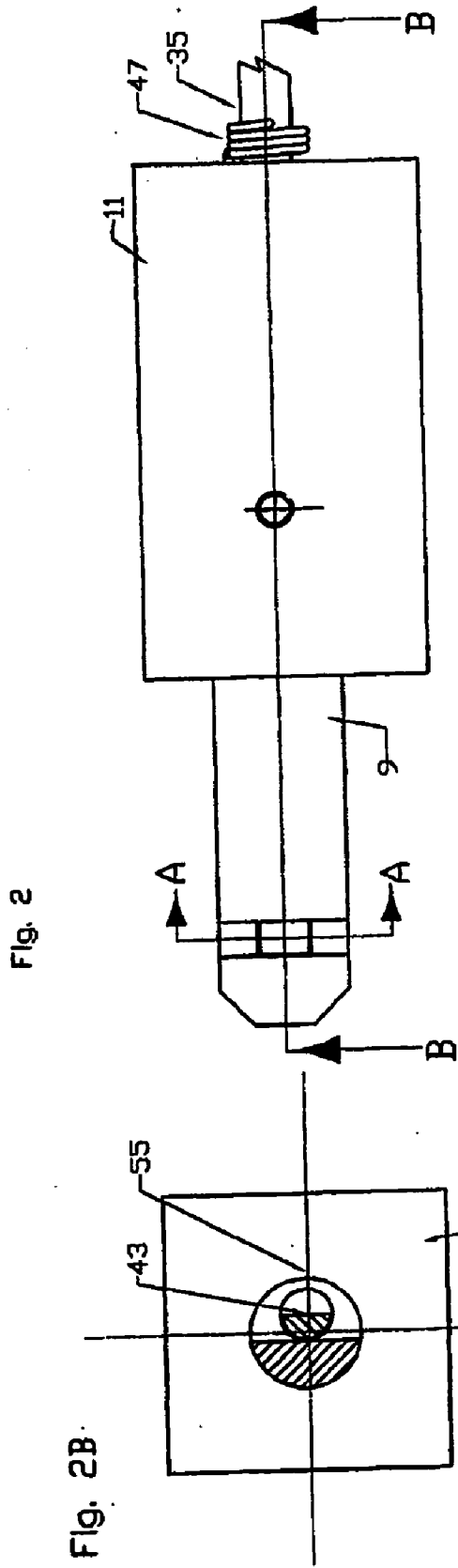


Fig. 1



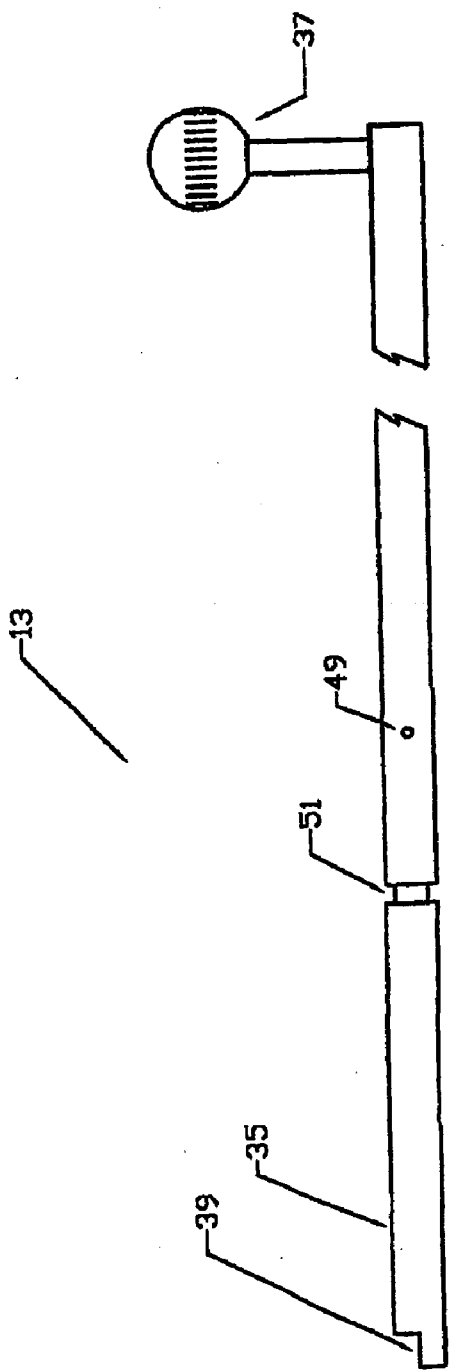
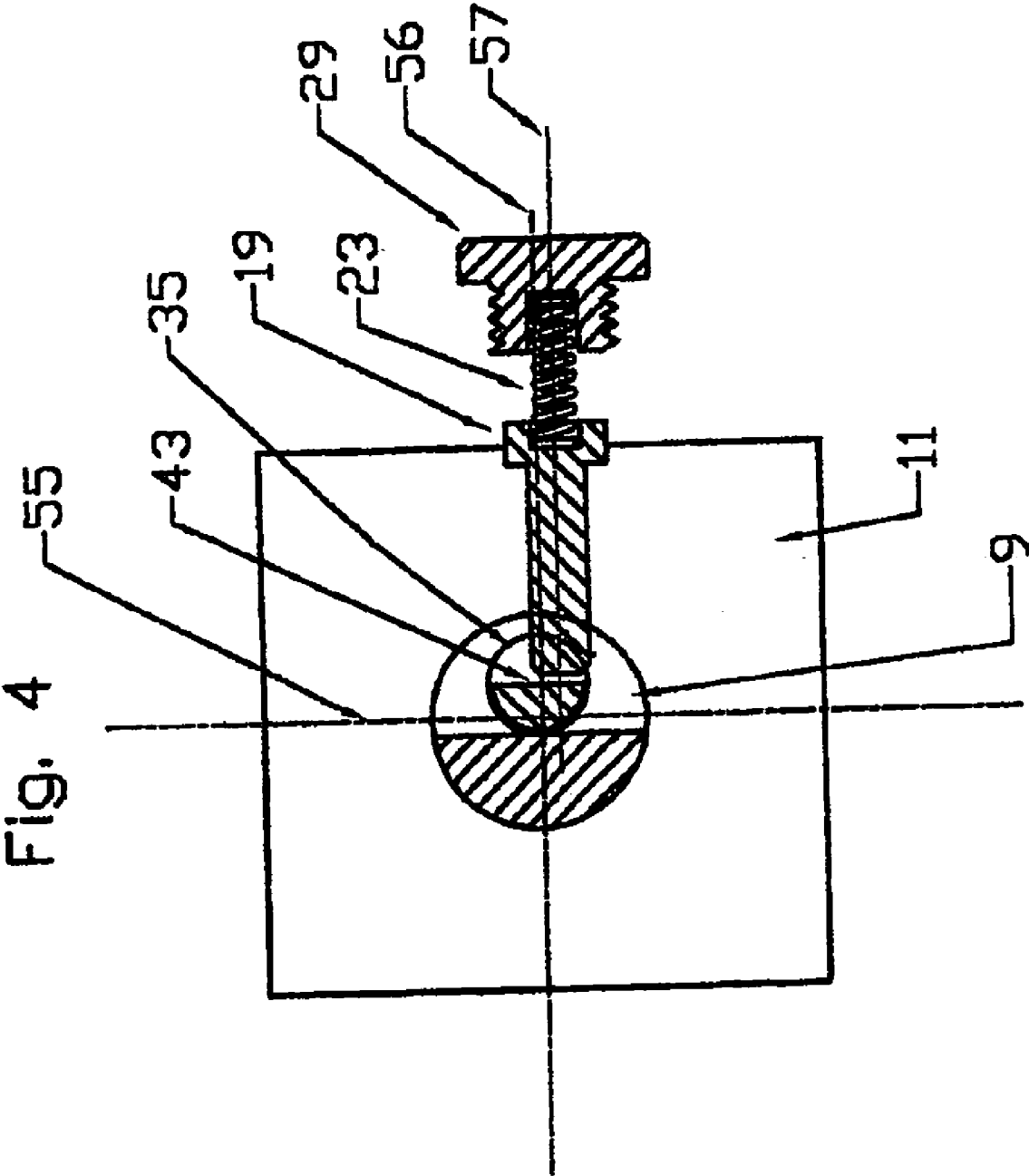


Fig. 3A

Fig. 3



CONNECTOR ARRANGEMENT

FIELD OF THE INVENTION

[0001] The present invention relates to a connector. The connector is especially suited for detachably interconnecting table top sections of an operating table. It will therefore be convenient to describe the invention in relation to that example application. It should be understood however that the invention is intended for broader application and use.

BACKGROUND OF THE INVENTION

[0002] Operating tables include a table top for supporting a patient during surgical procedures. The tables are typically made up of a plurality of interconnected table top sections which include a head supporting section, a back supporting section and a leg supporting section. The sections can be orientated at varying angles with respect to each other such that the patient can be suitably positioned for the required surgical procedure.

[0003] In the past, table top sections have been connected with some form of connector arrangement having a projecting pin, mounted or integrally formed with a section, which can be securely located into a complementary-shaped aperture, mounted or integrally formed with an adjoining section.

[0004] A problem with such prior connector arrangements is that they are usually required to be manually secured, once the projecting pins are located in their respective aperture, by some form of clamping device. As the sections can be of substantial weight one person is usually required to hold a section whilst another person manipulates and secures the connector arrangement.

[0005] A further problem with prior connector arrangements is that a significant amount of force is required to release the projecting pins from their apertures. In addition, the consequences of falling to properly secure the sections or dropping a section could be serious injury to either those attaching or removing the section or the patient on the table. A further consequence of dropping a section is that the end of the projecting pins can be damaged rendering the section unusable.

[0006] Accordingly, it would be desirable to provide a connector arrangement for detachably interconnecting sections of an operating table which overcomes or ameliorates at least one of the abovementioned problems of the prior art.

[0007] Any discussion of documents, devices, acts or knowledge in this specification is included to explain the context of the invention. It should not be taken as an admission that any of the material formed part of the prior art base or the common general knowledge in the relevant art in Australia or any other country on or before the priority date of the claims herein.

SUMMARY OF THE INVENTION

[0008] In accordance with the present invention there is provided a connector arrangement for detachably interconnecting sections of an operating table. The arrangement includes a first component for associating with a first section of the operating table and a second component for associating with a second section of the operating table. The first component includes a housing having an aperture therein, and a latch assembly having a latch member which is biased to extend into the aperture.

[0009] The second component includes a projecting leg adapted to be received within the aperture. The projecting leg including a restraining surface engageable with the latch member. The second component further includes a release mechanism for moving the latch member between a locked position and an unlocked position. In the locked position the latch member engages with the restraining surface to prevent withdrawal of the projecting leg from the aperture. In the unlocked position the latch member is disengaged from the restraining surface thereby enabling separation of the components.

[0010] Preferably, the release mechanism is in part located within a recess in the projecting leg. In a particularly preferred embodiment the recess is a tunnel within the projecting leg and main body of the second component through which a release rod of the release mechanism is housed. The release rod may include an end section for moving the latch member to the unlocked position. The end section of the release rod can include a release notch engageable with an end surface of the latch member. The release rod is preferably rotatable about a longitudinal axis of the release rod to push the latch member to the unlocked position. In addition, the longitudinal axis of the release rod is preferably offset from a longitudinal axis of the projecting leg.

[0011] In a particularly preferred embodiment the release rod is rotatable between an active and inactive position. When the release rod is in the inactive position the latch member remains in the locked position. When the release rod is in the active position the latch member remains in the unlocked position. Preferably, the latch member moves from the locked position to the unlocked position when the release rod is rotated from the inactive position to an active position. The release mechanism further includes a rod biasing means for biasing the release rod towards the inactive position. The release rod may be manually held in the active position by a user during separation of the components.

[0012] An end of the projecting leg preferably includes a lip member over which the latch member rides during insertion of the projecting leg into the aperture. In a particularly preferred embodiment, the restraining surface is a side wall of the lip member and preferably lies in a plane substantially parallel to a longitudinal axis of the latch member. In addition, an edge of a top surface of the lip member is preferably substantially aligned with an end surface of the latch member when the latch member is in the unlocked position. In this position the latch member is disengaged from the restraining surface such that the projecting leg can be pulled out of the aperture.

[0013] The first component is preferably integrally formed with the first section of the operating table and the second component is preferably integrally formed with the second section of the operating table. The first and second sections of the operating table are preferably interconnected by the connector arrangement.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] Further benefits and advantages of the present invention will become apparent from the following description of a preferred embodiment of the invention. The preferred embodiment should not be considered as limiting any of the statements in the previous section. The preferred embodiment will be described with reference to the following figures in which:

[0015] FIG. 1 is a side cross-sectional view of the connector arrangement, according to an embodiment of the invention,

illustrating the first component coupled to the second component with the latch member in a locked position;

[0016] FIG. 2 is a top view of the second component, according to an embodiment of the invention;

[0017] FIG. 2A is a side cross-sectional view of the second component taken along line B-B shown in FIG. 2;

[0018] FIG. 2B is a cross-sectional view taken along line A-A shown in FIG. 2;

[0019] FIG. 3 is a side view of the release mechanism of the second component, according to an embodiment of the invention;

[0020] FIG. 3A is an end view of the release mechanism shown in FIG. 3; and

[0021] FIG. 4 is an end, part sectional view, taken along line C-C shown in FIG. 1, of the latch assembly of the first component and the release rod and projecting leg of the second component.

DESCRIPTION OF PREFERRED EMBODIMENT

[0022] With reference to the accompanying drawings there is shown a connector arrangement for detachably interconnecting sections of an operating table. The arrangement includes a first component 1 securable to a second component 3. The first component 1 includes a housing 5 and a latch assembly 7. The second component 3 includes a projecting leg 9 which is integrally formed with a main body 11. The second component 3 further includes a release mechanism 13 which is partially located within a recess in the projecting leg 9. The recess is preferably in the form of a tunnel 15 which extends through the projecting leg 9 and the main body 11. The projecting leg 9 is adapted to be received in a complementary aperture 17 located within the housing 5.

[0023] The latch assembly 7 includes a latch member 19 housed within a bore 21 located in a side wall of the aperture 17. A longitudinal axis 57 of the latch member 19 and bore 21 can lie generally perpendicular to a longitudinal axis of the aperture 17. The bore 21 includes an upper section and a lower section. The upper section has a diameter which is greater than the lower section. The latch assembly 7 further includes biasing means, preferably in the form of a resilient spring 23, which biases the latch member 19 to at least partially extend into the aperture 17. The resilient spring 23 generally resides within the upper section of the bore 21. The lower section of the bore 21 is provided with a low friction bearing 27 to prevent the latch member 19 snagging on the walls of the lower section of the bore 21. In order to provide access to the resilient spring 23 and the latch member 19 a screw threaded end cap 29 is provided on an exterior of the housing 5. In this respect, the end cap 29 can be threaded onto a corresponding thread located in the walls of the upper section of the bore 21.

[0024] As shown in FIGS. 1, 2 and 2A an end of the projecting leg 9 remote from the main body 11 of the second component 3 includes a lip member 31 which is shaped such that the latch member 19 can slide over the lip member 31 as the projecting leg 9 is inserted into the aperture 17. A side wall of the lip member 31 provides a restraining surface 33 which engages with a side of the latch member 19. In this position the latch member 19 is extended and in its locked position whereby the projecting leg 9 can not be withdrawn from the aperture 17. As can be seen in FIG. 1 the projecting leg 9 is prevented from further insertion into the aperture 17 by the abutment of the main body 11 of the second component 3 against an exterior wall of the housing 5.

[0025] The release mechanism 13 includes a release rod 35 which extends through the tunnel 15 in the projecting leg 9 and main body 11. The release mechanism 13 further includes a release handle 37 at an end remote from the projecting leg 9 which projects laterally from the release rod 35. An end section of the release rod 35 remote from the release handle 37 lies adjacent to the restraining surface 33. The end section is preferably in the form of a release notch 39 which engages with an end surface 41 of the latch member 19. The release rod 35 is rotatable about a longitudinal axis 43 of the release rod 35 between an inactive and active position. In FIG. 1 the release rod 35 is shown in an inactive position with the latch member 19 fully extended into the aperture 17 to thereby be in a locked position. By laterally moving the release handle 37 about the longitudinal axis 43 of the release rod 35 the release rod 35 can be rotated into an active position whereby the end surface 41 of the latch member 19 is pushed into the bore 21 such that an edge 46 of the lip member 31, located at the intersection of a top surface 45 of the lip member 31 and the restraining surface 33, is aligned with the end surface 41 of the latch member 19. The latch member 19 is thereby in an unlocked position as the end surface 41 of the latch member 19 is no longer engaged with the restraining surface 33 thereby enabling the projecting leg 9 to be removed from the aperture 17. In this regard, during removal of the projecting leg 9 the end surface 41 of the latch member 19 slides over the top surface 45 of the lip member 31 with the latch member 19 subsequently returning to its fully extended or locked position.

[0026] The release mechanism 13 further includes a return spring 47 which biases the release rod 35 to the inactive position. One end of the return spring 47 is located in a hole 49 provided in the release rod 35.

[0027] As shown in FIGS. 1 and 3, in order to retain the release rod 35 within the tunnel 15 a groove 51 is provided in the release rod 35 into which a retaining pin 53, secured within the main body 11, is located.

[0028] As can be seen in FIGS. 1 and 2B, the longitudinal axis 43 of the release rod 35 is offset from a longitudinal axis 55 of the projecting leg 9. Further, as can be seen in FIG. 4, the longitudinal axis 57 of the latch member 19 and bore 21 is offset from a transverse axis 56 of the release rod 35 and projecting leg 9. In addition, the diameter of the projecting leg 9 is slightly less than the diameter of the aperture 17 such that the projecting leg 9 can be inserted into the aperture 17 without excessive force being applied. The top surface 45 of the lip member 31 is preferably flat and lies perpendicular to the restraining surface 33. The top surface 45 is formed by removing an upper segment of the lip member 31. The edge 46 of the lip member 31, at the intersection of the top surface 45 with the restraining surface 33, is aligned with the end surface 41 of the latch member 19 when the latch member 19 has been pushed by the release notch 39 to the unlocked position. When this occurs the latch member 19 is clear of the restraining surface 33 and is subsequently able to slide over the top surface 45 of the lip member 31.

[0029] In order to connect the first and second components 1, 3 the projecting leg 9 of the first component 1 is inserted into the aperture 17 in the housing 5. Provided that the release handle 37 is not rotated and held against the bias of the return spring 47 the release rod 35 will be in the inactive position whilst the projecting leg 9 is being inserted. As the projecting leg 9 comes into contact with the latch member 19 the latch member 19 will ride over the lip member 31, thereby progres-

sively compressing the resilient spring 23 of the latch assembly 7. By further inserting the projecting leg 9 into the aperture 17 the latch member 19 will slide over the top surface 45 and subsequently pass the restraining surface 33 such that the resilient spring 23 acting against the latch member 19 relaxes and thereby automatically extends the latch member 19 into the locked position whereby the restraining surface 33 will prevent the projecting leg 9 from being withdrawn from the aperture 17. The first and second components 1, 3 are therefore automatically securely connected by simply pushing the components 1, 3 together.

[0030] In order to separate the first and second components 1, 3 the release handle 37 is rotated against the bias of the return spring 47, in either direction, such that release rod 35 is rotated to the active position. The rotation of the release handle 37 to the active position causes the release notch 39 to rotate about the longitudinal axis 43 of the release rod 35 such that the end surface 41 of the latch member 19 is pushed, forcing the latch member 19 into the bore 21, thereby progressively compressing the resilient spring 23 of the latch assembly 7. In this respect, the longitudinal axis 57 of the latch member 19 and bore 21 is offset from the transverse axis 56 of the release rod 35 and projecting leg 9 to assist the release notch 39 to engage with the end surface 41 of the latch member 19 rather than a corner or side of the latch member 19, when the release rod 35 is rotated. When the release rod 35 has been fully rotated to the active position the end surface 41 of the latch member 19 is disengaged from the restraining surface 33. By pulling the release handle 37 in a direction away from the first component 1, whilst retaining the release handle 37 in the active position, the second component 3 can begin to be separated away from the first component 1. In this regard, once the end surface 41 of the latch member 19 is disengaged from the restraining surface 33 the end surface 41 of the latch member 19 is able to slide over the top surface 45 of the lip member 31 to thereby permit separation of the first component 1 from the second component 3.

[0031] The present invention advantageously enables the release rod 35 to be contained behind the lip member 31 such that the release rod 35 is immune from damage should the second component 3 be dropped or knocked. In addition, the first and second components 1, 3 when connected can be subjected to significant separation forces without damage occurring due to the strength provided by the abutment of the latch member 19 with the restraining surface 33. Further, in the event of a failure in the release mechanism 12, the first and second components 1, 3 are maintained securely connected, thereby ensuring that sections of the operating table which are connected by the connector arrangement can not inadvertently separate. Accordingly, a patient supported on the operating table will remain safely supported at all times.

[0032] As the present invention may be embodied in several forms without departing from the central characteristics of the invention, it should be understood that the above described embodiment should not be considered to limit the present invention but rather should be construed broadly. Various modifications and equivalent arrangements are intended to be included within the spirit and scope of the invention. For example, the projecting leg 9 could be of square, rectangular or round cross-section and received within a complimentary shaped aperture 17.

1-20. (canceled)

21. A connector arrangement for detachably interconnecting sections of an operating table, the arrangement including

a first component for associating with a first section of the operating table and a second component for associating with a second section of the operating table, the first component including a housing having an aperture therein, and a latch assembly having a latch member biased to extend into the aperture, the second component including a projecting leg adapted to be received within the aperture, the leg including a restraining surface engageable with the latch member, the second component further including a release mechanism for moving the latch member between a locked position in which the latch member engages with the restraining surface to prevent withdrawal of the projecting leg, and an unlocked position in which the latch member is disengaged from the restraining surface thereby enabling separation of the components.

22. An arrangement as claimed in claim 1 wherein the release mechanism is in part located within a recess in the projecting leg.

23. An arrangement as claimed in claim 2 wherein the recess is a tunnel within the projecting leg and a main body of the second component.

24. An arrangement as claimed in claim 3 wherein the release mechanism includes a release rod housed within the tunnel.

25. An arrangement as claimed in claim 4 wherein the release rod includes an end section for moving the latch member to the unlocked position.

26. An arrangement as claimed in claim 5 wherein the release rod is rotatable about a longitudinal axis of the release rod to push the latch member to the unlocked position.

27. An arrangement as claimed in claim 5 wherein the end section of the release rod includes a release notch engageable with an end surface of the latch member.

28. An arrangement as claimed in claim 4 wherein the release rod is rotatable between inactive and active positions, wherein the latch member remains in the locked position when the release rod is in the inactive position and the unlocked position when the release rod is in the active position.

29. An arrangement as claimed in claim 8 wherein the latch member moves from the locked position to the unlocked position when the release rod is rotated from the inactive to the active position.

30. An arrangement as claimed in claim 4 wherein the longitudinal axis of the release rod is offset from a longitudinal axis of the projecting leg.

31. An arrangement as claimed in claim 1 wherein a longitudinal axis of the latch member is offset from a transverse axis of the release rod.

32. An arrangement as claimed in claim 11 wherein the restraining surface lies in a plane substantially parallel to the longitudinal axis of the latch member.

33. An arrangement as claimed in claim 1 wherein an end of the projecting leg includes a lip member over which the latch member rides during insertion of the projecting leg into the aperture.

34. An arrangement as claimed in claim 13 wherein the restraining surface is a side wall of the lip member.

35. An arrangement as claimed in claim **14** wherein the lip member includes a top surface which intersects the restraining surface at an edge.

36. An arrangement as claimed in claim **15** wherein the edge is aligned with an end surface of the latch member when the latch member is in the unlocked position.

37. An arrangement as claimed in claim **8** wherein the release mechanism further includes a rod biasing means for biasing the release rod to the inactive position.

38. An arrangement as claimed in claim **1** wherein the first component is integrally formed with the first section and the second component is integrally formed with the second section.

39. An operating table including a first and second section interconnected with an arrangement as claimed in claim **1**.

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