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(54) **SUPPORT APPARATUS FOR A LUBRICATOR IN A COIL TUBING OPERATION**

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(57) **ABSTRACT**

A support system for a lubricator to prevent the lubricator from deflecting during coil tubing operations, particularly on slant wells. A support member is connected to the lubricator through truss members for supporting the lubricator in tension or in compression, depending upon whether the support member is placed above or below the lubricator. A coil tubing injector is provided which is capable of manipulating the supported lubricator axially along a path coaxial to the wellhead to permit fine adjustment with the wellhead.

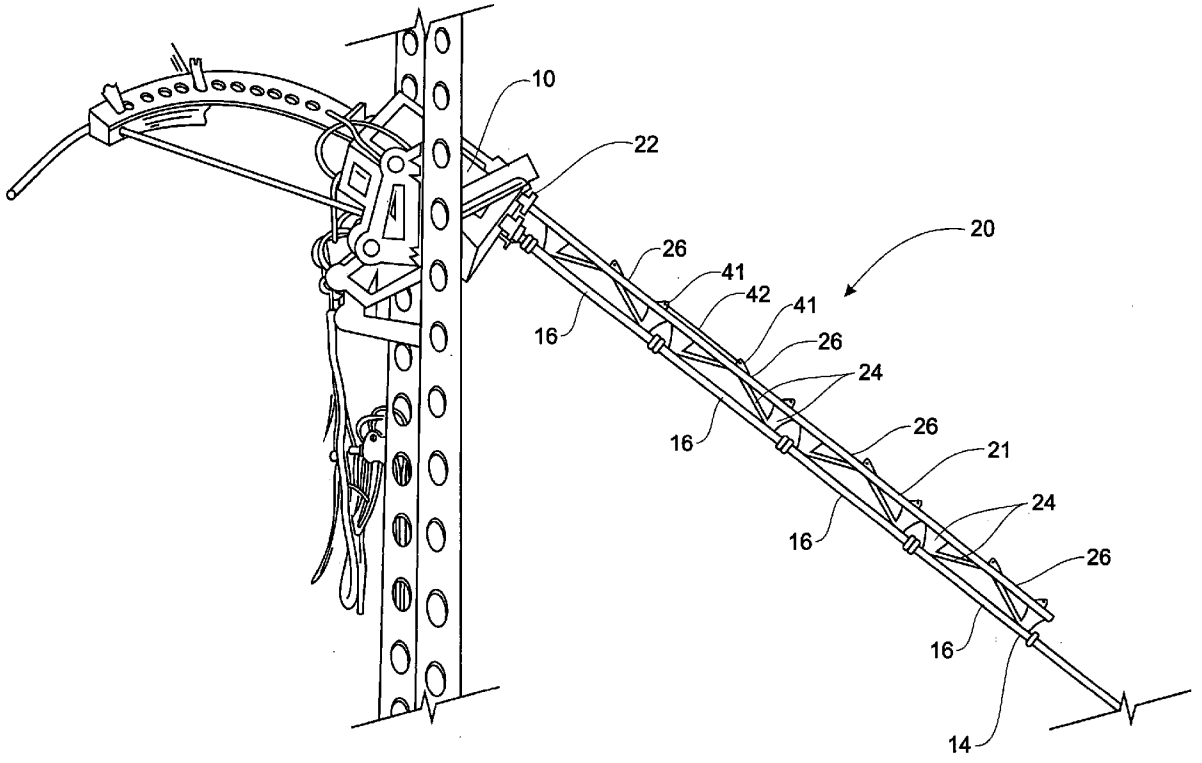


Fig. 1

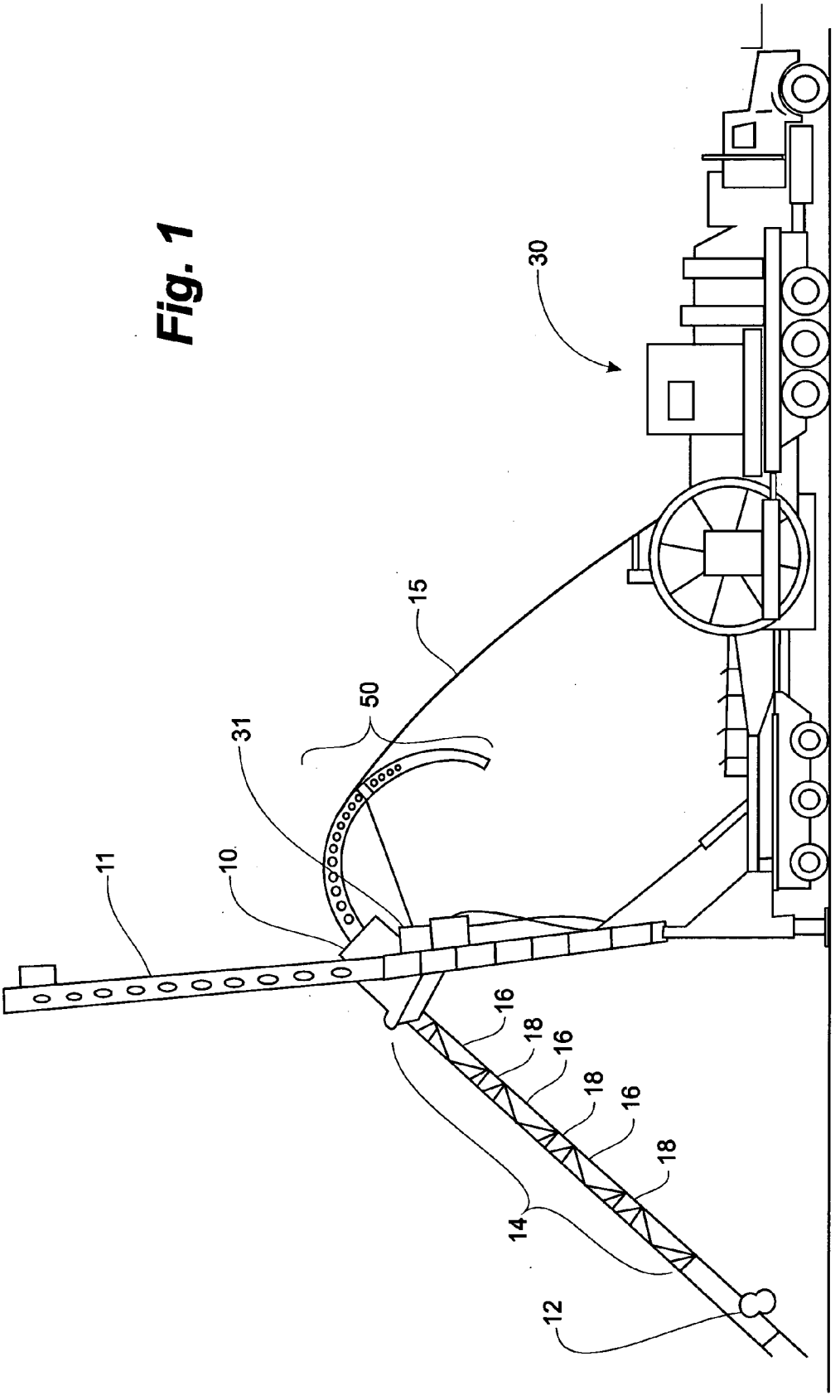
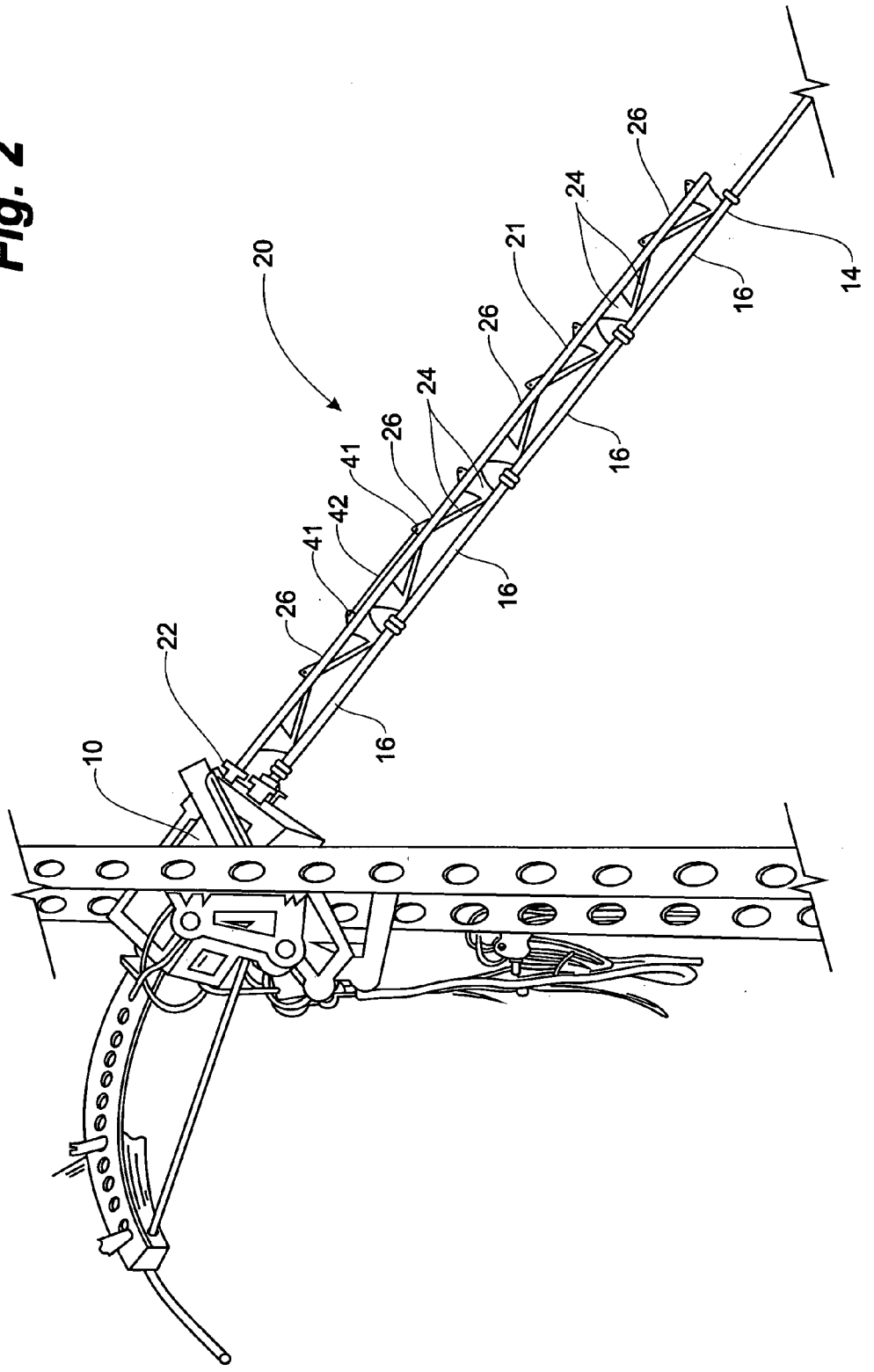


Fig. 2



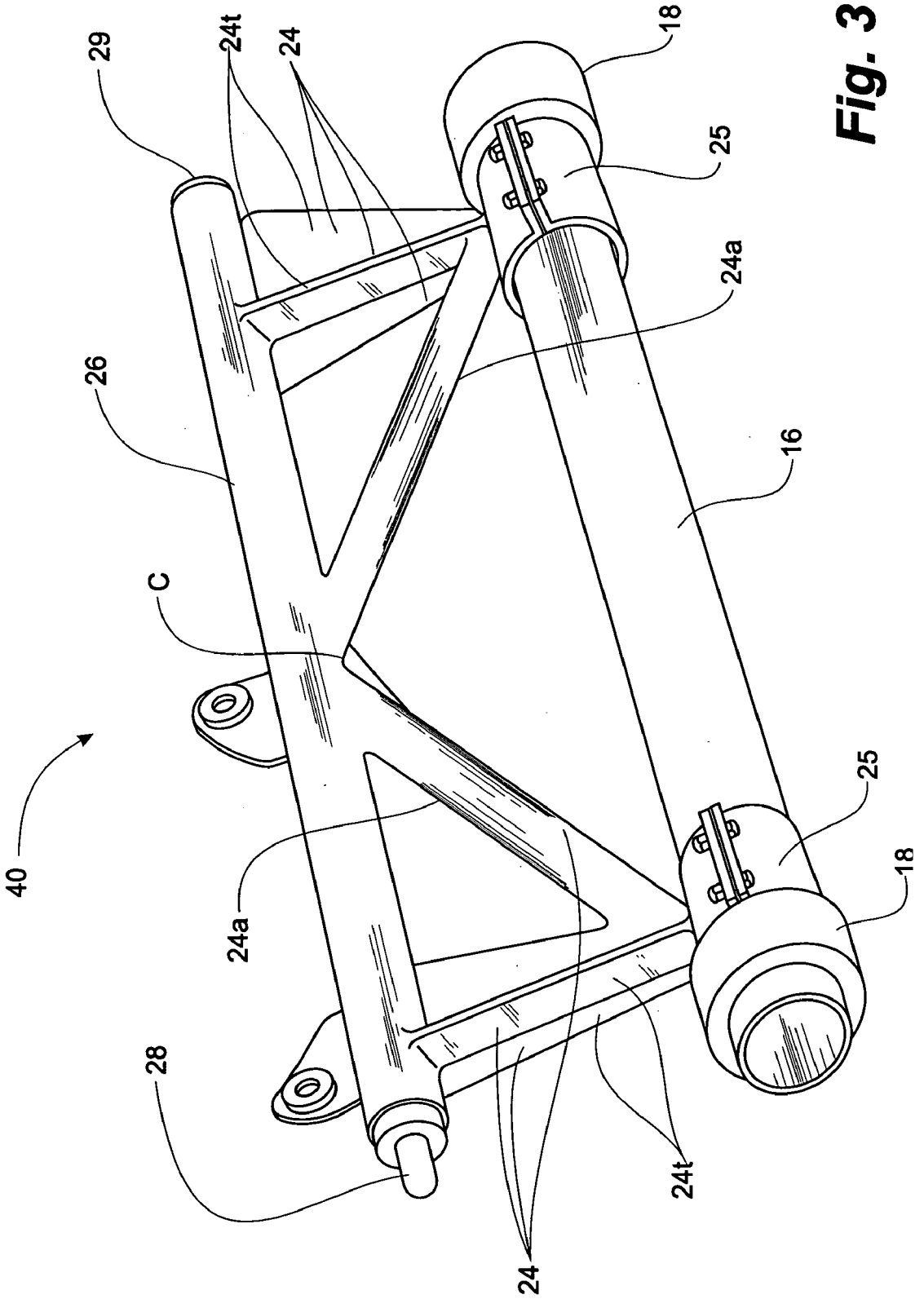


Fig. 3

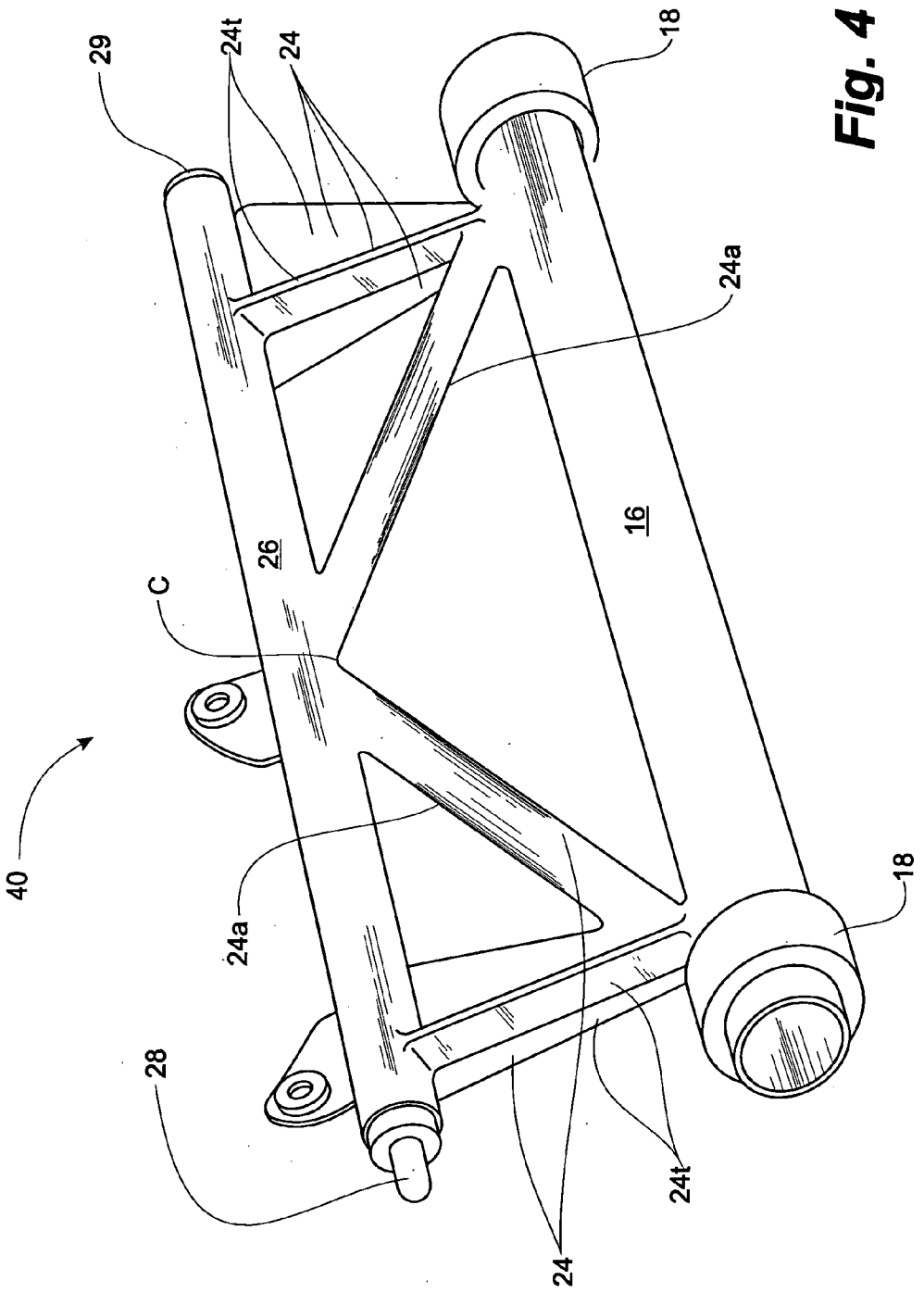


Fig. 4

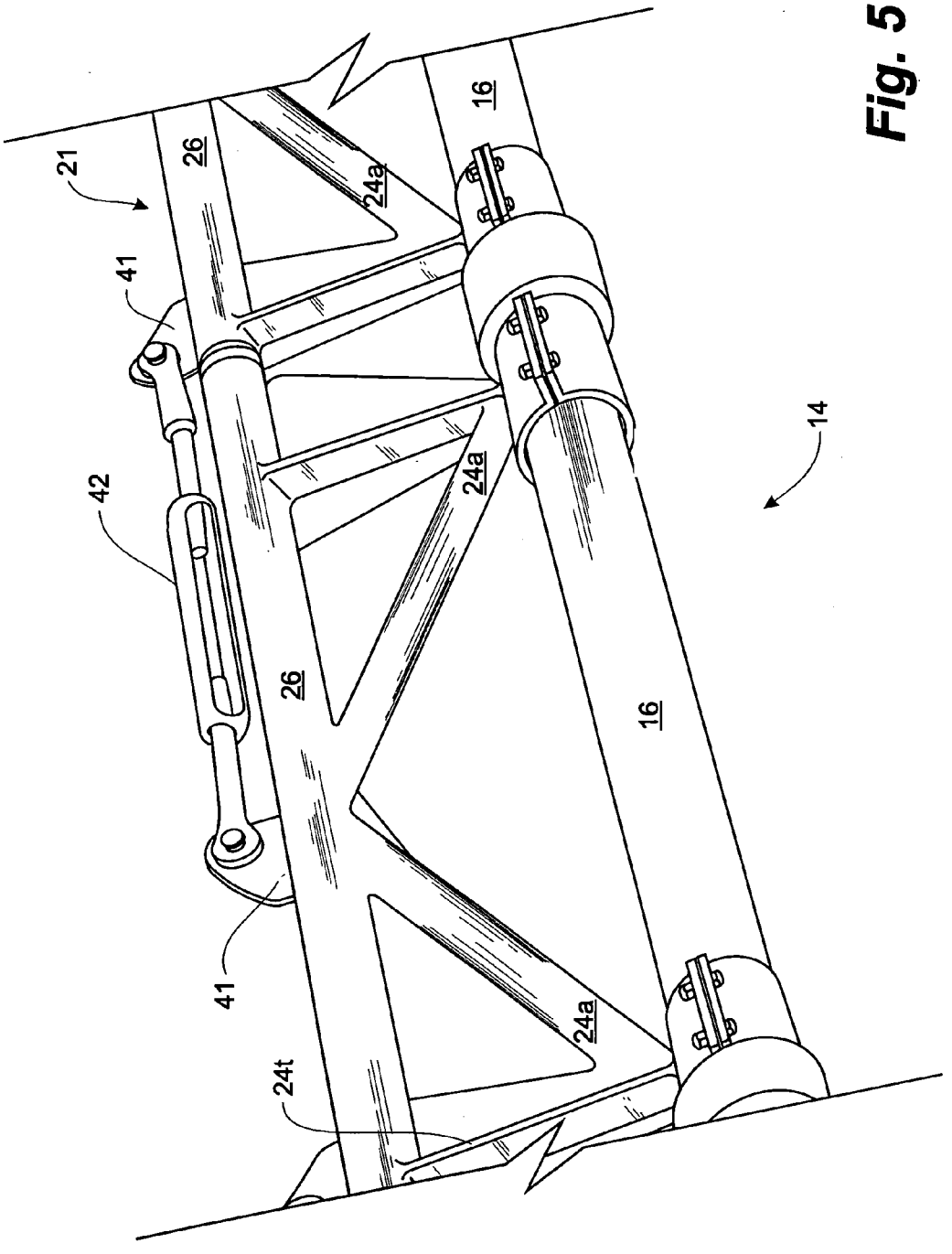


Fig. 5

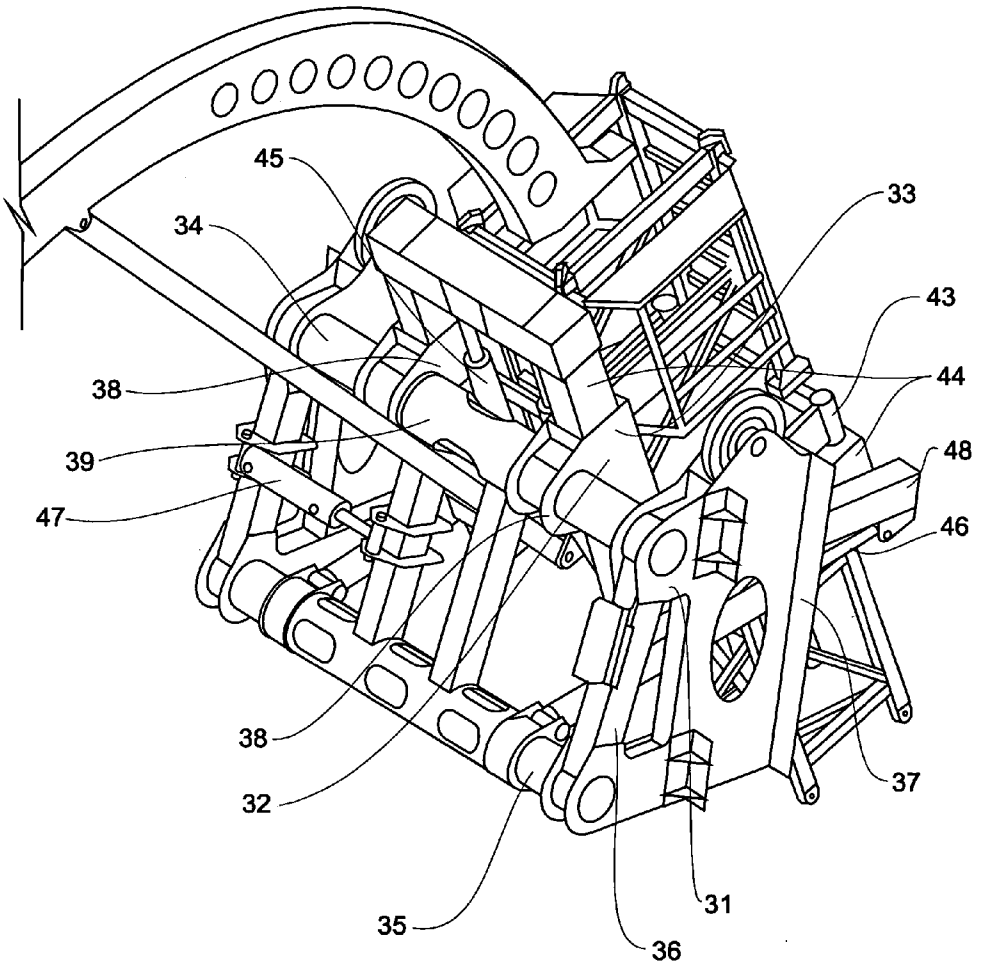


Fig. 6

Fig. 7

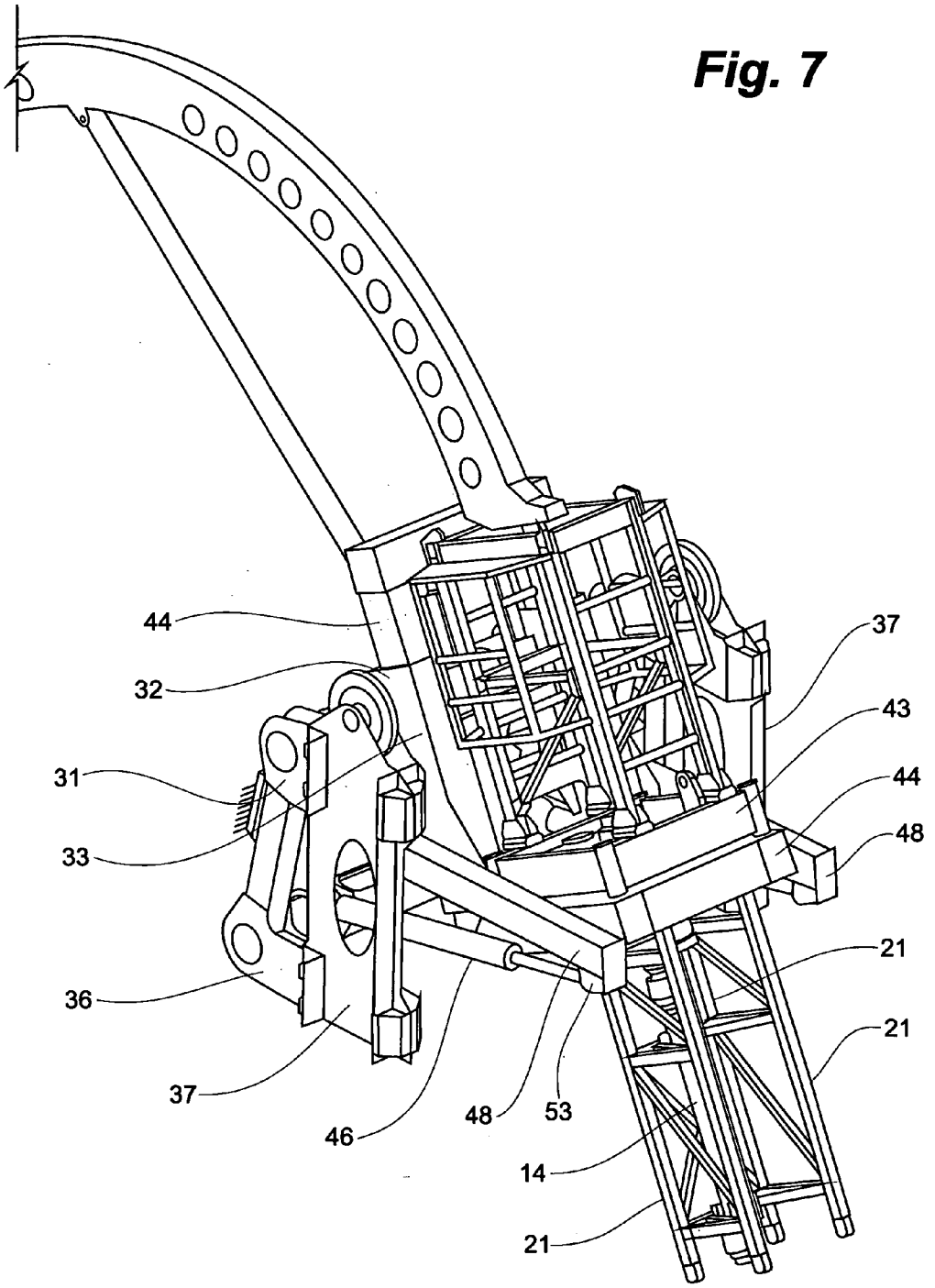


Fig. 8

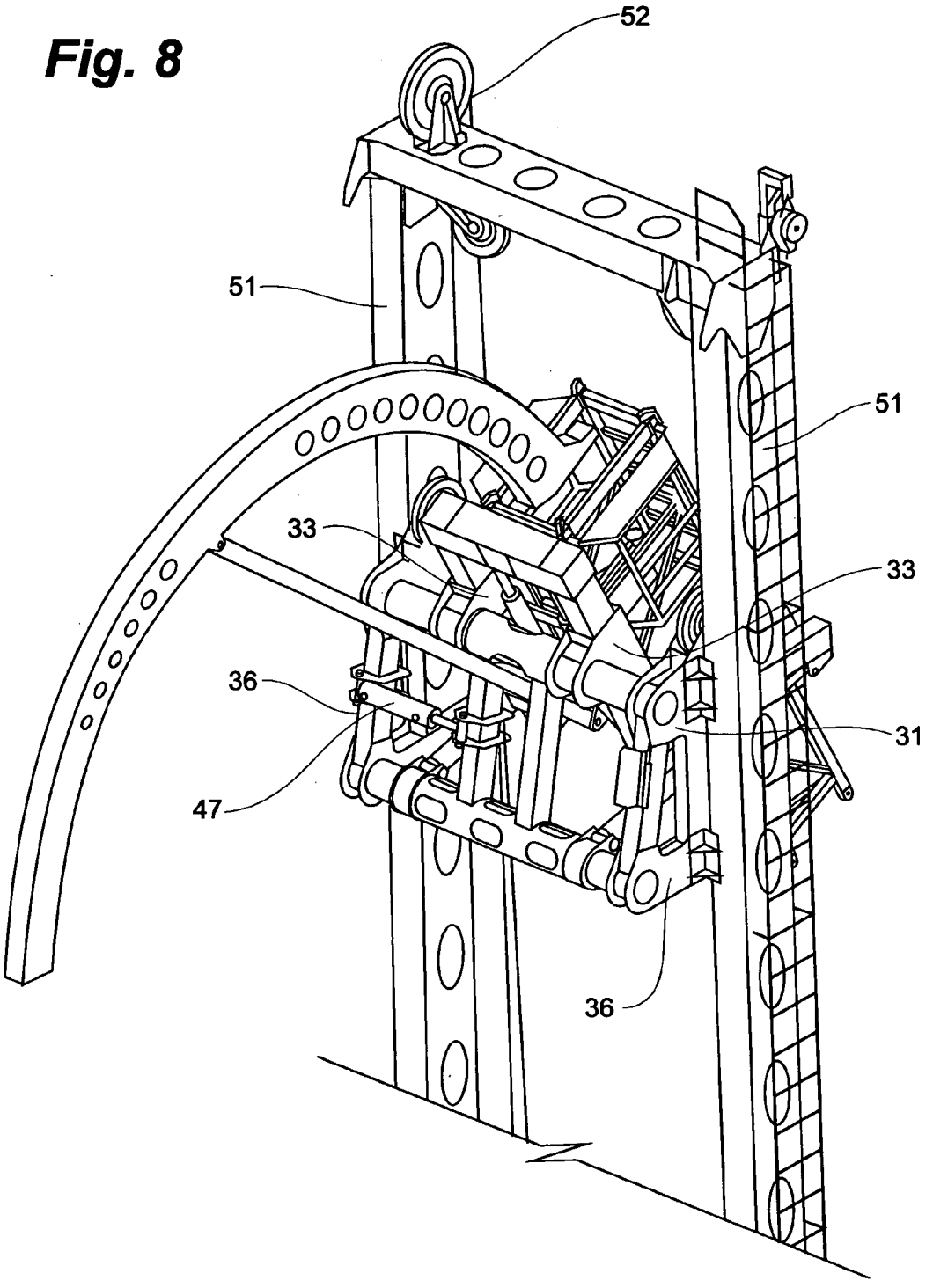


Fig. 9

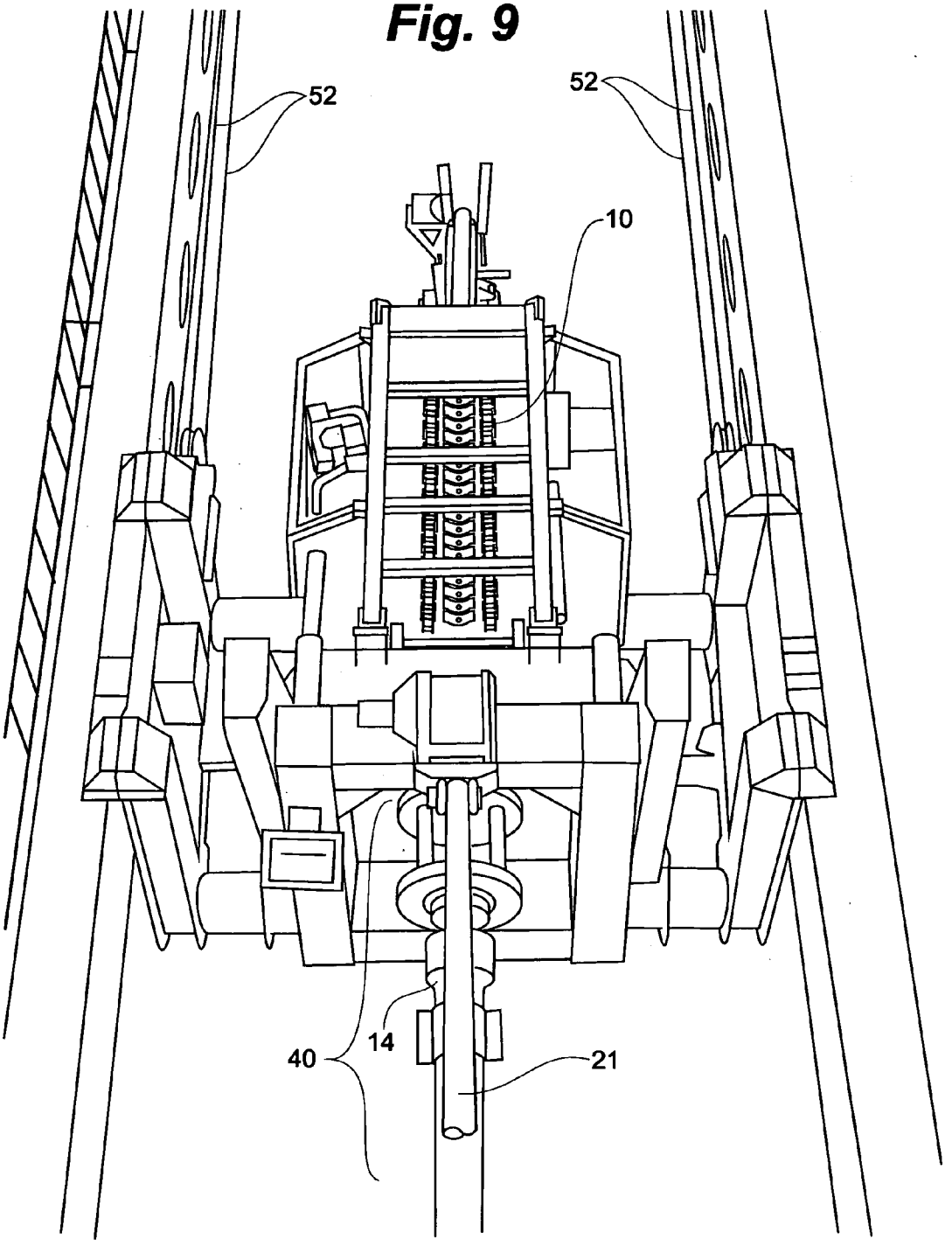


Fig. 10

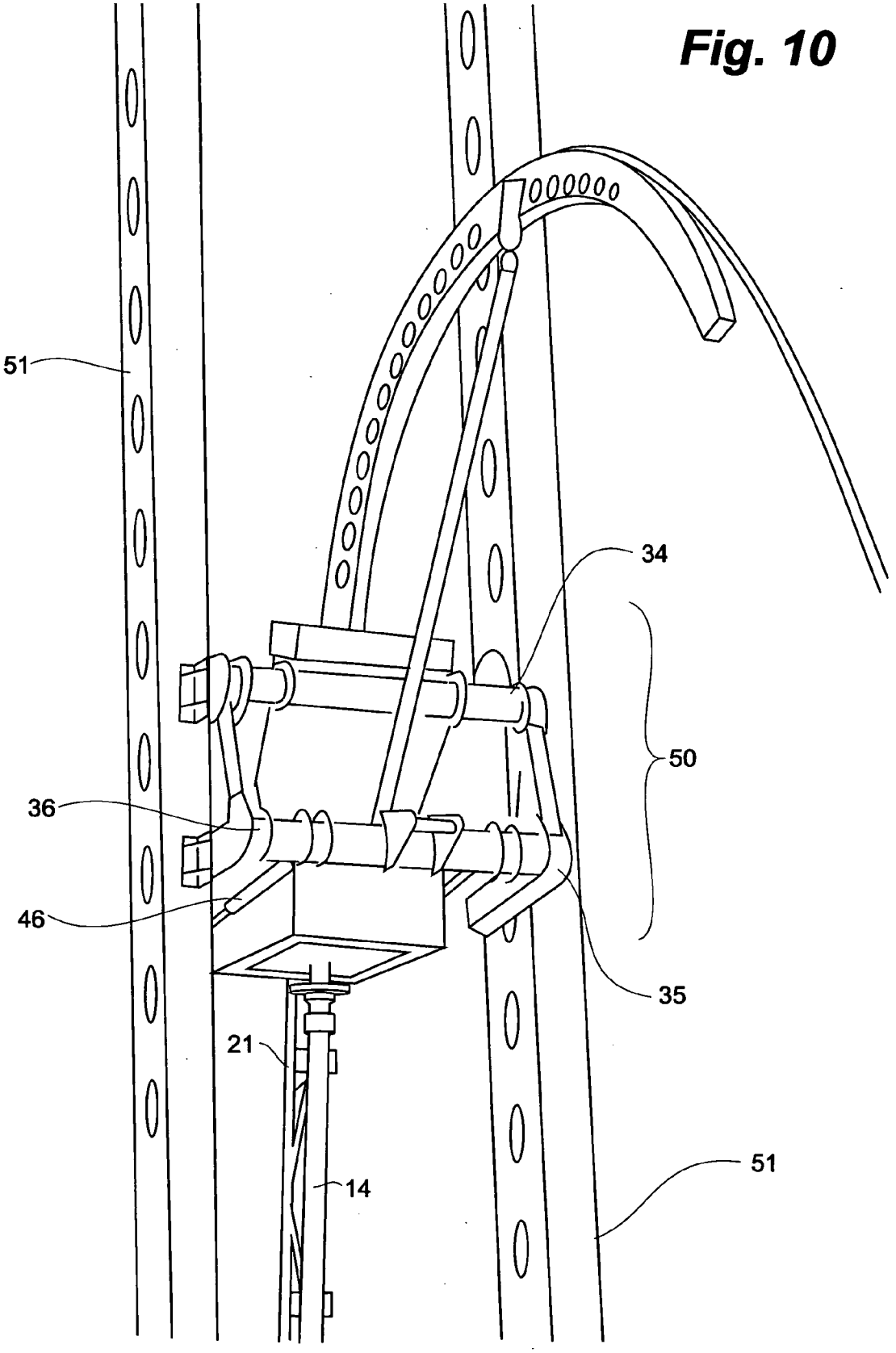
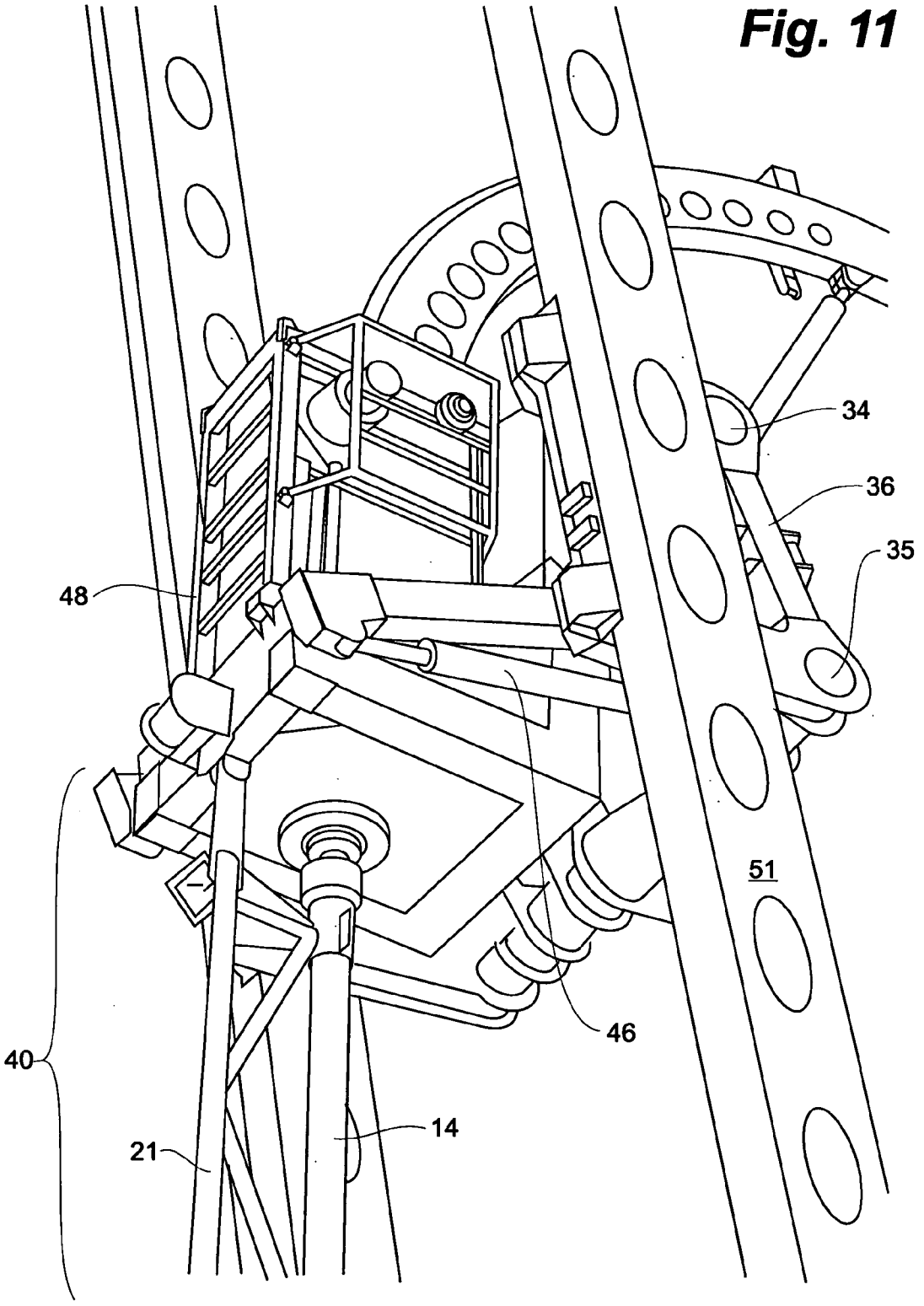


Fig. 11



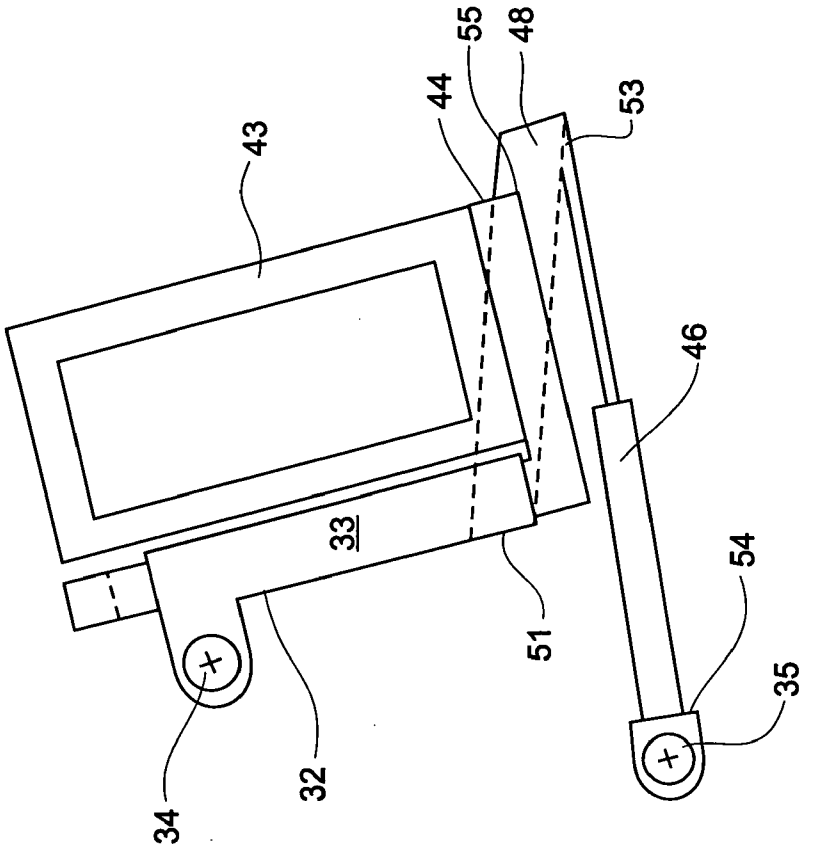


Fig. 13

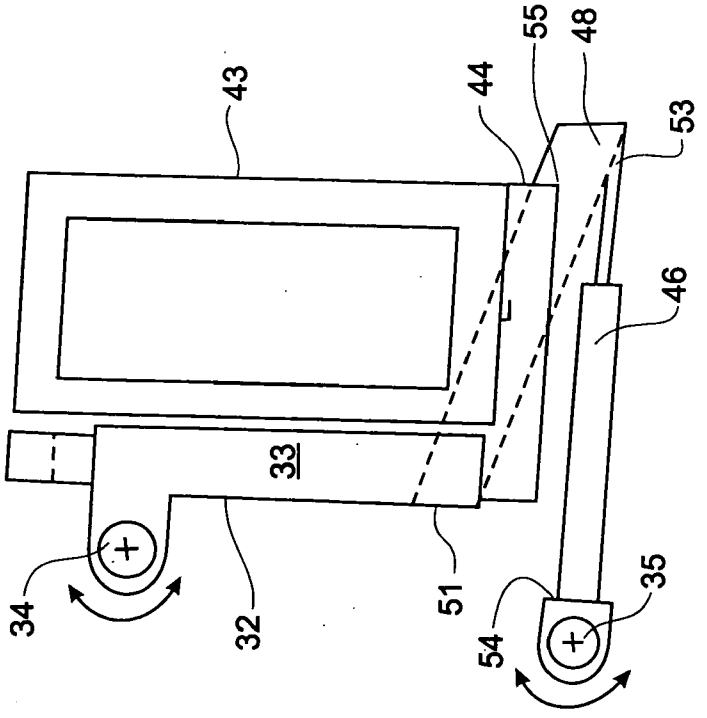


Fig. 12

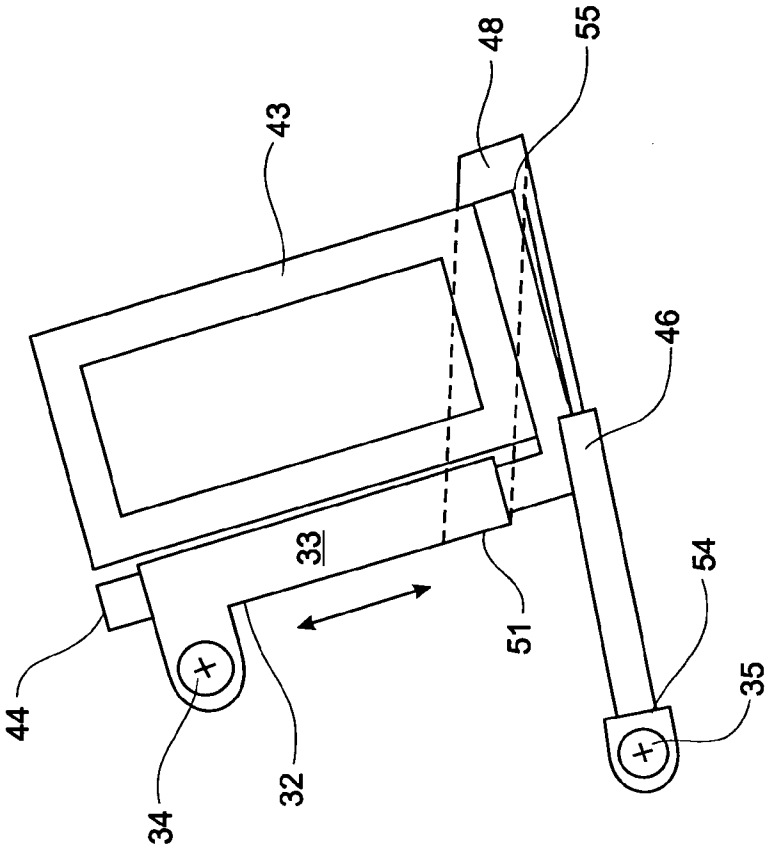


Fig. 15

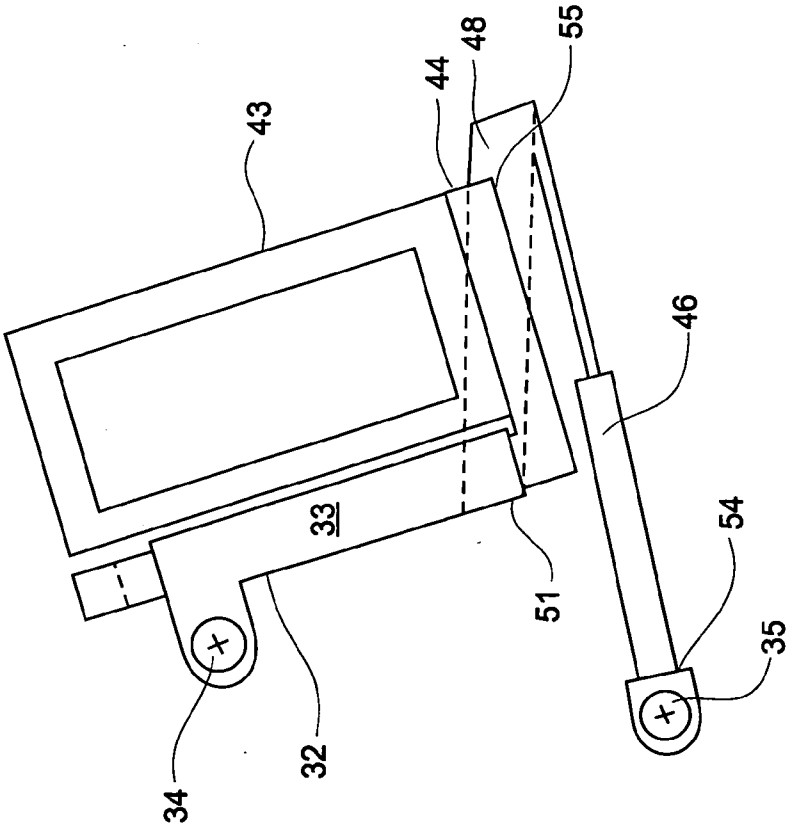


Fig. 14

Fig. 17

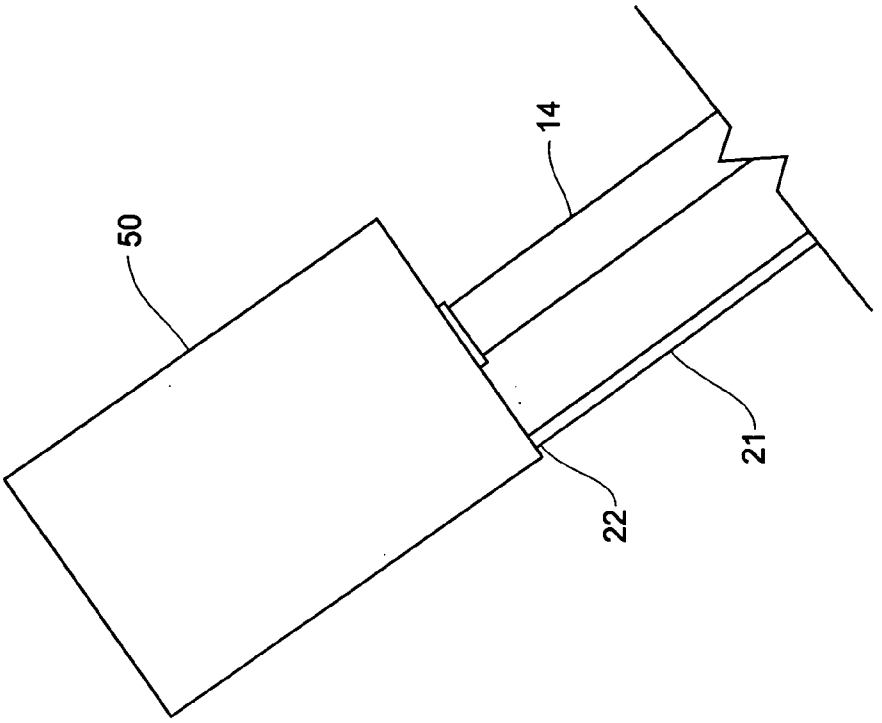
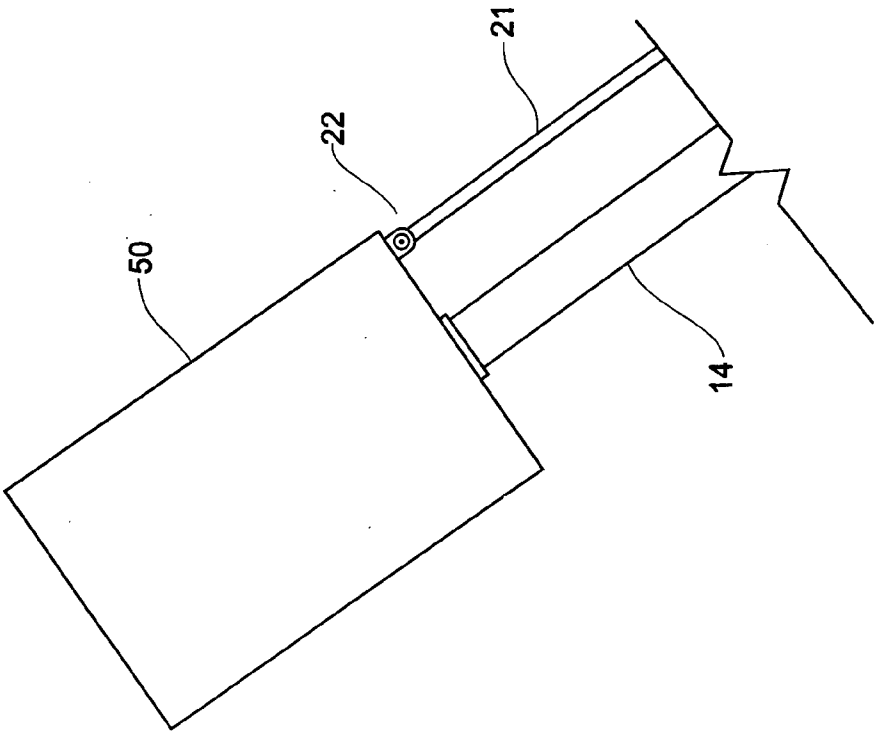


Fig. 16



SUPPORT APPARATUS FOR A LUBRICATOR IN A COIL TUBING OPERATION

FIELD OF THE INVENTION

[0001] The apparatus relates to the field of lubricators used in coil tubing operations in the petroleum industry and more particularly to apparatus for supporting lubricator segments connected between a coil tubing injector and a wellhead.

BACKGROUND OF THE INVENTION

[0002] Conventionally, coil tubing operations, such as wellbore stimulation and workover operations, have been performed on vertical wellbores using vertical derricks and coil tubing injectors which are moveable vertically within the derrick. Further, it is known to provide injectors carried in cradles which are movable in two planes, vertically and horizontally to better align the injector with the wellbore.

[0003] With the introduction of directional wellbores and particularly with slant wellbores, it is known to provide vertically-actuable coil tubing injectors on a derrick which can be slanted in at least one vertical plane to orient the injector with the wellbore and permit movement of the injector along the wellhead axis. In some cases the chassis stabilizer's of the rig are also manipulated somewhat to provide tilt in a second vertical plane.

[0004] Applicant is also aware of injectors which rotate and tilt relative to a trolley and to a derrick along which the trolley slides. The injector is moveable up and down the derrick using a winch mechanism and is capable of being adjusted, using hydraulic cylinders, in an out of the derrick and to rotate and tilt relative to the derrick to roughly align the injector with the wellbore.

[0005] Injectors are typically connected to the wellhead through a lubricator which is comprised of a plurality of lubricator sections which are connected by unions. Each of the lubricator risers may weigh as much as 300-400 lbs and may be rated to handle pressures in the order of about 5000 psi for stimulation or workover operations and the like. Conventional lubricators are designed to be used for vertical wellbores and thus are not designed to handle additional loads placed on them during alignment, connection and operations in a slant wellbore. Additionally, movement of a tiltable injector in any direction causes increased stress loads to be placed on the lubricator which may already be placed under tension as a result of the injection operations. Further, the lubricator may sag, deflect or to bind during injection operations and may not be capable of withstanding the high pressure loads for which they are designed.

[0006] Clearly what is required is means for supporting the lubricator during injection, either to a vertical wellbore or to a slant wellbore, particularly when injected using an injector capable of being rotated and tilted for alignment with the wellbore.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] **FIG. 1** is a side view of a coil tubing rig coupled to a slant well and having an injector arrangement and lubricator support apparatus according to embodiments of the invention;

[0008] **FIG. 2** is a partial perspective view according to **FIG. 1**, viewed from below;

[0009] **FIG. 3** is a perspective view of a supported lubricator section according to an embodiment of the invention;

[0010] **FIG. 4** is a perspective view of an integrated, supported lubricator section according to an embodiment of the invention;

[0011] **FIG. 5** is a partial perspective view of a supported lubricator wherein a support member is positioned substantially vertically above lubricator sections and having auxiliary fasteners connecting therebetween;

[0012] **FIG. 6** is a rear perspective view of a coil tubing injector support according to an embodiment of the invention (the injector removed for clarity of the support);

[0013] **FIG. 7** is front perspective view according to **FIG. 6** and illustrating an embodiment of a supported lubricator connected thereto;

[0014] **FIG. 8** is a rear perspective view according to **FIG. 6**, the injector support mounted in a derrick having spaced apart masts;

[0015] **FIG. 9** is a front view of an injector according to an embodiment of the invention, the injector mounted in a derrick having spaced apart masts and having a supported lubricator according to **FIG. 5** connected thereto;

[0016] **FIG. 10** is a perspective rear view according to **FIG. 9**;

[0017] **FIG. 11** is a perspective front side view according to **FIG. 9**;

[0018] **FIG. 12** is a side schematic illustrating the injector sub-frame and injector frame telescopically mounted in a saddle (the injector, and derrick removed and a tilt bracket shown in dotted line for clarity);

[0019] **FIG. 13** is a side schematic according to **FIG. 12** illustrating tiling of the saddle using an hydraulic actuator;

[0020] **FIG. 14** is a side schematic according to **FIG. 13**, the injector having been tilted;

[0021] **FIG. 15** is a side schematic according to **FIG. 14**, the injector having been moved axially relative to the saddle;

[0022] **FIG. 16** is a partial schematic of an embodiment in which the support apparatus is spaced substantially vertically above the lubricator; and

[0023] **FIG. 17** is a partial schematic of an embodiment in which the support apparatus is spaced substantially vertically below the lubricator.

SUMMARY OF THE INVENTION

[0024] A support apparatus prevents deflection of a lubricator along a path coaxial with a wellhead. In the case of a slant well, the path is angled, an injector being tilted to align the lubricator with the wellhead for connection thereto with the result that the lubricator is placed into tension or compression. The support apparatus, which provides a linearly extending support member which is connected to the lubricator sections such as through truss members, prevents deflection along the path preventing sagging or binding and ensuring the lubricator is operative at the pressures for which it is designed.

[0025] In a broad aspect a support apparatus, for a lubricator having one or more tubular lubricator sections and connecting between a coil tubing injector and a wellhead, comprises: one or more support members adapted to extend along the lubricator and at least one of which is spaced above or below the lubricator for substantially linearly supporting the lubricator thereon, the support member being supported at a first end at the injector; and one or more connecting members adapted to be connected between at least a portion of the one or more support members and at least a portion of the lubricator for reducing deflection along the lubricator.

[0026] If the support member is positioned above the lubricator, the support member is placed into tension, being cantilevered from the injector and the support member is connected to the injector to further support the lubricator. Preferably, auxiliary fastening means, such as turn buckles, chain boomers and the like, are connected between support member sections to brackets extending from the support member for supporting sections of the support member and lubricator while in tension.

[0027] Alternatively, the support member may be positioned below the lubricator, placing the lubricator into compression. The support member need only be supported at the injector and auxiliary fastening means may or may not be used. Further, a plurality of support members may be spaced circumferentially above and below the lubricator for forming a support cage, each of the support members being connected to the lubricator. Preferably, one of the one or more support members is substantially vertically above or below the lubricator.

[0028] In a further broad aspect a method for supporting a lubricator between a coil tubing injector and a wellhead, comprises: providing a plurality of supported lubricator sections, each supported lubricator section having a lubricator section; one or more support members extending substantially parallel to the lubricator section one of which is spaced substantially vertically therefrom for supporting the lubricator section thereon; and one or more connecting members connected between the one or more substantially linearly extending members and the lubricator section; engaging a first end of the lubricator section of a first supported lubricator section with the coil tubing injector; fastening a first end of one or more subsequent supported lubricator sections of the plurality of supported lubricator sections to a second end of a previous supported lubricator section, in series, for assembling a supported lubricator having a length sufficient to extend from the injector to the wellhead; and aligning the assembled coil tubing injector so as to position the supported lubricator along a path coaxial with an axis of the wellhead so as to permit connection between the supported lubricator and the wellhead, the supported lubricator being supported from deflection along the path to the wellhead.

[0029] In a system for injection of coil tubing into vertical or slant wellbores having a wellhead attached thereto, the combination comprises: a coil tubing injector supported within a carriage in a derrick, the injector and carriage being moveable along the derrick, the injector being tiltable and capable of axial movement in the carriage so as to direct coil tubing at a variety of angled paths therefrom; a lubricator engaged with and cantilevered from the coil tubing injector and extending along an angled path coaxial to an axis of the wellhead for passage of the coil tubing therethrough; and a support apparatus for supporting the lubricator from deflection along the angled path to the wellhead, wherein once aligned along the angled path to the wellhead through tilting of the injector, the injector and supported lubricator are manipulated axially along the path for fine adjustment to permit connection of the lubricator with the wellhead.

[0030] A coil tubing injector arrangement supportable in a derrick for injecting coil tubing into a wellbore comprises: a carriage for mounting the injector in the derrick, the carriage being moveable along the derrick; a saddle pivotally connected to the carriage; a coil tubing injector adjustably supported in the saddle; means for pivoting the saddle and injector supported therein for tilting the saddle and injector relative to the carriage and derrick adapted for alignment of the injector with an axis of a wellhead; and means for axially adjusting the injector within the saddle adapted for permitting fine adjustment of the injector with the wellhead.

[0031] A coil tubing rig adapted for injecting coil tubing in a slant wellbore comprises: a mobile carrier; a derrick pivotally mounted to the mobile carrier; a carriage mounted the injector in the derrick, the carriage being moveable along the derrick; a saddle pivotally connected to the carriage and being moveable relative thereto; a coil tubing injector adjustably supported in the saddle; means for pivoting the saddle and injector supported therein for tilting the saddle and injector relative to the carriage and derrick adapted for alignment of the injector along a path with a wellhead connected to the slant wellbore; and means for axially adjusting the injector within the saddle adapted for permitting fine adjustment of the injector with the wellhead.

[0032] A method of operating a mobile service rig as described for servicing a slant wellbore comprises: positioning the mobile service rig adjacent a slant wellbore; connecting a first supported lubricator section to the injector; connecting one or more additional supported lubricator sections to the first supported lubricator section for forming a substantially linearly extending supported lubricator supported from deflection resulting from manipulation of the injector; raising the carriage in the derrick for raising the saddle and injector to an operational height; actuating the means for pivoting the saddle and injector supported therein for tilting the saddle and injector relative to the carriage and derrick adapted for aligning of the injector with a wellhead connected to the slant wellbore; and actuating the means for axially adjusting the injector within the saddle adapted for permitting fine adjustment of the injector with the wellhead for connection of the supported lubricator thereto; actuating the injector for injecting coil tubing through the lubricator to the wellhead and into the wellbore; and performing a service operation through the coil tubing.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0033] Embodiments of the invention may be used for operations relating to both vertical and slant wellbores, however for the purposes of the description found herein, embodiments of the invention are described in the context of a slant wellbore. Those of skill in the art will understand that this in no way limits the use of embodiments of the invention to slant welbores.

[0034] As shown in **FIG. 1**, a coil tubing injector **10** is supported in a derrick **11** and is connected to a wellhead **12** by a lubricator **14** for injection of coil tubing **15** therethrough. The lubricator **14** typically comprises one or more lubricator sections **16**. Multiple sections **16** are connected to one another by unions **18** for forming the lubricator **14**. The lubricator **14** extends axially from the injector **10** to the wellhead **12** along one of a variety of angled and substantially linearly extending paths determined by the angle of the wellhead **12** relative to the ground. Typically wellheads **12** can vary from about 90 degrees relative to the ground in a vertical wellbore to about 30 degrees relative to the ground in a slant wellbore. In the case of wellheads **12** which are angled less than 90 degrees, the lubricator **14** becomes cantilevered from the injector **10** as it extends along a path coaxial with the wellhead **12**.

[0035] Injection of coil tubing **15**, such as for the purposes of servicing a wellbore and other such operations, is accomplished using a mobile coil tubing rig **30** having an injector arrangement **50** comprising an injector **10** supported in a support assembly or carriage **31**, moveable substantially vertically along the derrick **11**. The lubricator **14** is connected to the injector **10**. Preferably, the injector **10** is further adjustably supported for permitting the injector **10** to be tilted and moved side to side relative to the derrick **11** and moved axially relative to the support **20** for adjusting the alignment of the lubricator **14** for connection to the wellhead **12**. The movement of the injector **10** positions the lubricator **14** along the path to the wellhead **12** which, particularly in the case of slant wellheads, may be angled. The lubricator **14**, if unsupported may deflect from a linear path during use. Deflection of the lubricator **14** may cause binding during injection operations and may compromise the lubricator's ability to withstand the high pressure loads for which lubricators are typically designed. Thus, the support apparatus **20** disclosed herein prevents deflection of the lubricator **14** and the problems associated therewith.

[0036] In an embodiment of the invention, as shown in **FIGS. 1**, and **6-15**, an injector arrangement **50** is capable of being manipulated so as to align the injector **10** and lubricator **14**, supported according to embodiments of the invention described below, to the wellhead **12**. More particularly the injector arrangement **50** is capable of being tilted, moved laterally relative to the derrick **11** and, more particularly, moved axially within the injector arrangement **50** to permit the fine control necessary for connection to the wellhead **12** without the need to tilt the derrick **11** and to minimize connection time and maximize efficiency of a coil tubing operation.

Lubricator Support Apparatus

[0037] In an embodiment of the invention and having reference to **FIGS. 2-5** and **16-17**, a lubricator support apparatus **20** is engaged at a first end **22** to the injector **10**. The lubricator support apparatus **20** comprises one or more support members **21** and one or more connecting members **24**, such as a web or truss members, extending between the one or more support members **21** and the lubricator **14** for supporting the lubricator **14** from deflection along a substantially linearly extending path from the injector **10** to the wellhead **12**. Preferably the connecting members **24** are truss members. The path is along the axis of the wellhead **12**. The one or more truss members **24** are connected between at least a portion of the lubricator sections **16** and the one or more support members **21** for supporting the lubricator sections **16** thereon and for reducing stress loading on the lubricator **14**.

[0038] In one preferred embodiment, a single linearly extending support member **21** is used. The support member **21** is spaced substantially parallel to and above or below the lubricator **14** by the truss members **24**, which are fastened to both the lubricator **14** and the support member **21**.

[0039] The support member **21** can be formed from a plurality of substantially linearly extending support segments **26** which are fastened together using fasteners, such as pins **28** and cooperating sockets **29**, for forming the substantially linearly extending support member **21**.

[0040] Preferably, one or more connecting members **24** are connected between each of the lubricator sections **16** and a corresponding support segment **26** for forming a supported lubricator section **40**. Further, use of corresponding support segments **26** and truss members **24** connected therebetween permits the lubricator support apparatus **20** to be readily constructed of a length required to support the lubricator **14**, regardless the length of the lubricator **14**.

[0041] In one embodiment as shown in **FIG. 3**, one or more truss members **24** are unitary with the support segments **26** and are connected to the lubricator sections **16** through fasteners, such as clamps **25**. In an alternate embodiment, as shown in **FIG. 4**, the one or more truss members **24** are unitary with both the support segments **26** and with the lubricator sections **16**.

[0042] Preferably, as shown in **FIGS. 3 and 4**, the truss members **24** comprise one or more transverse truss members **24***t* which extend transversely between the support segments **26** and the lubricator sections **16** and one or more angled truss members **24***a* which extend at an angle therebetween. Most preferably, there are two transverse truss members **24***t* and two angled truss members **24***a*. One transverse truss member **24***t* extends between a first end of the support segment and a first end of a lubricator section **16**. The second transverse truss member **24***t* extends between a second end of the support segment and a second end of a lubricator section **16**. The two angled truss members **24***a* extend, one from the first end of the lubricator section **16** and the second from the second end of the lubricator section **16**, each angling to be connected to the support segment **26** at about a center C of the support segment **26**.

[0043] Having reference to **FIGS. 2, 5** and **16** and in particular to **FIG. 5**, in an embodiment wherein the support member **21** is spaced substantially vertically above the lubricator **14**, the support member **21** is placed into tension when the injector **10** is tilted and is therefore restrained in tension, through connection at the first end **22** to the injector arrangement **50**, for further supporting the support apparatus **20**. Additionally, a plurality of brackets **41** extend outwardly from each of the support segments **26** forming the support member **21** to which auxiliary fastening means **42**, such as turn buckles, chain boomers or the like, are engaged between support segments **26** for further supporting the support apparatus **20** and maintaining tensile connection between the support segments **26**.

[0044] As shown in **FIG. 17**, in an embodiment wherein the support member **21** is spaced substantially vertically

below the lubricator **14**, the support member **21** and lubricator **14** are placed into compression and therefore the support member **21** need only be supported at the first end at the injector arrangement **50** and auxiliary fastening means **42** need not be used. The brackets **41** and auxiliary fastening means **42** can however be used, in any event, for additional stability, such as during rig up.

[**0045**] In another embodiment of the invention, as shown in **FIG. 7**, a plurality of support members **21** may be used, spaced substantially parallel to, and circumferentially above and below the lubricator **14** for forming a cage about the lubricator, each of the support members **21** being connected to the lubricator **14** by truss members **24**, both angled **24***a* and transverse **24***t*.

Injector Arrangement

[**0046**] Having reference to **FIGS. 6-15**, and in a preferred embodiment of the invention, the injector arrangement **50** provides the ability to manipulate the injector **10** and supported lubricator **14** for connection to the wellhead **12** which may be oriented at a variety of angles relative to the ground.

[**0047**] As previously stated, the injector **10** is carried in the carriage **31**, the carriage **31** being moveable vertically along the derrick **11**. The derrick **11** preferably comprises two longitudinally extending, spaced apart masts **51**,**51** which are elevated to a substantially vertical position relative to the rig **30** using conventional means, well known in the art. Movement of the injector arrangement **50** along the derrick **11** is typically through a winch **52** connected thereto.

[**0048**] In a preferred embodiment of the invention, the injector **10** is supported by an injector subframe **43** in an L-shaped injector frame **44** which is telescopically connected to a saddle **32** for axial movement of the injector **10** and lubricator **14** relative to the saddle **32**. More particularly, the saddle **32** comprises a pair of spaced apart opposing substantially vertical sleeves **33** in which the injector **10** housed in the subframe **43** and the injector frame **44** is supported for movement axially therein.

[**0049**] In an embodiment of the invention, the injector **10** is supported directly on a modified L-shaped injector frame **44** eliminating the additional weight of the injector subframe **43**.

[**0050**] The saddle **32** is pivotally mounted to the carriage **31** through upper and lower transverse members **34**,**35** which extend between carriage brackets **36** located on opposing sides of the injector **10** and saddle **32** and connected to each of the masts **51**,**51** via C-shaped channel members **37** which slideably engage the masts **51**,**51** for movement therealong.

[**0051**] Preferably the saddle **32** is pivotally connected to the upper transverse member **34**, such as by brackets **38** and a transverse sleeve **39** through which the upper transverse member **34** extends. Further, the saddle **32** is slideably connected on the upper transverse member **34** and the lower transverse member **35** to permit lateral movement therealong between the masts **51**,**51** of the derrick **11**.

[**0052**] In order to manipulate the injector arrangement **50** relative to the derrick **11** and along a path parallel, and more particularly coaxial with the axis of the wellhead **12**, actuators **45**, **46**, **47** are connected between the injector arrangement **50** and the saddle **12**.

[**0053**] Best seen in **FIGS. 6, 8** and **15**, an axial actuator **45**, such as a hydraulic cylinder, is connected between the injector frame **44** and the saddle **32** so as to permit axial movement of the injector **10** and injector frame **44** guided within the opposing substantially vertical sleeves **33**, relative to the saddle **32**. After adjusting one or both of the angular and lateral alignment of the injector **10** and lubricator **14**, axial movement of the injector **10** and lubricator **14** permits fine adjustment of the lubricator **14** with the wellhead **12** and permits ease of connection thereto.

[**0054**] Best seen in **FIGS. 12-15**, actuation means **46**, such as one or more hydraulic actuators for tilting the injector arrangement **50**, are connected between the saddle **32** and the lower transverse member **35** for pivoting the injector **10** and lubricator **14** to align with the path toward the wellhead **12**. Preferably tilt brackets **48** are connected to the outside of each substantially vertical sleeve **33** at a downwardly extending angle, adjacent a bottom end **51**, to permit attachment of the hydraulic actuators **46** between the saddle **32** and the lower transverse member **35** on each side of the saddle **32**. The hydraulic actuators **46** are fastened at a first end **53** to the tilt brackets **48** and are pivotally connected at a second end **54** to the lower transverse member **35**. As the hydraulic tilt actuators **46** extend for tilting a bottom end **55** of the injector arrangement **50** away from the derrick **11**, the second end **54** of the tilt actuator **46** pivots about the lower transverse member **35** to permit the bottom end **55** of the injector arrangement **50** to move outwardly therefrom as the saddle **32** pivots about the upper transverse member **34**.

[**0055**] As shown in **FIGS. 6 and 8**, one or more lateral actuators **47** are connected between one of the opposing carriage brackets **36** and the saddle **32** so as to move the saddle **32** and injector **10** laterally therealong relative to the derrick **111** for lateral adjustment of the injector **10** and lubricator **14** to align with the wellhead **12**.

In use

[**0056**] In operation, the mobile rig **30** is positioned adjacent the wellhead **12** and the derrick **111** is raised to a substantially vertical position. A first supported lubricator section **40** is connected to the injector **10**. Preferably, the first supported lubricator section **40** remains permanently connected to the injector **10**. The carriage **31** is raised in the derrick **11**. As the carriage **31** is raised, subsequent trussed lubricator sections **40** are connected to a previous supported lubricator section **40**, in series, to assemble the support member **21** and for forming the supported lubricator **14** of sufficient length to span between the injector **10** and the wellhead **12**.

[**0057**] More particularly, supported lubricator sections **40** are positioned beneath the injector **10** typically using a mobile crane. The supported lubricator sections **40** are supported on a stand (not shown) on the ground after which the carriage **31** and the injector **10** are manipulated, typically laterally and axially, first to attach a first supported section **40** and thereafter to permit connection of the unions **18** on the adjacent supported lubricator sections **40** and to align the pin **28** on one support segment **26** with the co-operating socket **29** of the next support segment **26**.

[**0058**] Best seen in **FIGS. 2 and 5** and in the embodiment wherein the support member **21** is spaced vertically above

the lubricator sections **16**, auxiliary fastening means **42** are further connected between the brackets **41** of adjacent supported lubricator sections **40** for further supporting the lubricator **14** which is in tension.

[**0059**] Once the supported lubricator **14** is assembled, the carriage **31** is raised and lowered within the derrick **111** to a desired operational height and the injector **10** is manipulated angularly, laterally and axially, as required, to align the now substantially linearly extending and supported lubricator **14** with the wellhead **12**. After connection of the supported lubricator **14** to the wellhead **12**, coil tubing (not shown) can be injected therethrough by the injector and service operations and the like can be performed on the wellbore.

What is claimed is:

1. A support apparatus for a lubricator having one or more tubular lubricator sections and connecting between a coil tubing injector and a wellhead, the support apparatus comprising:

one or more support members adapted to extend substantially parallel to the lubricator and at least one of which is spaced above or below the lubricator for supporting the lubricator along a substantially linearly extending path, the support member being supported at a first end at the injector; and

one or more connecting members adapted to be connected between at least a portion of the one or more support members and at least a portion of the lubricator for reducing deflection along the lubricator.

2. The support apparatus of claim 1 comprises one support member.

3. The support apparatus of claim 1 wherein one of the one or more support members is spaced substantially vertically above the lubricator and is connected at a first end to the coil tubing injector.

4. The support apparatus of claim 1 wherein one of the one or more support members is spaced substantially vertically below the lubricator.

5. The support apparatus of claim 1 wherein at least one of the one or more connecting members is adapted to be connected to each of the plurality of tubular lubricator sections.

6. The support apparatus of claim 1 wherein the one or more support members further comprise a plurality of support segments, the segments being fastened to one another using fasteners.

7. The support apparatus of claim 2 wherein the one support member further comprises a plurality of support segments, the segments being fastened to one another using fasteners.

8. The support apparatus of claim 1 wherein the support apparatus is adapted to support the lubricator between the injector and a slant wellhead.

9. The support apparatus of claim 6 wherein the plurality of support segments further comprise:

a cooperating socket formed in a first end of each of the plurality of support segments; and

a pin extending from a second end of each of the plurality of support segments, wherein the plurality of support segments are fastened by mating the pin at the first end of each of the plurality of support segments into a cooperating socket at the second end of a subsequent of the plurality of support segments.

10. The support apparatus as described in claim 6 further comprising:

a plurality of brackets extending outwardly from each of the plurality of support segments so as to engage auxiliary fastening means for connection between brackets of subsequent of the plurality of support segments.

11. The support apparatus of claim 7 wherein the plurality of support segments further comprise:

a cooperating socket formed in a first end of each of the plurality of support segments; and

a pin extending from a second end of each of the plurality of support segments, wherein the plurality of support segments are fastened by mating the pin at the first end of each of the plurality of support segments into a cooperating socket at the second end of a subsequent of the plurality of support segments.

12. The support apparatus as described in claim 7 further comprising:

a plurality of brackets extending outwardly from each of the plurality of support segments so as to engage auxiliary fastening means for connection between brackets of subsequent of the plurality of support segments.

13. The support apparatus of claim 1 wherein the one or more connecting members further comprise:

one or more truss members adapted to extend transversely between the one or more support members and the lubricator; and

one or more angled truss members adapted to extend between the support member and the lubricator.

14. The support apparatus of claim 13 wherein the one or more support members each further comprise a plurality of support segments and each lubricator section is supported by one of the plurality of support segments and first and second transverse truss members and first and second angled truss members, wherein

the first and second transverse truss members are adapted for connection to first and second ends of the lubricator section; and

the first and second angled truss members are adapted to extend from the first and second ends of the lubricator section to substantially a centre of one of the plurality of support segments.

15. The support apparatus of claim 1 wherein the one or more connecting members are adapted for connection to each of the plurality of lubricator sections using clamps.

16. The support apparatus of claim 1 wherein the one or more connecting members are integral with each of the plurality of lubricator sections.

17. A method for supporting a lubricator between a coil tubing injector and a wellhead, the method comprising:

providing a plurality of supported lubricator sections, each supported lubricator section having

a lubricator section;

one or more support members extending along the lubricator section, at least one of which is spaced above or

below the lubricator for supporting the lubricator section along a substantially linearly extending path; and

one or more connecting members connected between the one or more support members and the lubricator section;

engaging a first end of the lubricator section of a first supported lubricator section with the coil tubing injector;

fastening a first end of one or more subsequent supported lubricator sections of the plurality of supported lubricator sections to a second end of a previous supported lubricator section, in series, for assembling a supporting lubricator having a length sufficient to extend from the injector to the wellhead; and

aligning the assembled coil tubing injector so as to position the substantially linearly extending supported lubricator along a path coaxial with an axis of the wellhead so as to permit connection between the supported lubricator and the wellhead, the supported lubricator being supported from deflection along the path to the wellhead.

18. The method of claim 17 wherein each support member is spaced substantially vertically above each lubricator section, further comprising:

connecting a first end of the support member of the first supported lubricator section to the coil tubing injector.

19. The method of claim 18 wherein each support member further comprises a plurality of brackets extending therefrom above the support member, and following fastening the at least a second supported lubricator section to the second end of the first supported lubricator section, the method further comprising:

connecting auxiliary fasteners between the brackets of each adjacent support member for further supporting the supported lubricator from deflection.

20. The method of claim 17 wherein the wellhead is a slant wellhead further comprising:

tilting and manipulating the coil tubing injector axially so as to permit alignment of the assembled supported lubricator along an angled path coaxial to the slant wellhead.

21. The method of claim 17 wherein the wellhead is a slant wellhead further comprising:

tilting and manipulating the coil tubing injector axially and laterally so as to permit alignment of the assembled supported lubricator along an angled path coaxial to the slant wellhead.

22. In a system for injection of coil tubing into vertical or slant wellbores having a wellhead attached thereto, the combination comprising:

a coil tubing injector supported within a carriage in a derrick, the injector and carriage being moveable along the derrick, the injector being tiltable and capable of axial movement in the carriage so as to direct coil tubing at a variety of angled paths therefrom;

a lubricator engaged with and cantilevered from the coil tubing injector and extending along an angled path coaxial to an axis of the wellhead for passage of the coil tubing therethrough; and

a support apparatus for supporting the substantially linearly extending lubricator from deflection along the angled path to the wellhead,

wherein once aligned along the angled path to the wellhead through tilting of the injector, the injector and supported lubricator are manipulated axially along the path for fine adjustment to permit connection of the lubricator with the wellhead.

23. The system of claim 22 wherein the support apparatus further comprises:

one or more support members adapted to extend substantially parallel to the lubricator and at least one of which is spaced above or below the lubricator for substantially linearly supporting the lubricator thereon, the support member being supported at a first end at the injector; and

one or more connecting members adapted to be connected between at least a portion of the one or more support members and at least a portion of the lubricator for reducing deflection along the lubricator.

24. The system of claim 23 wherein the one or more connecting members further comprise:

one or more truss members adapted to extend transversely between the one or more support members and the lubricator; and

one or more angled truss members adapted to extend between the support member and the lubricator.

25. The system of claim 24 wherein the one or more support members each further comprise a plurality of support segments and each lubricator section is supported by one of the plurality of support segments and first and second transverse truss members and first and second angled truss members, wherein

the first and second transverse truss members are adapted for connection to first and second ends of the lubricator section; and

the first and second angled truss members are adapted to extend from the first and second ends of the lubricator section to substantially a centre of one of the plurality of support segments.

26. The system of claim 25 wherein the plurality of support segments further comprise:

a cooperating socket formed in a first end of each of the plurality of support segments; and

a pin extending from a second end of each of the plurality of support segments, wherein the plurality of support segments are fastened by mating the pin at the first end of each of the plurality of support segments into a cooperating socket at the second end of a subsequent of the plurality of support segments.

27. The system of claim 22 wherein the coil tubing injector comprises:

a carriage for mounting the injector in the derrick, the carriage being moveable along the derrick;

a saddle pivotally connected to the carriage;

a coil tubing injector adjustably supported in the saddle;

means for pivoting the saddle and injector supported therein for tilting the saddle and injector relative to the carriage for alignment of the injector with a wellhead; and

means for axially adjusting the injector within the saddle adapted for permitting fine adjustment of the injector with the wellhead.

28. The system of claim 27 further comprising:

spaced apart opposing substantially vertical sleeves formed in the saddle; and

an injector frame for supporting the injector in the saddle, the frame being telescopically housed within the sleeves in the saddle for permitting axial movement of the injector therein relative to the saddle.

29. The system of claim 27 wherein the means for adjusting the injector within the saddle comprises one or more hydraulic actuators connected between the injector frame and the saddle for permitting the injector frame to be moved axially within the saddle sleeves.

30. A coil tubing injector arrangement supportable in a derrick for injecting coil tubing into a wellbore comprising:

a carriage for mounting the injector in the derrick, the carriage being moveable along the derrick;

a saddle pivotally connected to the carriage;

a coil tubing injector adjustably supported in the saddle;

means for pivoting the saddle and injector supported therein for tilting the saddle and injector relative to the carriage for alignment of the injector with an axis of a wellhead of the wellbore; and

means for axially adjusting the injector within the saddle adapted for permitting fine adjustment of the injector with the wellhead.

31. The injector arrangement of claim 30 further comprising:

spaced apart opposing substantially vertical sleeves formed in the saddle; and

an injector frame for supporting the injector in the saddle, the frame being telescopically housed within the sleeves in the saddle for permitting axial movement of the injector therein relative to the saddle.

32. The injector arrangement of claim 31 wherein the means for adjusting the injector within the saddle comprises one or more hydraulic actuators connected between the injector frame and the saddle for permitting the injector frame to be moved axially within the saddle sleeves.

33. The injector arrangement of claim 30, wherein the derrick comprises two spaced apart masts, further comprising:

carriage brackets located on opposing sides of the injector and the saddle and connected to the derrick, each connected to one of the two spaced apart masts by a C-shaped channel member slideably engaging each mast;

upper and lower transverse members extending between the carriage brackets; and

a transverse sleeve formed on the saddle for pivotally housing the upper transverse members therein for permitting pivoting of the saddle and injector relative to the carriage.

34. The injector arrangement of claim 31 wherein the means for pivoting the saddle and injector is one or more hydraulic actuators connected between the injector frame and the lower transverse member, the one or more hydraulic actuators being pivotally connected to the lower transverse member.

35. The injector arrangement of claim 31 further comprising:

a subframe for supporting the injector on the injector frame.

36. A coil tubing rig adapted for injecting coil tubing in a slant wellbore comprising:

a mobile carrier;

a derrick pivotally mounted to the mobile carrier;

a carriage mounted the injector in the derrick, the carriage being moveable along the derrick;

a saddle pivotally connected to the carriage and being moveable relative thereto;

a coil tubing injector adjustably supported in the saddle;

means for pivoting the saddle and injector supported therein for tilting the saddle and injector relative to the carriage for alignment of the injector along a path with a wellhead connected to the slant wellbore; and

means for axially adjusting the injector within the saddle adapted for permitting fine adjustment of the injector with the wellhead.

37. The coil tubing rig of claim 36 further comprising:

a support apparatus for a lubricator, having one or more tubular lubricator sections, connecting between the coil tubing injector and the wellhead, the support apparatus comprising:

one or more support members adapted to extend substantially parallel to the lubricator and at least one of which is spaced above or below the lubricator for substantially linearly supporting the lubricator thereon, the support member being supported at a first end at the injector; and

one or more connecting members adapted to be connected between at least a portion of the one or more support members and at least a portion of the lubricator for reducing deflection along the lubricator.

38. The coil tubing rig of claim 37 comprising one support member.

39. The coil tubing rig of claim 37 wherein one of the one or more support members is spaced substantially vertically above the lubricator and is connected at a first end to the coil tubing injector.

40. The coil tubing rig of claim 37 wherein the one or more connecting members further comprise:

one or more truss members adapted to extend transversely between the one or more support members and the lubricator; and

one or more angled truss members adapted to extend between the support members and the lubricator.

41. The coil tubing rig of claim 37 wherein the one or more support members each further comprise a plurality of support segments and each lubricator section is supported by one of the plurality of support segments and first and second transverse truss members and first and second angled truss members, wherein

the first and second transverse truss members are adapted for connection to first and second ends of the lubricator section; and

the first and second angled truss members are adapted to extend from the first and second ends of the lubricator section to substantially a centre of one of the plurality of support segments.

42. The coil tubing rig of claim 41 wherein the plurality of support segments further comprise:

a cooperating socket formed in a first end of each of the plurality of support segments; and

a pin extending from a second end of each of the plurality of support segments, wherein the plurality of support segments are fastened by mating the pin at the first end of each of the plurality of support segments into a cooperating socket at the second end of a subsequent of the plurality of support segments.

43. A method of operating a mobile service rig according to claim 36 for servicing a slant wellbore comprising:

positioning the mobile service rig adjacent a slant wellbore;

connecting a first supported lubricator section to the injector;

connecting one or more additional supported lubricator sections to the first supported lubricator section for forming a substantially linearly extending supported lubricator supported from deflection resulting from manipulation of the injector;

raising the carriage in the derrick for raising the saddle and injector to an operational height;

actuating the means for pivoting the saddle and injector supported therein for tilting the saddle and injector relative to the carriage for aligning of the injector with a wellhead connected to the slant wellbore; and

actuating the means for axially adjusting the injector within the saddle adapted for permitting fine adjustment of the injector with the wellhead for connection of the supported lubricator thereto;

actuating the injector for injecting coil tubing through the lubricator to the wellhead and into the wellbore; and

performing a service operation through the coil tubing.

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