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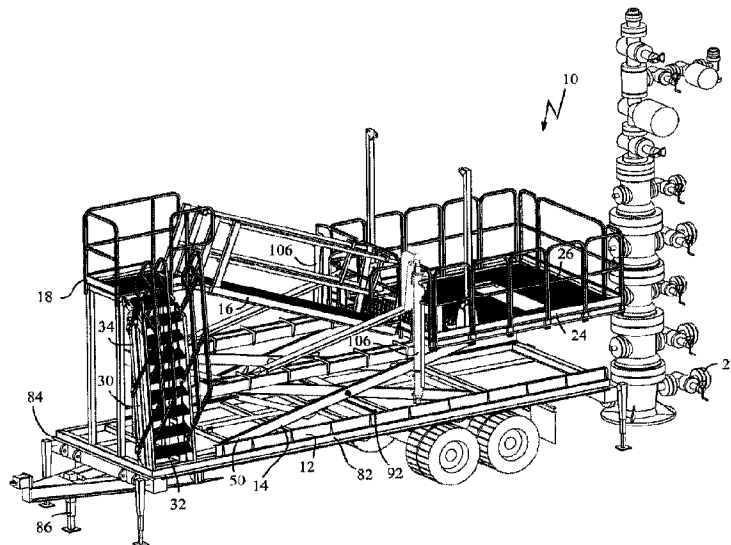
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(54) Title: MOVABLE WELLHEAD PLATFORM



(57) Abrégé/Abstract:

A movable platform system has a base, a scissor lift assembly, a telescoping walkway and a tower. The base supports the scissor lift assembly. The scissor lift assembly comprises a first pair of legs, a second pair of legs, and a platform supported by the first pair of legs and the second pair of legs. The telescoping walkway extends from the platform to the tower to provide access to the platform. The base comprises at least one track extending across the base, and each of the first pair of legs and second pair of legs couple independently to the track such that the each of the first pair of legs and the second pair of legs can translate relative to the base and relative to each other.

ABSTRACT OF THE DISCLOSURE

A movable platform system has a base, a scissor lift assembly, a telescoping walkway and a tower. The base supports the scissor lift assembly. The scissor lift assembly comprises a first pair of legs, a second pair of legs, and a platform supported by the first pair of legs and the second pair of legs. The telescoping walkway extends from the platform to the tower to provide access to the platform. The base comprises at least one track extending across the base, and each of the first pair of legs and second pair of legs couple independently to the track such that the each of the first pair of legs and the second pair of legs can translate relative to the base and relative to each other.

MOVABLE WELLHEAD PLATFORM

TECHNICAL FIELD

[0001] This invention relates generally to the field of temporary work platforms for oil and gas wellheads and more particularly to platforms designed for facilitating different types of work being performed on or around wellheads in the absence of drilling rigs.

BACKGROUND

[0002] Producing oil and natural gas wells occasionally requires major repairs or modifications, called "workovers." A workover may last anywhere from a few days to several weeks to accomplish. Workover services are occasionally carried out with the same type of rig used to perform maintenance services, although the rig often is outfitted with specialized equipment including rotary drilling equipment, mud pumps, mud tanks and blowout preventers. In many cases it is convenient to perform workovers in the absence of drilling rigs. Such workover examples may require the use of endless tubing units, wire line units, snubbing units and fracture stimulation units for example. In addition to workover of an existing well, various tasks need to be performed to plug a well whose useful lifetime is finished. These tasks are typically described as "completion" tasks. The completion process may involve selectively perforating the well casing at the depth of discrete producing zones and installing down-hole equipment. Workover or completion tasks may take anywhere from a few days to several weeks to accomplish.

[0003] In most cases when such workover completion work is being performed on a wellhead, ordinary modular-type scaffolding is erected around the wellhead so that workers can access the equipment vertically erected around the wellhead. This scaffolding is inconvenient for several reasons. It takes significant time to assemble and certify for safety, it can be unstable on frozen ground that is subject to thawing by steam heaters employed in the vicinity of the wellhead, and is not easily moved to accommodate exchange of equipment at the wellhead. In addition, this type of scaffolding is accessed by ladders which represent an additional safety hazard.

[0004] The inventor's own C.A. Patent 2,629,578 discloses a movable platform system having a support frame that can be translated up and down along a vertical track and which can be translated along a horizontal track.

SUMMARY

[0005] In an embodiment, there is provided a movable platform system, comprising a base; a scissor lift assembly; a telescoping walkway; a tower; the base supporting the scissor lift assembly; the scissor lift assembly comprising a first set of legs, a second set of legs, and a platform supported by the first set of legs and the second set of legs; the telescoping walkway extending from the platform to the tower to provide access to the platform; and the base comprising a first track extending across the base, and each of the first set of legs and second set of legs coupling independently to the first track such that the first set of legs and the second set of legs are translatable relative to the base and relative to each other.

[0006] In various embodiments, there may be included any one or more of the following features: the first set of legs and the second set of legs are a first pair of legs and a second pair of legs, respectively; the movable platform system further comprising telescoping steps extending from the tower towards the ground; the platform is provided with a wellhead access gap; the platform is cantilevered from the scissor lift assembly; the scissor lift assembly comprises a plurality of beams, the beams comprising a second track formed along the length of the beams, and the first set of legs coupling to the second track such that the first set of legs is translatable relative to the beams; the platform comprises a surface cantilevered from the beams such that the surface extends away from the beams; the second set of legs is pivotally coupled to the surface; the platform is further connected to the beams by a brace; the platform further comprises an elevated portion extending from the surface; the brace is fixed to the elevated portion of the surface; the base comprises a bed of a trailer.

BRIEF DESCRIPTION OF THE FIGURES

[0007] Embodiments will now be described with reference to the figures, in which like reference characters denote like elements, by way of example, and in which:

[0008] Fig. 1 is a perspective view of an embodiment of a movable platform system in a closed configuration with a secondary vertical lock system;

[0009] Fig. 2 is a perspective view of an embodiment of a movable platform system in an open configuration;

[0010] Fig. 3 is a perspective view of the embodiment of Fig. 1 in an open configuration, with part of the secondary vertical lock system not shown;

[0011] Fig. 4 is a side view of the embodiment of Fig. 2 in a closed configuration;

[0012] Fig. 5 is a side view of the embodiment of Fig. 2 in an open configuration;

[0013] Fig. 6 is a top view of the embodiment of Fig. 2 in a closed configuration; and

[0014] Fig. 7 is a top view of the embodiment of Fig. 2 in an open configuration.

[0015] Fig. 8 is a detail side view of the embodiment of Fig. 3.

DETAILED DESCRIPTION

[0016] Immaterial modifications may be made to the embodiments described here without departing from what is covered by the claims. In the claims, the word “comprising” is used in its inclusive sense and does not exclude other elements being present. The indefinite articles “a” and “an” before a claim feature do not exclude more than one of the feature being present. Each one of the individual features described here may be used in one or more embodiments and is not, by virtue only of being described here, to be construed as essential to all embodiments as defined by the claims.

[0017] Embodiments of a movable platform system 10 are shown in Figs. 1-7. The movable platform system 10 has a base 12, a scissor lift assembly 14, a telescoping walkway 16 and a tower 18. The base 12 supports the scissor lift assembly 14. The scissor lift assembly 14 comprises a first set of legs 20, a second set of legs 22, and a platform 24 supported by the first set of legs 20 and the second set of legs 22. The first set of legs 20 may be a first pair of legs 20, and the second set of legs 22 may be a second pair of legs 22. In the embodiment shown, two pairs of legs are used.

[0018] As shown in Figs. 2 and 3, the telescoping walkway 16 extends from the tower 18 to a surface 26 of platform 24 to provide access to the platform 24. A person may thus safely and easily walk from the tower 18 to the platform 24. Workers on the platform 24 may access a wellhead 27.

[0019] The base 12 comprises a first track 28 extending across the base 12, and each of the first pair of legs 20 and second pair of legs 22 couples independently to the first track 28 such that the first pair of legs 20 and the second pair of legs 22 are translatable relative to the base 12 and relative to each other.

[0020] Figs. 1, 4 and 6 show a movable platform system 10 in a fully closed configuration and Figs. 2-3, 5 and 7 show the movable platform system 10 in a fully open configuration. In the fully closed configuration the movable platform system 10 is ready to be transported between locations. In the fully open configuration a worker may ascend to the platform 24 for a “workover” to be undertaken.

[0021] Access to the tower 18 from ground level may be by means of steps 30. For example, the steps may be telescoping steps which extend from the tower 18 towards the ground. When the movable platform system 10 is in a closed configuration, the steps 30 may be collapsed such that telescoping sections of the steps 30 are stabilized against or on the base 12. In a closed configuration,

the steps 30 may be stabilized against the ground, although the steps 30 may instead extend to slightly above the ground, as shown for example in Fig. 5.

[0022] As shown in Fig. 2, the steps 30 may comprise a first step segment 32 and a second step segment 34. The first step segment 32 may have a similar or smaller width which allows the first step segment 32 to slide above the second step segment 34. The step segments 32 and 34 may slide along tracks. The first step segment 32 may slide along the length of the second step segment 34 until the first step segment 32 locks at its upper end to the lower end of the second step segment 34, as shown in Figs. 2, 3 and 5. Each step segment 32 and 34 may have a railing 36, and the railing 36 may be further outward of the second step segment 34 in order to allow the first step segment 32 to slide over the second step segment 34.

[0023] As shown in Figs. 2, 3, 5 and 7, workers may reach the surface 26 of the platform 24 using the telescoping walkway 16. The walkway 16 may be flexibly or rotatably connected to the tower 18 at one end of a first walkway section 38 and to the platform 24 at one end of a second walkway section 40, to allow the walkway 16 to expand or retract dependent on the motion of the platform 24. Thus, as the platform 24 is raised or lowered by the scissor lift assembly 14 or translated by the motion of the scissor lift assembly 14 along the first track 28, the first walkway section 38 and second walkway section 40 may slide by each other to lengthen or shorten the walkway 16. The walkway 16 may have an incline of for example 10 to 20 degrees in an open configuration in order to allow workers to safely and quickly reach the platform 24. As shown in Figs. 1, 4 and 6, in a closed configuration, the walkway 16 may have an incline of for example 18 to 26 degrees.

[0024] As shown for example in Figs. 2 and 3, the walkway 16 may have a railing, which may for example comprise a first railing 42 corresponding to the first walkway section 38 and a second railing 44 corresponding to the second walkway section 38. A first pair of stabilizing bars 46 may be fixed to the first railing 42 while allowing the second railing 44 slide through the first pair of stabilizing bars 46. A second pair of stabilizing bars 48 may be fixed to the second railing 44 while allowing the first railing 42 slide through the second pair of stabilizing bars 48. The stabilizing bars 46 and 48 stabilize the walkway 16, at least by allowing the ends of the first walkway section 38 and the second walkway section 40 to overlap.

[0025] In a closed configuration, the scissor lift assembly 14 may be lowered and the lower ends 50 of the second pair of legs 22 may be adjacent to the tower 18. To bring the scissor lift assembly 14 to an open configuration, the scissor lift assembly 14 may for example be actuated hydraulically, pneumatically or mechanically. The scissor lift assembly 14 may be raised by the operation of a linear

actuator, which may for example be lifting cylinders. As shown in Fig. 2, there may be two linear actuators, with a first linear actuator 52 acting on a first leg 54 of the first pair of legs 20 and a first leg 56 of the second pair of legs 22. A second linear actuator 58 may act on a second leg 60 of the first pair of legs 20 and a second leg 62 of the second pair of legs 22, causing the platform 24 to rise and may also cause at least one of the first pair of legs 20 and the second pair of legs 22 to translate along the first track 28. The linear actuators 52 and 58 may be equipped with counterbalance valves so that the linear actuators 52 and 58 act as a pressure activated check valve. By controlling the linear actuators 52 and 58 with the counterbalance valves, the vertical movement of the scissor lift assembly 14 may be locked.

[0026] Each of the first leg 54 of the first pair of legs 20, the second leg 56 of the second pair of legs 22, the second leg 60 of the first pair of legs 20 and the second leg 62 of the second pair of legs 22 may include multiple segments connected end to end at an angle to each other, such that the first pair of legs 20 and the second pair of legs 22 form a cross pattern.

[0027] As shown in Figs. 3, 6 and 7, the platform 24 is provided with a wellhead access gap 64. The wellhead access gap 64 and the positioning of the scissor lift assembly 14 may allow the platform 24 to be placed in a position above or around the wellhead 27 so that workers can carry out workover or completion tasks on the wellhead 27. The platform 24 may for example be 2.5 to 3.5 meters in length and 2 to 3 meters in width. The wellhead access gap 64 may for example be 1.5 to 3 meters in length and 1 to 2 meters in width. The wellhead access gap 64 may be partially covered with removable covers which may be for example removable metal grating 68. The grating 68 may be removed in order to place the platform above or around the wellhead 27. Workers may stand on the grating 68 to approach closer to the wellhead 27 when the movable platform system 10 is in an open configuration.

[0028] As shown in Figs. 1-7, the platform 24 may be cantilevered from the scissor lift assembly 14. The scissor lift assembly 14 may comprise a plurality of beams 70 fixed to the first pair of legs 20. The platform 24 may comprise the surface 26, and the surface 26 may be anchored or cantilevered to an end portion of the beams 70 and the surface may extend away from the beams 70. Thus, only a small portion of the surface 26 may be directly supported from underneath by beams 70.

[0029] As shown in Figs. 6 and 7, each beam 70 may comprise a second track 71 along the length of the beam 70, and the first pair of legs 20 may couple to the second track 71 such that the first set of legs 20 is translatable relative to the beams 70. The second pair of legs 22 may be pivotally coupled to an underside 72 of the surface 26. Thus, the first pair of legs 20 may translate along first track 28

at one end and along the second track 71 at its other end, and the second pair of legs 22 may translate along the first track 28 at one end, while remaining pivotally fixed to the platform 24 at its other end.

[0030] The platform 24 may also be connected to and supported by the beams 70 by a brace 74. The platform 24 may further comprise an elevated portion 76 extending from the surface 26, and the brace 74 may be fixed to the elevated portion 76. The elevated portion 76 may be connected to a railing 78 along the outer edge of the surface 26. The surface 26 may include a surface grating 80 forming a portion of a perimeter of the surface and the removable covers or metal gratings 68. The surface may be for example 2.5 - 3.5 meters long and 2 - 3 meters wide.

[0031] The base 12 may comprise a bed 82 of a trailer 84. The trailer 84 may be for example 11-13 meters wide. The trailer 84 may have jacks 86 which stabilize the trailer 84 and prevent it from moving during use. There may for example be a jack 86 for each corner of the trailer 84 and a fifth adjacent the hitch.

[0032] A possible mechanism for lateral movement of the platform 24 is shown in Figs. 1-3, and in detail in Fig. 8. A hydraulic cylinder 88 may comprise a ram 90 which is connected to a carriage 92 by connector 94. The hydraulic cylinder 88 may translate the scissor lift assembly 14 along the first track 28. The hydraulic cylinder 88 may hold the carriage 92 such that the carriage 92 cannot translate along the first track 28. Fig. 1 shows the carriage 92 in a retracted position, and Figs. 3 and 8 show the carriage 92 in an extended position

[0033] As shown in Figs. 2-3, 5-6 and 8, the first pair of legs 20 may be connected to the platform 24 by a pair of upper travelling pivots 96 which translates within the first track 28, and may be connected to the carriage 92 by a lower pair of fixed pivots 98. The second pair of legs 22 may be connected to the base 12 by a lower pair of travelling pivots 100 which translates within the second track 71, and may be connected to the platform 24 by an upper pair of fixed pivots 102. The fixed pivots 98 and 102 may allow the respective first pair of legs and second pair of legs to be fixed to the carriage 92 and platform 24, respectively, while being able to pivot relative to the carriage 92 and platform 24. The travelling pivot 96 and 100 may pivot relative to and be translatable relative to the second track and first track, respectively. The connection of the lower pair of fixed pivots 98 to the carriage 92 may allow the translation of the carriage 92 by the hydraulic cylinder 88 along the first track 28 to also translate the lower pair of fixed pivots 98 and the corresponding first pair of legs 20 relative to the base 12.

[0034] As shown in Figs. 1, 3 and 8, the scissor lift assembly may also be locked for vertical movement by a secondary vertical lock system 104. The secondary vertical lock system 104 may

include a telescopic post system 104, which may be for example a two-stage telescopic post system. The telescopic post system may include two telescopic posts 106 on either side of the platform 24. The telescopic post system 104 may have a lower section 108 and an upper section 110. The lower section 108 may be mounted to the carriage 92 and the upper section 110 may be attached to the platform 24. The telescopic posts 106 may be mounted to the carriage 92 and the platform 24 such that the platform 24 and carriage 92 may be translated laterally while the platform 24 is locked at a vertical height. A mounting element 112 may be fixed to the carriage 92 for attaching the lower section 108. The telescopic posts 106 may each be pinned to the carriage 92 or mounting element 112 for example by an over center lever having a spring loaded rod running vertically to connect to a bell crank, the bell crank running a horizontal pin for locking the post 106 at a desired height. The telescopic posts 106 may for example be connected to the platform 24 by an extension from the brace 74 or to the elevated portion of the platform 24.

[0035] The carriage 92 may comprise a set of rollers 114, which may be for example four rollers. The rollers 114 may be rotatably connected by rods or beams which may form the frame of the carriage 92 and the pair of fixed pivots 98 may be connected to or paired with the rollers 114.

[0036] Each of the railings on the steps 30, the tower 18, the walkway 16 and the platform 24 may be for example 0.7 to 1.7 meters high.

[0037] In a closed configuration, the length from the farthest end of the tower to the farthest end of the platform may be for example between 6.8 and 7.8 meters. The length from the trailer hitch to the farthest end of the platform may be for example 10 – 11 meters. The surface 26 may be for example between 1.5 and 2.5 meters from the ground. The tower 18 may be for example 3 – 4 meters tall.

[0038] In an open configuration, the length from the farthest end of the tower 18 to the farthest end of the platform 24 may be for example between 8.8 and 9.8 meters. The length from the trailer hitch to the farthest end of the platform may be for example 8.3 to 9.3 meters. The back end of the trailer SS may be for example between 1.5 and 2.5 meters from the farthest end of the platform 24. The height of the platform surface from the ground may be for example between 4.5 and 5.5 meters.

What is claimed is:

1. A movable platform system, comprising:
 - a base;
 - a scissor lift assembly;
 - a telescoping walkway;
 - a tower;
 - the base supporting the scissor lift assembly;
 - the scissor lift assembly comprising a first set of legs, a second set of legs, and a platform supported by the first set of legs and the second set of legs;
 - the telescoping walkway extending from the platform to the tower to provide access to the platform; and
 - the base comprising a first track extending across the base, and each of the first set of legs and second set of legs coupling independently to the first track such that the each of the first set of legs and the second pair of legs is translatable relative to the base and relative to each other.
2. The movable platform system of claim 1 wherein the first set of legs and the second set of legs are a first pair of legs and a second pair of legs, respectively.
3. The movable platform system of any one of claims 1 and 2 further comprising telescoping steps extending from the tower towards the ground.
4. The movable platform system of any one of claims 1 – 3 wherein the platform is provided with a wellhead access gap.
5. The movable platform system of any one of claims 1 – 4 wherein the platform is cantilevered from the scissor lift assembly.

6. The movable platform system of any one of claims 1 – 5 wherein the scissor lift assembly comprises a plurality of beams, the beams comprising a second track formed along the length of the beams, and the first set of legs coupling to the second track such that the first set of legs is translatable relative to the beams.
7. The movable platform system of claim 6 wherein the platform comprises a surface cantilevered from the beams such that the surface extends away from the beams.
8. The movable platform system of any one of claims 6 – 7 wherein the second set of legs is pivotally coupled to the surface.
9. The movable platform system of any one of claims 6 – 8 wherein the platform is further connected to the beams by a brace.
10. The movable platform system of any one of claims 6 – 9 wherein the platform further comprises an elevated portion extending from the surface.
11. The movable platform system of claim 10 wherein the brace is fixed to the elevated portion of the surface.
12. The movable platform system of any one of claims 1 - 11 wherein the base comprises a bed of a trailer.

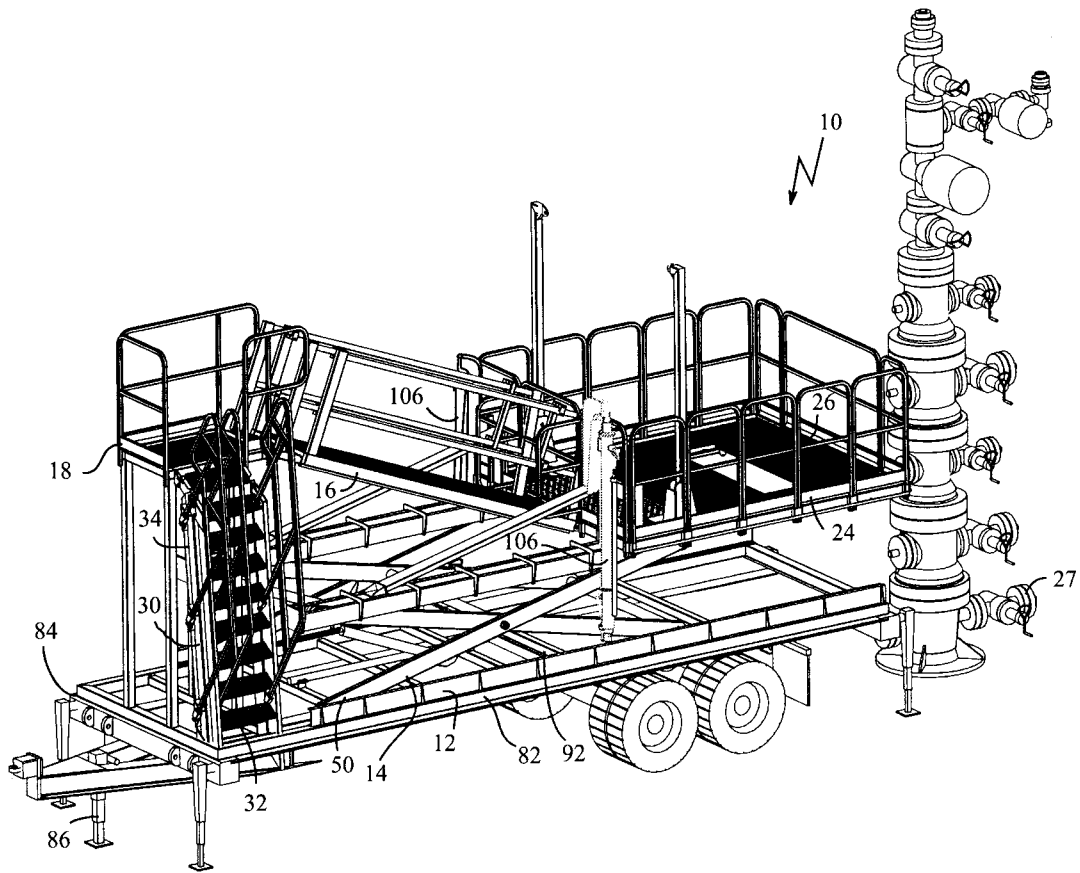


Fig. 1

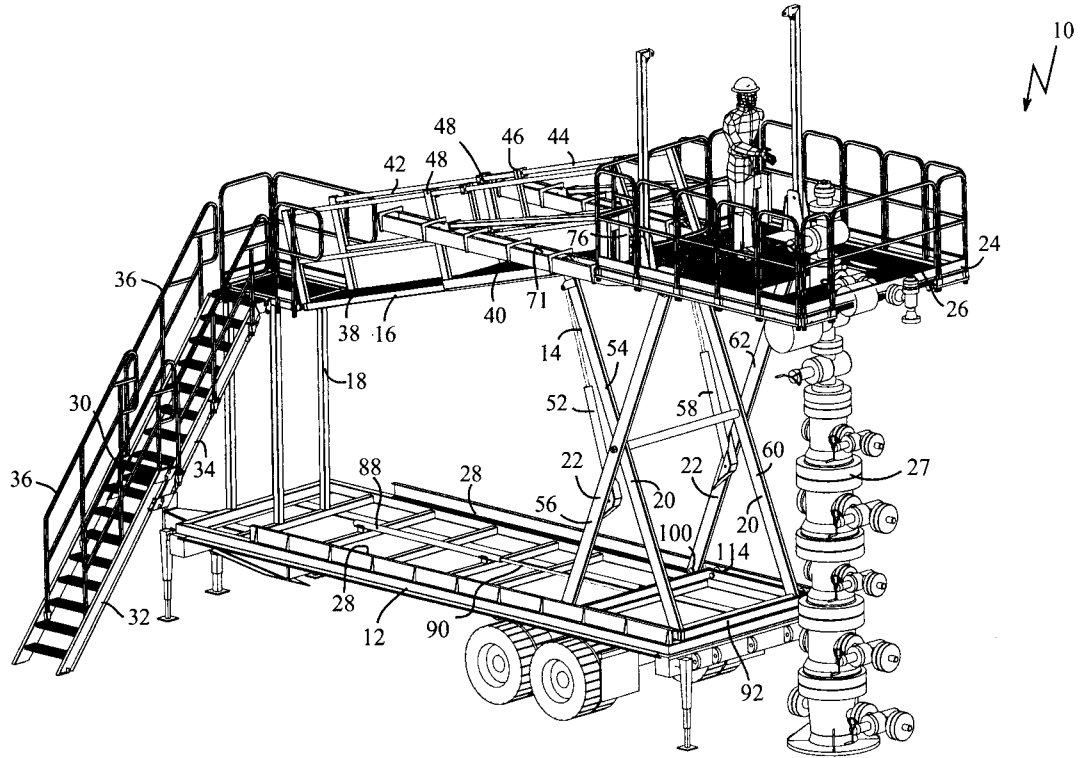


Fig. 2

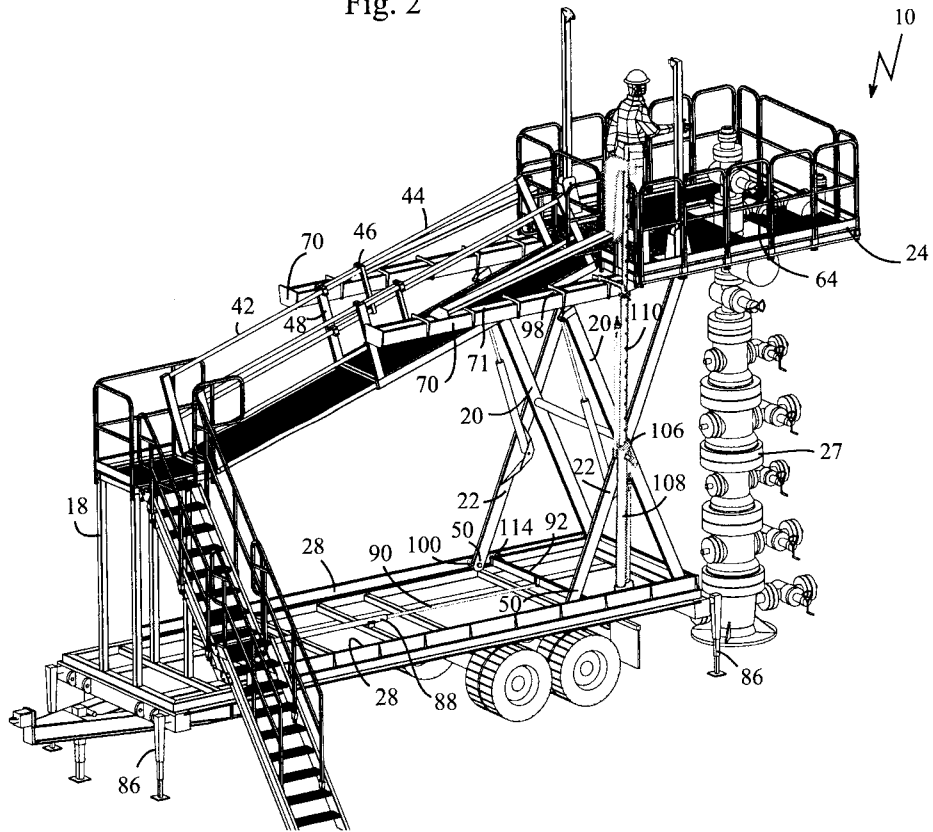


Fig. 3

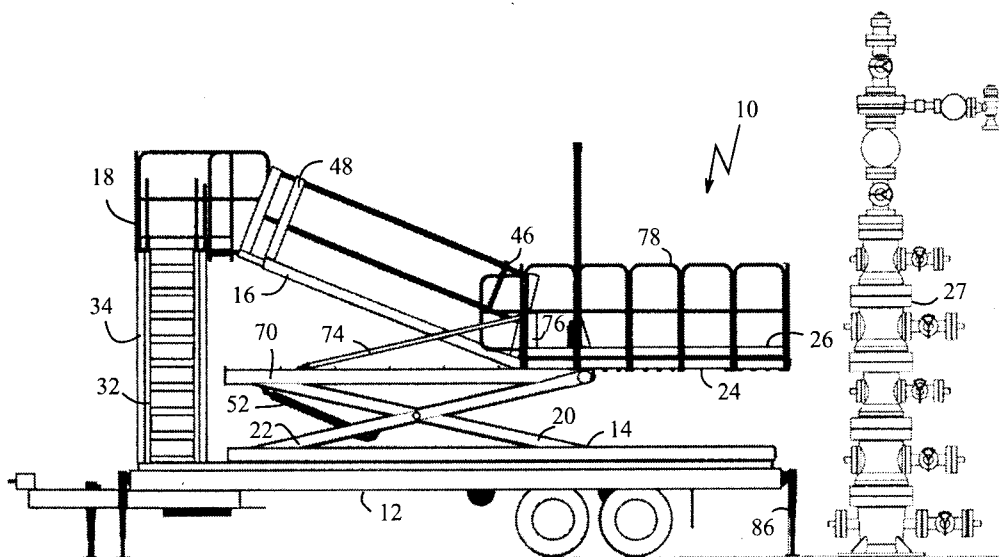


Fig. 4

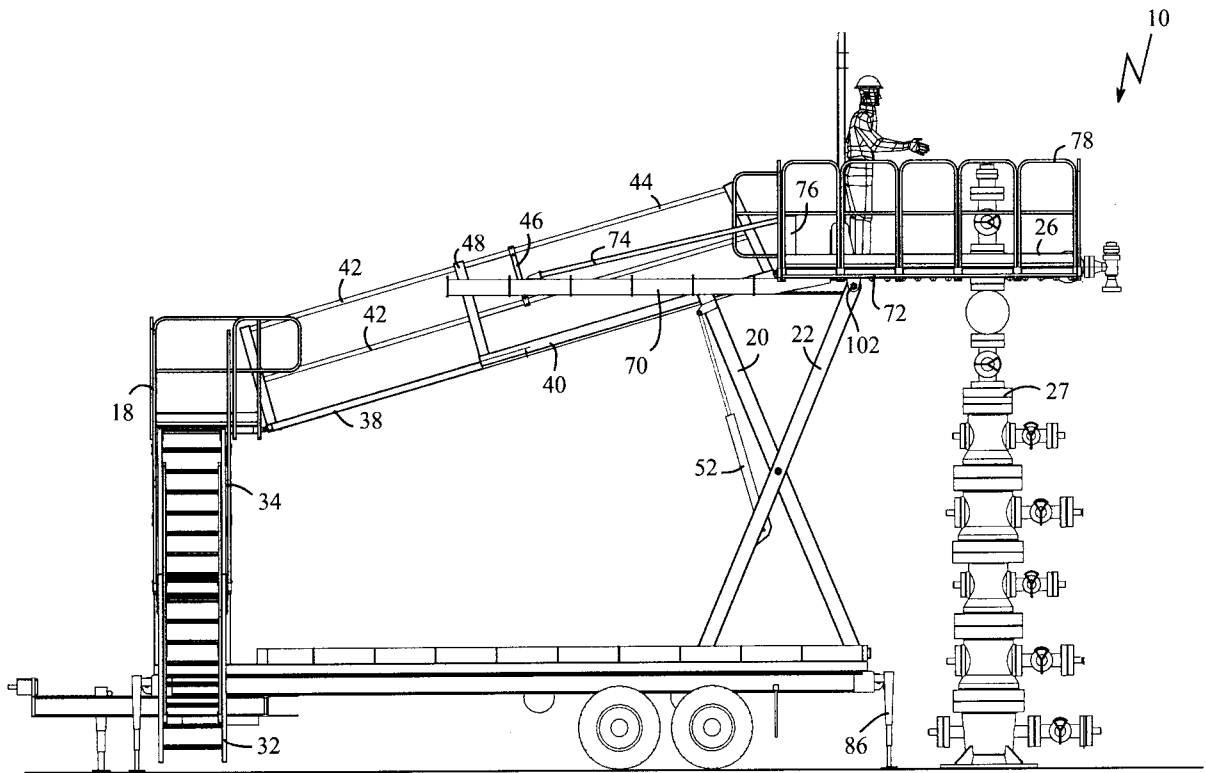


Fig. 5

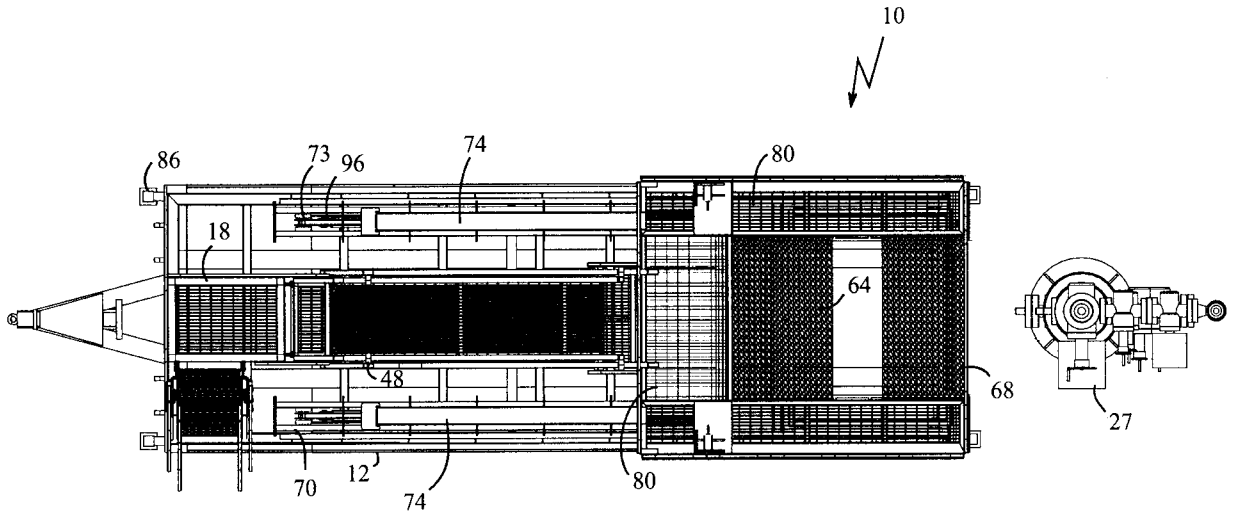


Fig. 6

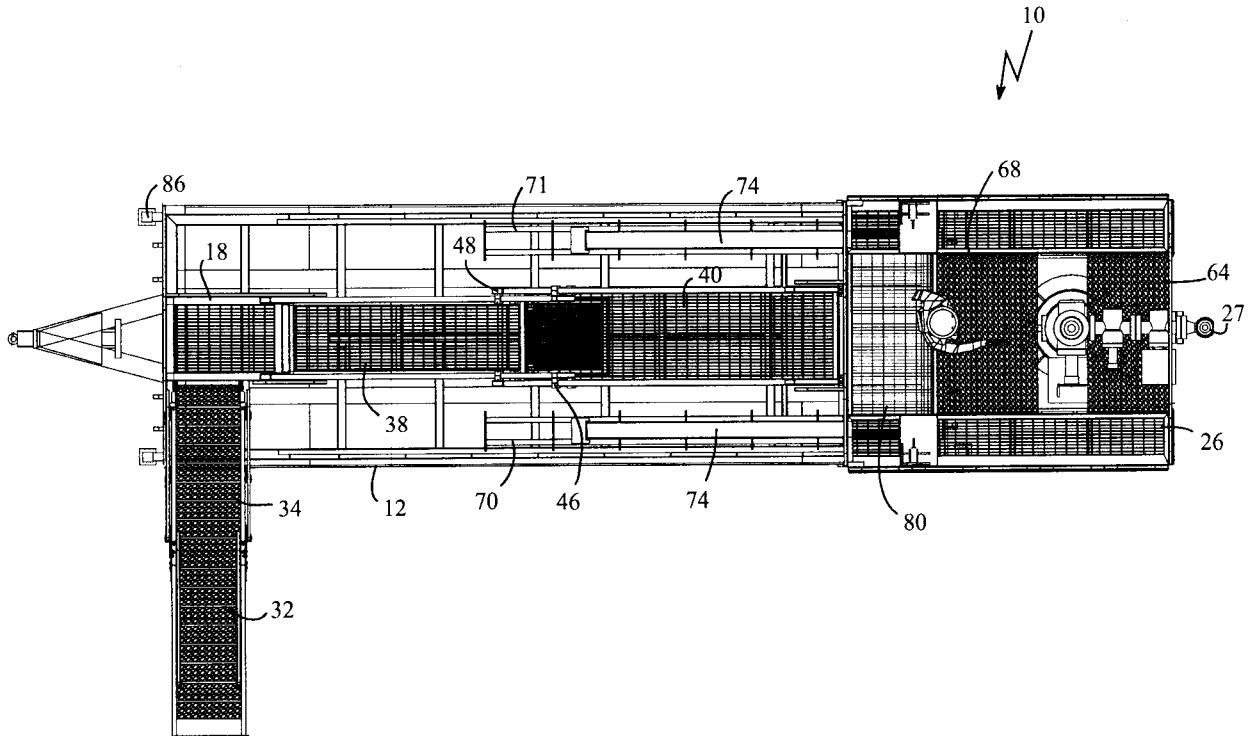


Fig. 7

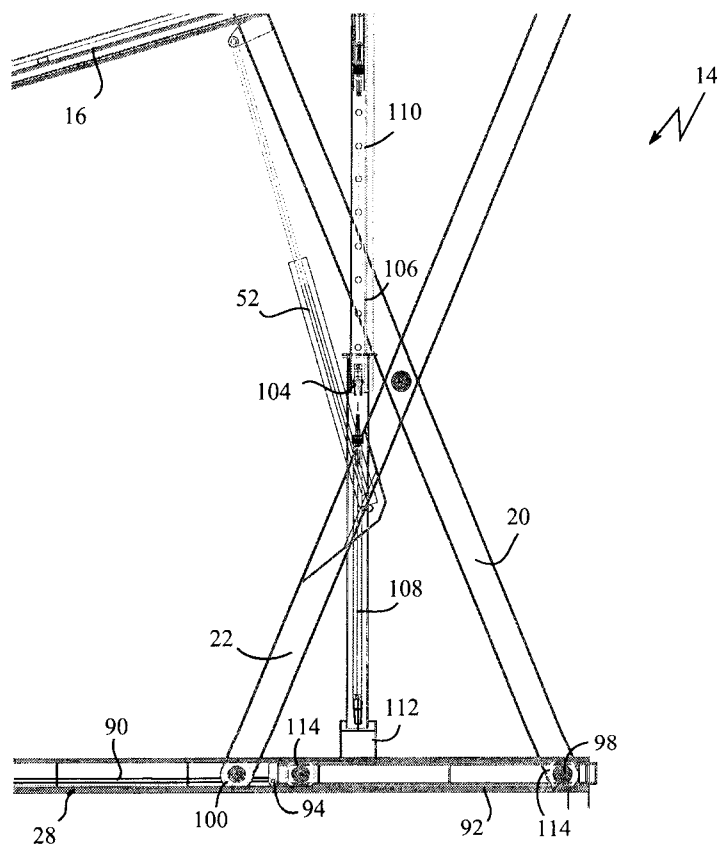


Fig. 8

