ELECTRICALLY POWERED WELL SERVICING RIGS

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ABSTRACT

A mobile land rig for use in wellbore operations. The mobile land rig, in certain aspects, has a vehicle; an erectable mast; winch apparatus (e.g., one or two winches); and electric motor apparatus for powering the winch apparatus. In one aspect there are two winches and one electric motor powers both winches. This abstract is provided to comply with the rules requiring an abstract which will allow a searcher or other reader to quickly ascertain the subject matter of the technical disclosure and is submitted with the understanding that it will not be used to interpret or limit the scope or meaning of the claims, 37 CFR 1.72(b).
ELECTRICALLY POWERED WELL SERVICING RIGS

BACKGROUND OF THE INVENTION

[0001] Field of the Invention

[0002] The present invention is directed to well servicing rigs; methods of their use; in certain particular aspects to such rigs with electrical motor(s) as power apparatus, e.g., for a winch or winches; and in other particular aspects, to such rigs with a single electric motor to power two rig winches.

[0003] Description of Related Art

[0004] Well servicing rigs, which are not used to drill a wellbore, perform a variety of operations after an oil or gas well has been drilled to get a well ready for production; for example, and not by way of limitation: logging operations; swabbing operations; operations involving the insertion of pipe or tubing into the well; and a perforation operation to perforate tubing.

[0005] A typical well servicing system, disclosed in U.S. Pat. No. 6,003,598, has a mobile vehicle/carryer with a collapsible mast or derrick which may be hydraulically raised and lowered by means of hydraulic pistons. A first winch and cable as provided near the crown of the derrick perform functions such as manipulating joined pipe segments if required. A second winch assembly and a drum having on it a line and item or tool, e.g., a conductive wireline with a logging instrument to be lowered into the well to permit logging.

[0006] Established producing wells are often "worked over" or serviced from time to time, including replacing downhole equipment or lowering or raising objects into the wellbore such as casing, tubing, rods, tools, etc. When such service operations become necessary, often a portable workover rig is used which can be moved to the well site and set up. Certain known workover rigs have a derrick or mast which supports pulleys or block and tackle arrangements; a mainline drum about which a heavy cable is wound and the free end connected over a crown block and connected to a traveling block. By rotating the drum, the traveling block is raised or lowered with the drilling mast as is necessary. Another drum, called a sandline drum (not used with the traveling block), has a line wound about which goes up over the crown block and is then connected to an object such as a swab mandrel which is to be lowered into the wellbore to a selected depth. In many conventional workover rigs the mainline drum and the sandline drum are each driven by a dedicated separate motor, typically e.g., a system with diesel-powered engines and associated drive shafts, clutches, right angle gear boxes, chains, and sprockets; or hydraulic motors.

[0007] Providing hydraulic power fluid to well servicing rigs and workover rigs has presented a variety of problems. When hydraulic systems leak, hydraulic fluid is spilled polluting the environment. Hydraulically-powered motors and apparatuses, especially in multi-motor systems, are relatively heavy; relatively noisy; require a large amount of space on a rig; and are relatively complex and expensive to operate and maintain. Diesel-powered engine systems for servicing rigs and workover rigs present issues with excessive weight, power efficiency, safety concerns, excessive noise, inefficient manually-operated braking systems, diesel fume pollution and relatively high maintenance costs.

[0008] The prior art discloses a variety of mobile rigs, well servicing rigs, workover rigs, and components of them; for example, and not by way of limitation, the following U.S. Patents present exemplary systems and components thereof:

U.S. Pat. Nos. 2,704,653; 2,847,098; 3,109,523; 3,670,831; 3,734,210; 3,994,350; 4,257,578; 4,290,495; 4,371,046; 4,432,532; 4,478,291; 4,555,092; 4,591,006; 4,756,366; 5,094,302; 5,794,723; and 7,249,629—these patents all incorporated fully herein for all purposes.

[0009] The present inventor has recognized the need for low weight, low cost, more efficient, safer, less noisy, environmentally-friendly mobile rigs for well servicing and workover; in certain aspects, with advanced control systems and/or improved braking performance. The present inventor has recognized the need for such rigs which are effective and efficient, yet relatively simple. The present inventor has recognized the need for such rigs with motors that are not hydraulically powered and rigs that are not powered through complicated mechanical drive arrangements. The present inventor has recognized the need for providing an electrical motor powered hoisting and braking system for the main drum and sandline drum, combined with an advanced electronic computerized control system in well servicing rig systems that are lighter quieter, safer, more efficient, and friendlier to the environment than conventional mechanical or hydraulically powered well servicing rigs.

BRIEF SUMMARY OF THE INVENTION

[0010] The present invention, in certain aspects, discloses a mobile rig for well operations which has apparatuses, e.g., winch apparatus, powered by an electric motor or motors. In certain aspects, such a rig has one or more single-board computers in a control system and/or one or more programmable logic controllers or a similar type of electronic control devices.

[0011] In certain particular aspects, the present invention teaches a mobile rig with a single electric motor which provides power for a main winch apparatus and for a sandline winch apparatus. In certain aspects, the single electric motor also provides the primary braking function for each of the winch apparatuses.

[0012] In certain aspects, the present invention discloses a mobile rig with a single, dual-shaft electric motor which provides power to two winch systems.

[0013] In certain aspects, the present invention teaches a mobile rig with an electric motor or motor which is engaged for both hoisting operations and for lowering items into a wellbore, providing control of a load being lowered into the wellbore.

[0014] In certain aspects, the present invention teaches a mobile rig with a drawworks powered by its own permanent magnet electric motor and a sandline winch powered by its own permanent magnet electric motor.

[0015] In certain aspects, the present invention discloses a rig which employs electric power for a variety of rig functions, e.g., but not limited to, winch operation, mast raising, and outrigger deployment; rigs in which all such operations are powered by electric motors; and/or with a motor or motors that provide control while lowering a load and/or a braking function.

[0016] Accordingly, the present invention includes features and advantages which are believed to enable it to advance mobile rig technology. Characteristics and advantages of the present invention described above and additional features and benefits will be readily apparent to those skilled in the art upon consideration of the following detailed description of preferred embodiments and referring to the accompanying drawings.
Certain embodiments of this invention are not limited to any particular individual feature disclosed here, but include combinations of them distinguished from the prior art in their structures, functions, and/or results achieved. Features of the invention have been broadly described so that the detailed descriptions that follow may be better understood, and in order that the contributions of this invention to the arts may be better appreciated. There are, of course, additional aspects of the invention described below and which may be included in the subject matter of the claims to this invention. Those skilled in the art who have the benefit of this invention, its teachings, and suggestions will appreciate that the conceptions of this disclosure may be used as a creative basis for designing other structures, methods, and systems for carrying out and practicing the present invention. The claims of this invention are to be read to include any legally equivalent devices or methods which do not depart from the spirit and scope of the present invention.

What follows are some of, but not all, the objects of this invention. In addition to the specific objects stated below for at least certain embodiments of the invention, there are other objects and purposes which will be readily apparent to one of skill in the art who has the benefit of this invention's teachings and disclosures. It is, therefore, an object of at least certain preferred embodiments of the present invention to provide:

New, useful, unique, efficient, non-obvious electrically-powered mobile rig systems for well operations and methods of their use;

Such systems and methods which employ multiple electric motors or a single electric motor, and, in one particular aspect, a rig with a single electric motor to operate two winches and

Such systems and methods which significantly reduce or eliminate leakage of hydraulic fluids.

The present invention recognizes and addresses the problems and needs in this area and provides a solution to those problems and a satisfactory meeting of those needs in its various possible embodiments and equivalents thereof. To one of skill in the art who has the benefits of this invention's realizations, teachings, disclosures, and suggestions, other purposes and advantages will be appreciated from the following description of certain preferred embodiments, given for the purpose of disclosure, when taken in conjunction with the accompanying drawings. The detail in these descriptions is not intended to thwart this patent's object to claim this invention no matter how others may later attempt to disguise it by variations in form, changes, or additions of further improvements.

The Abstract that is part hereof is to enable the U.S. Patent and Trademark Office and the public generally, and scientists, engineers, researchers, and practitioners in the art who are not familiar with patent terms or legal terms of phraseology to determine quickly from a cursory inspection or review the nature and general area of the disclosure of this invention. The Abstract is neither intended to define the invention, which is done by the claims, nor is it intended to be limiting of the scope of the invention in any way.

It will be understood that the various embodiments of the present invention may include one, some, or all of the disclosed, described, and/or enumerated advancements and/or technical advantages and/or elements in claims to this invention.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

A more particular description of embodiments of the invention briefly summarized above may be had by references to the embodiments which are shown in the drawings which form a part of this specification. These drawings illustrate certain preferred embodiments and are not to be used to improperly limit the scope of the invention which may have other equally effective or legally equivalent embodiments.

FIG. 1A is a top perspective view of a system according to the present invention.

FIG. 1B is an enlarged perspective view of part of the system of FIG. 1A.

FIG. 1C is an enlarged perspective view of part of the system of FIG. 1A.

FIG. 1D is a top view of part of the system of FIG. 1A.

FIG. 1E is a partial cross-section view of part of the system of FIG. 1A.

FIG. 1F is a partial cross-section view of part of the system of FIG. 1A.

FIG. 1G is a partial cross-section view of part of the system of FIG. 1A.

FIG. 1H is a partial cross-section view of part of the system as shown in FIG. 2A.

FIG. 1I is a partial cross-section view of part of the system as shown in FIG. 2A.

FIG. 1J is a partial cross-section view of part of the system as shown in FIG. 2A.

FIG. 1K is a partial cross-section view of part of the system as shown in FIG. 2A.

FIG. 1L is a partial cross-section view of part of the system as shown in FIG. 2A.

FIG. 1M is a partial cross-section view of part of the system as shown in FIG. 2A.

FIG. 1N is a partial cross-section view of part of the system as shown in FIG. 2A.

FIG. 1O is a partial cross-section view of part of the system as shown in FIG. 2A.

FIG. 2A is a perspective view of a system according to the present invention.

FIG. 2A is a side view of the system of FIG. 2A.

FIG. 2A is an enlarged top view of part of the system as shown in FIG. 2A.

FIG. 2A is a perspective view of part of the system as shown in FIG. 2A.

FIG. 2A is a partial cross-section view of part of the system as shown in FIG. 2A.

FIG. 2A is a partial cross-section view of part of the system as shown in FIG. 2A.

FIG. 3A is a side view of a system according to the present invention.

FIG. 3A is a top view of the system of FIG. 3A.

FIG. 4 is a side schematic view of a system according to the present invention.

Presently preferred embodiments of the invention are shown in the above-identified figures and described in detail below. Various aspects and embodiments of the invention are described below and some are set out in the dependent claims. Any combination of aspects and/or features described below or shown in the dependent claims can be used except where such aspects and/or features are mutually exclusive. It should be understood that the appended drawings and description herein are of preferred embodiments and are not intended to limit the invention or the appended claims. On the contrary, the intention is to cover all modifications, equivalents and alternatives falling within the spirit and scope of the invention as defined by the appended claims. In showing and describing the preferred embodiments, like or identical reference numerals are used to identify common or similar elements. The figures are not necessarily to scale and certain features and certain views of the figures may be shown exaggerated in scale or in schematic in the interest of clarity and conciseness.

As used herein and throughout all the various portions (and headings) of this patent, the terms "invention", "present invention" and variations thereof mean one or more embodiment, and are not intended to mean the claimed invention of any particular appended claim(s) or all of the appended
claims. Accordingly, the subject or topic of each such reference is not automatically or necessarily part of, or required by, any particular claim(s) merely because of such reference.

DETAILED DESCRIPTION OF THE INVENTION

[0047] FIGS. 1A-1G show a system 10 according to the present invention which includes a vehicle with a trailer 12 moved by a truck 14 and a mast 16 which can be raised from the trailer 12 to an erected position as shown in FIG. 1A. Levelling jacks 18 support the trailer 12. Optionally, no separate truck is used and the rig is self-propelled.

[0048] An electric motor 20 provides power to operate a main winch 30 (also called a drawworks) and a sandline winch 40. The motor 20 has two drive shafts, with one shaft extending from each end of the motor. One drive shaft 21 drives the main drum winch 30 via a gear system 32. Optionally, a chain drive system is used. Another drive shaft 22 drives the sandline winch via a chain drive system 42. A shiftable cutout coupling 23 selectively couples the drive shaft 21 to a shaft 37a of the gear system 32. A housing 39 encloses the gears and shafts.

[0049] A shiftable cutout coupling 24 selectively couples the drive shaft 22 to a shaft 44 of the chain drive system 42. The gear system 32 includes intermeshed gears 35a-35f on shafts 38a-38f, respectively, which drive a drive shaft 36 of the main drum winch 30. The chain drive system 42 drives a drive shaft 46 of the sandline winch 40. The chain drive system 42 has a chain 45 on sprockets 46a, 46b mounted, respectively, on the shaft 44 and a shaft 48. A housing 49 partially encloses the chain 45. The system 10 includes a blowout preventer control cabinet 11; an AC drive compartment 13; and a water cooled resistor tank 11 for removing the power (heat) generated during braking functions with the motor 20.

[0050] In one particular aspect, the motor 20 is a 1250 horsepower AC induction motor which provides a main winch hoisting capacity of 500 horsepower and a lowering capacity of 1250 horsepower. In other particular aspects, the motor's horsepower is between 800 horsepower to 1500 horsepower. Such a motor can provide controlled lowering of a load, e.g. up to 250,000 pounds, 113,636 kilograms. Any system according to the present invention can have such an electric motor or any other suitable electric motor.

[0051] Comparing the system 10 in one particular comparison to a traditional rig with two separate hydraulically powered motors, one for each winch (e.g. 500 horsepower motors) and using a 1250 horsepower AC motor with the system 10, it is anticipated that the system 10 will achieve a tripping in time of 22 seconds, and a tripping out time of 30 seconds (total tripping time 52 seconds); whereas with the traditional system tripping in time is 26 seconds, tripping out time is 55 seconds, for a total tripping time of 81 seconds. (“Tripping in time” is the time required to lower tools, tubing, or other well components approximately sixty feet into the hole and “Tripping out time” is the time required to raise tools, tubing, or other well components approximately sixty feet out of the hole.)

[0052] FIGS. 2A-21 show a system 100 according to the present invention which in some aspects is like the system 10, FIG. 1A (like numerals indicate like parts). A motor 120, similar to the motor 20, FIG. 1A, has a single drive shaft 122 which drives both the gear system 32 and the chain drive system 42, thus a single motor drive shaft drives the main winch 30 and the sandline winch 40.

[0053] A coupling 102 couples the motor drive shaft 122 to the drive shaft 37a of the gear system 32 and a shifting mechanism 104 selectively couples the drive shaft of the gear system 32 to the drive shaft 44 of the chain drive system 42. FIG. 2C shows the shifting mechanism 104 in a neutral position (engaging neither splines 106 on the shaft 37a nor splines 108 on the shaft 44). FIG. 2H shows the system with the main winch 30 (drawworks) engaged; the shifting mechanism 104 has engaged the splines 106 on the shaft 37a. FIG. 2I shows the system with the sandline winch 40 engaged; the shifting mechanism 104 has engaged the splines 108 on the shaft 44.

[0054] FIGS. 3A and 3B show a system 200 according to the present invention which includes a truck 202 that pulls a trailer 204. An erectable mast 206 initially rests on the trailer 204. The trailer 204 includes outrigger levelling jacks 208. The trailer 204 supports a main drum of drive shaft 210 and a sandline winch 220. In one particular aspect, the mast is raised by a system ST (shown schematically) which has a small electrically-powered winch or an electrically-powered ball screw system BC. A system SY (shown schematically) with an electric motor raises and lowers the outrigger levelling jacks 208. Optionally, the system SY includes an electrically operated ball screw system BR (shown schematically) built into the outrigger system.

[0055] In one aspect, the main drum winch 210 has an internal electric motor system and the sandline winch 220 has an internal electric motor system. In one aspect the motors are AC permanent magnet motors (which may be the case for any motor in any system according to the present invention) with an AC drive system 250.

[0056] The AC drive system converts DC power to variable frequency AC power and includes a cooling unit 252 and an interface panel 254 for the cooling unit. In the cooling unit, water or forced air cools the resistors in a bank 218 that become hot while burning off the power developed during the motor's braking function. The AC motors can “brake” the load during load lowering or stopping. The AC motor simply acts as a generator while braking the load. As it acts like a generator, it produces power which is burned off through the bank of resistors. Such a system has no brake pads or brake shoes and no physical exertion is performed by a mobile rig operator to try to manually brake the load through long lever handles and mechanical linkage to brake bands.

[0057] According to the present invention, the computerized control system provides signals to the AC motor to safely determine the motor speed and braking activity. The panel 254 is mounted to the floor of the trailer and includes electrical switch gear and control relays for operating the resistor cooling unit 252 and/or air blowers for cooling the resistor bank. It communicates with temperature sensors associated with the resistor bank.

[0058] A system with the blowout preventer panel 214 has control valves and gages which close the blowout preventer, e.g. in the event of an undesirable escape of gas (blowout) from the wellbore.

[0059] An operator panel 222, in communication with the apparatuses, winches, and devices of the system 200, allows an operator to perform the various functions of the system 200.

[0060] The electric motors 230, 240 may, according to the present invention, be any suitable electric motor (as may be true for any system according to the present invention) including, but not limited to: AC induction motors; permanent mag-
net motors; printed circuit board permanent magnet motors; or direct current (DC) motors.

The present invention, therefore, provides in some, but not in necessarily all, embodiments a mobile land rig for use in wellbore operations, the mobile land rig including: a vehicle; an erectable mast on the vehicle; winch apparatus on the vehicle; and electric motor apparatus on the vehicle for powering the winch apparatus. Such a mobile land rig may have one or more, in any possible combination, of the following: the electric motor apparatus including a main winch and a sandline winch; the electric motor apparatus is a single electric motor; the winch apparatus includes a main winch and a sandline winch; the vehicle levelling apparatus is a vehicle levelling apparatus which is electrically powered; the mast erection apparatus includes an electric winch system; vehicle levelling apparatus which is electrically powered; the vehicle levelling apparatus includes an electrically operated ball screw unit; a computerized control system for controlling the electric motor apparatus; the electric motor apparatus is at least one electric motor which is one of AC induction motor, DC motor, permanent magnet motor, and a printed circuit board permanent magnet motor; a power source for the electric motor apparatus; wherein the power source is one of local utility, battery, power storage apparatus, and generator; and/or a control system in controlling communication with the electric motor apparatus and the winch apparatus, and an operator panel in communication with the control system whereby an operator can control the electric motor apparatus and the winch apparatus.

Power is supplied to the motors 230, 240 from a power source 260 which may include (as is true for powering any motor of any system according to the present invention): local utility power; power from batteries; power from a power storage device or facility; and/or one or more independent engine generator units.

FIG. 4 shows schematically a system 300 according to the present invention which has a truck 302 with a trailer 304 having an erectable mast 306 and levelling jacks 308. A system operator 310 in a cabin 312 controls the various apparatuses, winches, and functions of the system 300 via a control system 314. A system 324 raises the mast 306.

The system 300 has a main winch 320, a sandline winch 330, and an electric motor 340 which provides power for both winches. Appropriate lines 331, 332 around appropriate sheaves 333-335, support and move various items, e.g. tubing 336 and/or tool 337 in a wellbore 338.

Power for the electric motor 340 is provided from a power source 350. The electric motor 340 can run both winches. The levelling jacks 308 and the system 324 can include electrically operated ball screw units. Such a system may have one or some, in any possible combination, of the following:

The present invention, therefore, provides in some, but not in necessarily all, embodiments a mobile land rig for use in wellbore operations, the mobile land rig including: a vehicle; an erectable mast on the vehicle; winch apparatus on the vehicle; and electric motor apparatus on the vehicle for powering the winch apparatus. Such a mobile land rig may have one or more, in any possible combination, of the following: the electric motor apparatus including a main winch and a sandline winch; the electric motor apparatus is a single electric motor; the winch apparatus includes a main winch and a sandline winch; the electric motor apparatus is a single electric motor; both the main winch and the sandline winch powered by the single electric motor; the single electric motor has two drive shafts, a first drive shaft and a second drive shaft, the first drive shaft for driving the main winch, and the second drive shaft for driving the sandline winch; the single electric motor has a single drive shaft, the main winch driven by the single drive shaft, and the sandline winch driven by the single drive shaft; shifting mechanism for selectively driving the main winch or the sandline winch; the mobile land rig is a well servicing rig or a workover rig; the electric motor apparatus provides braking while the winch apparatus lowers a load; mast erection apparatus which is electrically powered; the mast erection apparatus includes an electric winch system; vehicle levelling apparatus which is electrically powered; the vehicle levelling apparatus includes an electrically operated ball screw unit; a computerized control system for controlling the electric motor apparatus; the electric motor apparatus is at least one electric motor which is one of AC induction motor, DC motor, permanent magnet motor, and a printed circuit board permanent magnet motor; a power source for the electric motor apparatus; wherein the power source is one of local utility, battery, power storage apparatus, and generator; and/or a control system in controlling communication with the electric motor apparatus and the winch apparatus, and an operator panel in communication with the control system whereby an operator can control the electric motor apparatus and the winch apparatus.

In conclusion, therefore, it is seen that the present invention and the embodiments disclosed herein and those covered by the appended claims are well adapted to carry out the objectives and obtain the ends set forth. Certain changes can be made in the subject matter without departing from the spirit and the scope of this invention. It is realized that changes are possible within the scope of this invention and it is further intended that each element or step recited in any of the following claims is to be understood as referring to the step literally and/or to all equivalent elements or steps. The following claims are intended to cover the invention as broadly as legally possible in whatever form it may be utilized. The invention claimed herein is new and novel in accordance with 35 U.S.C. § 102 and satisfies the conditions for patentability in § 102. The invention claimed herein is not obvious in accordance with 35 U.S.C. § 103 and satisfies the conditions for patentability in § 103. This specification and the claims that follow are in accordance with all of the requirements of 35 U.S.C. § 112. The inventor may rely on the Doctrine of Equivalents to determine and assess the scope of
the invention and of the claims that follow as they may pertain
to apparatus not materially departing from, but outside of, the
l literal scope of the invention as set forth in the following
claims. All patents and applications identified herein are
incorporated fully herein for all purposes. What follows are
some of the claims for some of the embodiments and aspects
of the present invention, but these claims are not necessarily
meant to be a complete listing of nor exhaustive of every
possible aspect and embodiment of the invention.

What is claimed is:
1. A mobile land rig for use in wellbore operations, the

   mobile land rig comprising

   a vehicle,

   an erectable mast on the vehicle,

   winch apparatus on the vehicle,

   electric motor apparatus on the vehicle for powering the

   winch apparatus.

2. The mobile land rig of claim 1 wherein

   the winch apparatus includes a main winch and a sandline

   winch.

3. The mobile land rig of claim 1 wherein

   the electric motor apparatus is a single electric motor.

4. The mobile land rig of claim 1 wherein

   the winch apparatus includes a main winch and a sandline

   winch,

   the electric motor apparatus is a single electric motor, and

   both the main winch and the sandline winch powered by

   the single electric motor.

5. The mobile land rig of claim 4 wherein

   the single electric motor has two drive shafts, a first drive

   shaft and a second drive shaft,

   the first drive shaft for driving the main winch, and

   the second drive shaft for driving the sandline winch.

6. The mobile land rig of claim 4 wherein

   the single electric motor has a single drive shaft,

   the main winch driven by the single drive shaft, and

   the sandline winch driven by the single drive shaft.

7. The mobile land rig of claim 6 further comprising

   shifting mechanism for selectively driving the main winch

   or the sandline winch.

8. The mobile land rig system of claim 1 wherein

   the mobile land rig is a well servicing rig or a workover rig.

9. The mobile land rig system of claim 1 wherein the

   electric motor apparatus provides braking while the winch

   apparatus lowers a load.

10. The mobile land rig of claim 1 further comprising

    mast erection apparatus which is electrically powered.

11. The mobile land rig system of claim 10 wherein the

    mast erection apparatus includes an electric winch system.

12. The mobile land rig system of claim 1 further comprising

    vehicle levelling apparatus which is electrically powered.

13. The mobile land rig system of claim 12 wherein the

    vehicle levelling apparatus includes an electrically-operated

    ball screw unit.

14. The mobile land rig system of claim 1 further comprising

    a computerized control system for controlling the electric

    motor apparatus.

15. The mobile land rig system of claim 1 wherein the

    electric motor apparatus is at least one electric motor which is

    one of AC induction motor, DC motor, permanent magnet

    motor, and a printed circuit board permanent magnet motor.

16. The mobile land rig system of claim 1 further comprising

    a power source for the electric motor apparatus.

17. The mobile land rig system of claim 16 wherein the

    power source is one of local utility, battery, power storage

    apparatus, and generator.

18. The mobile land rig system of claim 1 further comprising

    a control system in controlling communication with the

    electric motor apparatus and the winch apparatus, and

    an operator panel in communication with the control sys-

    tem whereby an operator can control the electric motor

    apparatus and the winch apparatus.

19. A mobile land rig for use in wellbore operations, the

    mobile land rig comprising

    a vehicle,

    an erectable mast on the vehicle,

    winch apparatus on the vehicle,

    electric motor apparatus on the vehicle for powering the

    winch apparatus and for providing braking while the

    winch apparatus lowers a load,

    wherein the winch apparatus includes a main winch and a

    sandline winch,

    the electric motor apparatus is a single electric motor,

    both the main winch and the sandline winch powered by

    the single electric motor,

    shifting mechanism for selectively driving the main winch

    or the sandline winch,

    a computerized control system for controlling the electric

    motor apparatus and the winch apparatus,

    a power source for the electric motor apparatus, and

    an operator panel in communication with the control sys-

    tem whereby an operator can control the electric motor

    apparatus and the winch apparatus.

20. The mobile land rig of claim 19 wherein

    the electric motor apparatus has two drive shafts, a first drive

    shaft and a second drive shaft,

    the first drive shaft for driving the main winch, and

    the second drive shaft for driving the sandline winch.

21. A method for performing wellbore operations with a

    mobile land rig, the method comprising

    erecting a mast on a vehicle of a mobile land rig, the mobile

    land rig including winch apparatus on the vehicle and

    electric motor apparatus on the vehicle for powering the

    winch apparatus, and

    winching an item with the winching apparatus.

22. A winch system for a mobile land rig, the winch system

    comprising

    winch apparatus mountable on a vehicle of a mobile land

    rig, and

    electric motor apparatus mountable on the vehicle in driv-

    ing relationship with the winch apparatus for powering

    the winch apparatus.

23. A method for winching an item on a mobile land rig, the

    method comprising

    attaching the item to a winch apparatus, the winch appara-

    tus mounted on a vehicle of a mobile land rig, and

    winching the item with the winch apparatus, the winch

    apparatus powered by electric motor apparatus.