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(54) **UNIT FOR WELL REPAIR**

(57) The invention is related to a unit for repair of wells containing a chassis (1), a lower frame (2) and a slewing platform (26) connected through a supporting-turning device (28) installed in the rear part of the lower frame, while equipment is installed on the lower frame including a platform, working platforms, special equipment for conducting round trips of pipes, hydraulic rotor (18) for drilling wells. Front telescoped pillars are installed in the front part of the lower frame, rear telescoped pillars and rear non-telescoped pillars are installed in the rear part of the lower frame. Equipment is also installed on the slewing frame, such as a two-section mast with a crown block (5) and fastening elements of power guys (10), the slewing platform being additionally equipped with a mast section of an auxiliary winch (35), at least one restrictor of mast lifting connecting it with the base of the mast, a cargo hydraulic winch, an auxiliary hydraulic winch, a slewing platform rotation mechanism, a mast lifting mechanism and a hydraulic cutter of pipes (22).

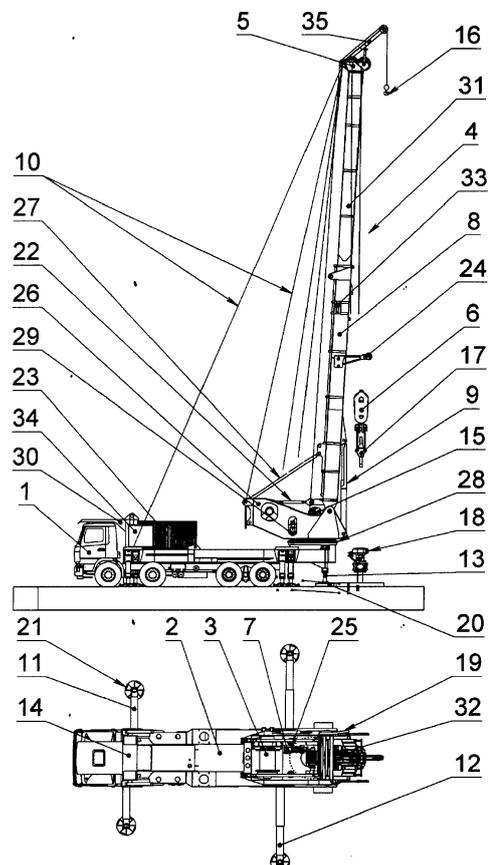


Fig. 1.

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Description

[0001] The invention is related to machine engineering, in particular to machines for maintenance, repair, development and accident response of oil, gas and other wells, as well as cargo handling operations.

[0002] Renowned machine for repair and drilling AR32/40 (Patent RU 2380512. IPC E21V 7.2 as of 2007.07.23) having an automobile chassis with the rigidly held frame on it with equipment consisting of the mast with hoist system, basic single-drum, and auxiliary winches, driving mechanisms, rear pillar, hydraulic jacks, the wellhead platform. The base of the mast is pivotally joint with the rear mast pillar around which the mast rotates while raising it in vertical (working) position or lowering in the horizontal transport position. Repair and drilling unit is intended for repair and drilling of deep oil and gas wells.

[0003] There is also a well-known unit for development, repair, and drilling of oil and gas wells (Patent RU 95729. IPC E21V 7/2 as of 2010.02.08), which includes a vehicle, a frame with equipment set on it, such as a winch, winch drive transmission, dispensing gearbox, the mast with the crown block. The unit is intended for conducting works on drilling, development, current maintenance, and overhaul repair of oil and gas wells.

[0004] The disadvantages of the known units for repair and drilling and installation for development, repair, and drilling of oil and gas wells is that the mast is unable to turn in a horizontal plane and perform round-trip operations in sectors adjacent to the longitudinal axis of the car chassis or vehicle, respectively. Moreover, the use of wind guys in the unit for repair and drilling increases the land area for technological equipment where the works on repair, development and accident response of the wells take place.

[0005] The hydraulic crane is well-known (patent RU 98751. IPC V66S 23/00 as of 2010.07.30) containing the chassis, the lower frame, and slewing platform, connected through the supporting-turning device installed in the middle part of the lower frame, while rear telescoped pillars are installed in the rear part of the lower frame, cargo winch is installed at the slewing platform.

[0006] The invention is related to the construction and road machine engineering for the performance of handling works in the industry and other sectors of the national economy. The disadvantages of the known hydraulic crane are that the jib has four sections, three of which are extended, and extension boom, which can be rotated relatively to the boom in the vertical plane greatly complicating the construction and the possibility of the perception of large loads on the hook. Moreover, the use of the front turning pillars in the design of the crane leads to reduced reliability of the construction because of the formation of zones of stress concentration in the axes as well as to reduced level of machine unification. For crane's large loads, carrying its kinematic scheme does not provide sufficient rigidity of the construction, namely,

the power transmission medium "slewing platform - mast".

[0007] This analog is the closest to the claimed invention in design and achieved a technical result, therefore, is has been taken as a prototype.

[0008] The technical task of the invention is an improvement of load-lifting features of the unit for wells repair in the working area of 180°, increase in the support contour of the unit, reduction of the land area for technological equipment where the works on repair, development and accident response of the wells take place.

[0009] The technical result is achieved owing to the unit for repair of wells containing the chassis, the frame and lower slewing platform connected through the supporting-turning device installed in the rear part the lower frame, while the equipment like platform, working platforms, special equipment for conducting round trips of pipes, hydraulic rotor for drilling wells, front telescoped pillars are installed in the front part of the lower frame, rear telescoped pillars and rear non-telescoped pillars are installed in the rear part of the lower frame; for instance, two-section mast with the crown block and the fastening elements of the load guys is installed at the slewing platform, which is additionally equipped with mast section of an auxiliary winch, at least one restrictor of mast lifting connecting it with the base of the mast, cargo hydraulic winch, auxiliary hydraulic winch, slewing platform rotation mechanism, mast lifting mechanism, hydraulic cutter of pipes.

[0010] The essence of the invention is explained by the drawings Fig. 1 - General drawing of the unit for wells repairing. The unit for wells repairing (UWR) (Fig. 1) is intended for conducting works on drilling, development, current maintenance and overhaul repair of oil and gas wells as well as cargo handling operations.

[0011] To maintain the wells at their current maintenance and overhaul repair, the UWR provides the following operating modes:

- Transport mode - moving over all types of roads and off-roads;
- Crane mode - for the installation of platforms, working platforms, special equipment, unloading (loading) and moving of drilling pipes, etc.
- Hoist mode - for conducting lowering and lifting operations with pipes in wells, for twisting-untwisting pipes, keeping them up in the air, works on drilling, milling, etc.

[0012] The unit is installed on a production chassis 1. The chassis 1 is rigidly attached to the lower frame 2. The pillar, hydraulic tank 23, cooling radiator of the hydraulic fluid 34, the supporting-turning device 28 with the slewing platform 26. Moreover, the frame 2 has movable technical equipment for conducting works in the well: working platforms, special equipment for conducting round trips of pipes, hydraulic rotor 18 for drilling wells, hydraulic key, etc.

[0013] In transport mode, the mast is in a horizontal folded position, and its front part rests upon the pillar of the mast 14, while the cockpit is protected from damage by the protection 30. Crane mode of UWR is provided by the supporting-turning device 28, where the slewing platform 26 with the main (hoist) 3 and auxiliary 15 hydraulic winches, masts, control panels and other special equipment which includes pipe hydro cutter 22 are attached. The turn of the platform 26 is carried out by rotation gear 29.

[0014] The mast consists of a rotary part 8 with the fixing mechanism 33 of the extended part 31 where the crown block 5 and mast section of an auxiliary winch 35 is installed. Moreover, the mast has the manifold tube 19 and the suspension of drilling keys 24 installed. The UWR system is equipped with the hoist system the elements of which are hoist block 6, hoist rope 4, hoist rope mechanism of fastening and bypass 7, hoisting swivel 17, auxiliary winch hook 16 and weight indicator 25. The mast is raised (lowered) by two hydraulic cylinders 9, attached to a slewing platform 26, extended part of the mast 31 is put forward also by two hydraulic long-stroke cylinders 32, which provide the functionality of the unit in the crane and hoist modes.

[0015] The switch from the crane to hoist moist is performed through the installation of the mast lifting restrictor 27 that connects the mast basis with slewing platform as well as installation of the power guys 10: it leads to the creation of a rigid system - slewing frame 26, mast 8, 31, mast lifting restrictor 27, power guys 10 and lower frame 2 with the chassis 1.

[0016] To ensure the operation of UWR in crane and hoist modes the unit's frame 2, except rear non-telescoped pillars 13 under the mast 8, is additionally equipped with front 11 and side 12 telescoped pillars creating appropriate index contour. Pillars 11 and 12 contact with the ground through the pillar plates 21, non-telescoped rear pillars 13 contact through rear pillar beam 20.

[0017] The basic winch of UWR has a hydraulic drive of the drum from high-torque hydraulic motor used in large moments modes, and high-speed hydraulic motors for operation in the mode of large rotations of the drum (here high-torque hydraulic motor switches to free rotation mode). Winch braking system consists of 4 sets of disc brake of constantly closed type, guided hydraulically. The drive of hydraulic units is controlled by a regulated pump that depends on the selection of the entire engine power of the basic automobile and has a system of distributors with proportional control for the main working operations. This ensures high economic indicators and stepless adjustment of speed and power parameters.

[0018] The UWR construction has a hydraulic drive of the pillar, hydraulic key drive, hydraulic pipes cutter as well as connection to the hydraulic rotor for drilling wells.

Claims

1. The unit for repair of wells contains the chassis, the lower frame and slewing platform connected through the supporting-turning device alongside with which rear telescoped pillars are installed in the rear part of the lower frame, a cargo winch is installed at the slewing platform, which differs since the cargo winch is hydraulic, the equipment installed at the lower frame like platform, working platforms, special equipment for conducting round trips of pipes, hydraulic rotor for drilling wells, front telescoped pillars are installed in the front part of the lower frame, rear telescoped pillars and rear non-telescoped pillars are installed in the rear part of the lower frame; the equipment installed at the slewing platform, for instance, two-section mast with the crown block and the fastening elements of the load guys, which is additionally equipped with mast section of an auxiliary winch, at least one restrictor of mast lifting connecting it with the base of the mast, auxiliary hydraulic winch, slewing platform rotation mechanism, mast lifting mechanism, hydraulic cutter of pipes.

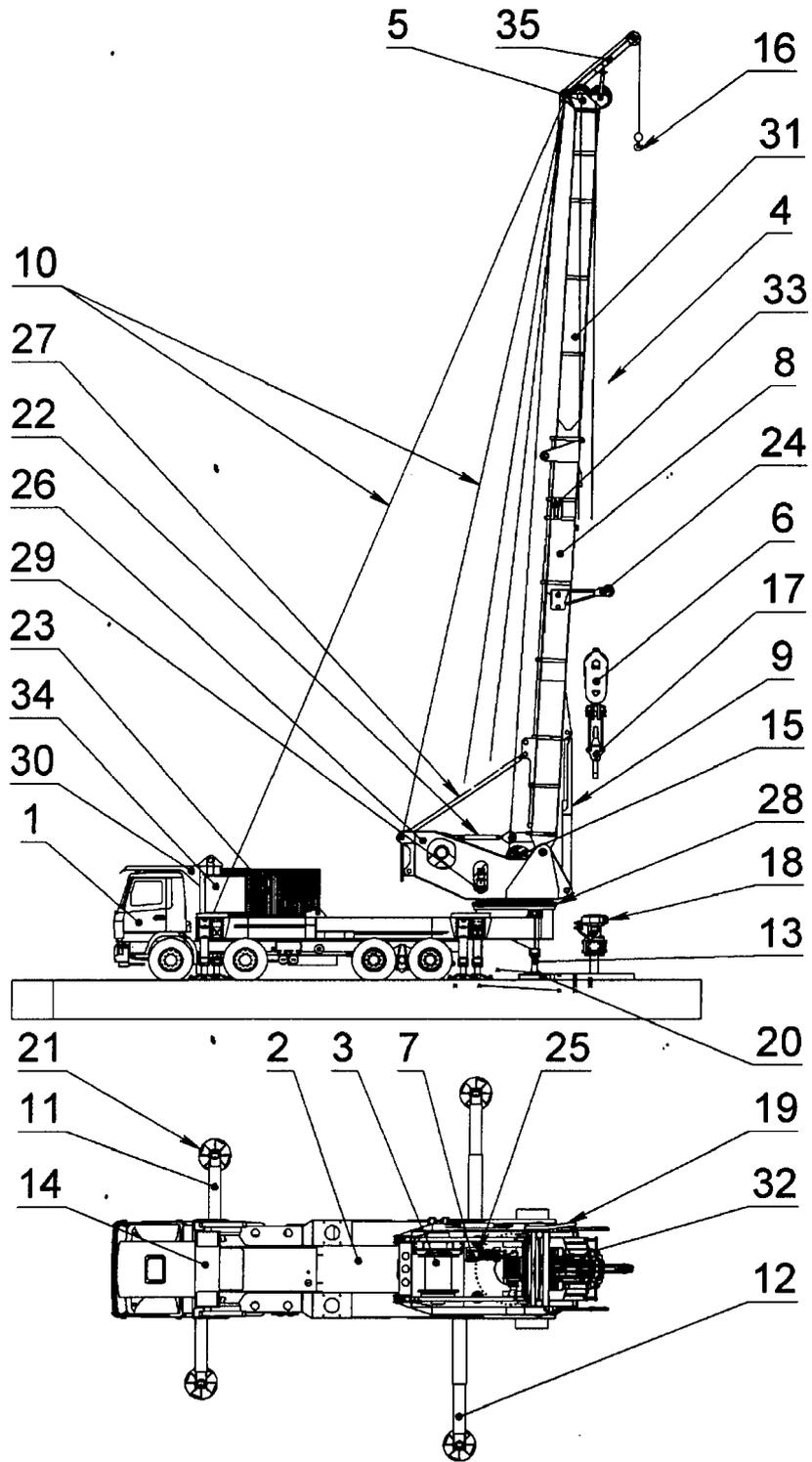


Fig. 1.



EUROPEAN SEARCH REPORT

Application Number
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
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Place of search		Date of completion of the search	Examiner
The Hague		23 May 2018	Sheppard, Bruce
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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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