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(54) **Machine for installing and uninstalling pumps in wells**

(57) The present invention relates to a machine for installing and uninstalling pumps in wells, formed from a platform (1) in which there is arranged a generator set (9) for the power supply of the pump (5) to be installed, next to which there is arranged a hydraulic motor (8) provided with driving means, which is in charge of a drum suitable for receiving the tube wound and connected to the pump to be installed/uninstalled, which drum (3) is located at the rear end of the platform, it having been provided that at the front end there is arranged a guiding

system for said tube which projects with respect to the front edge of the platform, it having been provided that in the front area of the platform there are arranged reels driven by respective hydraulic motors on which the electric power cables (15) of the pump, as well as a cable connected to a level sensor, are wound, which cables are connected to the main tube through a series of separators (18) implanted in the main tube every certain distance.

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Description

Object of the Invention

[0001] The present invention relates to a machine which has been especially designed for installing and uninstalling pumps in wells.

[0002] The object of the invention is to provide a device by means of which submersible pumps are installed and uninstalled quickly, simply and effectively, without needing cranes, by means of using a flexible tube, incorporating means which assure that said tube adopts the corresponding straight arrangement in a working position.

Background of the Invention

[0003] In the field of practical application of the invention, when installing submersible pumps, it is typical to use tubes with plates connected at one of their ends to the corresponding pump, assuring a correct verticality of the tube, such that in the event of working in a well made in an industrial building, the tube sections to be introduced cannot exceed the height of the industrial building, such tube sections having to be spliced until reaching the desired depth.

[0004] Consequently, this operation entails extremely long operation times, which it would be desirable to reduce.

[0005] In addition to this problem, this type of installing/uninstalling is carried out with the aid of a crane, with the consequent economic cost this involves.

[0006] Attempting to obviate this problem, the use of flexible tubes connected to the pump is also known, such that these tubes, in order to reduce the volume that they occupy, are provided in reels, suitably wound, such that at the time of their installation they tend to adopt a curved arrangement in which they have been supplied, hindering the tasks for installing the pump.

[0007] The space and maneuverability problem involved by the fact that said tubes are deposited in the proximity of the well, without a pre-established order, should also be emphasized.

Description of the Invention

[0008] The machine for installing and uninstalling pumps in wells proposed by the invention fully and satisfactorily solves the problems set forth above as a result of a simple but highly effective structure.

[0009] To that end, the proposed machine is formed from a platform of reduced dimensions such that it allows its placement in a trailer or bed of a truck from where it can work, although it can also work from the ground.

[0010] In said platform there is arranged a generator set, in charge of supplying electric power to the pump once it is installed, without the need for there to be current at that time in said location, being used in appraisal wells or for checking the correct operation of the pump once it

is installed.

[0011] Next to the mentioned generator set there is arranged a hydraulic motor in charge of driving, through the corresponding transmission, a large-sized drum, on which the tube connected to the pump is wound. Said transmission mechanism will incorporate an emergency brake, as well as a guiding system for the tube which is formed as a pulley, centrally located at the front end of the platform articulated with respect to the corresponding holding frame, and guiding the tube both in the tasks for installing the pump and in the tasks for uninstalling and winding it on the main drum. In order to correctly wind the tube in the drum and prevent one tube turn from winding on top of another one or from entering in a very forced manner, the drum can be moved with the aid of a piston or gear rack with a movement perpendicular to the direction of the tube.

[0012] Complementarily, in the front area of the machine there are arranged two reels driven by respective hydraulic motors on which, on one hand, the electric power cables of the pump and, on the other hand, the cable connected to a level probe, are wound, which cables will be linked with the tube connected to the pump at the exit thereof from the second drum through separators which are fixed to said main tube, having respective pulleys assuring the correct unwinding and alignment therewith.

[0013] The mentioned frame of the second drum will project with respect to the platform, such that by means of this structure the tube and the electric cables are prevented from rubbing against the walls of the well.

[0014] According to another feature of the invention, the mentioned platform could be supported by corresponding hydraulic feet for its leveling.

[0015] Finally, it should be emphasized that the machine will be scalable depending on the specific needs of each case, i.e., on the depth of the well, by simply resizing the pumps and the power of the equipment connected thereto.

[0016] A device is thus achieved which allows installing and uninstalling submersible pumps very quickly, without needing a great free height since it is not necessary to vertically erect a crane, allowing its operation inside industrial buildings and with features making it easily transportable in a trailer or the like to any work area.

Description of the Drawings

[0017] To complement the description which is being made and for the purpose of aiding to better understand the features of the invention according to a preferred practical embodiment thereof, a set of drawings is attached as an integral part of said description in which the following has been depicted with an illustrative and non-limiting character:

Figure 1 shows a side elevational view of a machine for installing and uninstalling pumps in wells made according to the object of the present invention.

Figure 2 shows an upper perspective detail of one of the supports which are coupled to the tube connected to the pump in order to allow suitably separating the electric power cables thereof.

Figure 3 shows a front perspective detail of the guiding system applicable to both the main drum and the two smaller-sized reels.

Preferred Embodiment of the Invention

[0018] In view of the indicated figures, and especially Figure 1, it can be observed how the proposed machine for installing and uninstalling pumps in wells is formed from a platform (1) which, in the chosen practical embodiment, is arranged directly on the ground in the proximity of the well with the aid of hydraulic legs (2) for its stabilization, although the device can be used directly from the trailer of a vehicle or on top of the bed of a truck, as a result of its contained dimensions.

[0019] At the rear end of the platform (1) there is arranged a main drum (3) on which the tube (4) with which the pump (5) is connected is wound, which drum is considerably sized in order to allow the winding thereon of a long tube length, arranged on the complementary support (6) and driven through a chain (7), connected to a gear reducer powered by a hydraulic motor (8), said assembly being complemented with a generator set (9) for the electric power supply of the pump (5). An emergency brake mechanism which allows locking said drum will be connected to the mentioned mechanism for driving the drum (3).

[0020] From this structure, the tube to be wound or unwound is guided through a pulley (10) arranged in the front area of the platform (1), which pulley is supported by a frame (11) emerging vertically from said end to be finished in a pair of articulated arms (12) framing the mentioned pulley (10), which arms are adjustable through respective hydraulic cylinders (13) such that the tube hanging therefrom is substantially separated from the front end of the platform (1), and consequently from the edge of the well (2), thus preventing possible frictions in the maneuvers for the extraction or introduction thereof.

[0021] Complementarily in the front area of the platform (1) there are arranged, in parallel, a pair of reels (14) connected to respective hydraulic motors for driving them on which the electric cables (15) in charge of powering the pump (5), as well as the cable (16) connected to a level sensor (17), are respectively wound.

[0022] Said set of cables is linked with the tube (4) through a plurality of separators (18) as shown in detail in Figure 2, arranged every certain distance, formed as three plates which, screwed to one another, configure a tubular element with an inner diameter appropriate for the diameter of the tube (4), while they incorporate respective externally and equiangularly distributed plates (19) provided with holes for fixing the corresponding cables.

[0023] Finally, it should be indicated that like the main drum, the reels (14) may be supported by small pulleys (20) assuring a correct unwinding/winding and guiding of the cables, which pulleys have features similar to those of the reels, supported by the same driving system, with a smaller reinforcement due to the little weight they have to support. As mentioned above, the two reels (14) are driven by a motor and their guiding system is the same as that of the main drum (3), which is shown in Figure 3, for the correct winding thereof, in which the support (6) will be supported by a rack (21) parallel to the axis of rotation of the drum, being movable in said direction by means of the driving of a pinion (22) in either direction, although said mechanism could be substituted with hydraulic means as well as be driven by means of towlines or equivalent elements, assuring a correct winding in any case.

[0024] The generator set (9) serves to supply electricity for the use of the pump and occasionally for an electrically powered hydraulic unit in order to have oil pressure if necessary.

Claims

1. Machine for installing and uninstalling pumps in wells, **characterized in that** it is formed from a platform in which there is arranged a generator set for the power supply of the pump to be installed, next to which there is arranged a hydraulic motor provided with driving means in charge, through the corresponding transmission, of a large-sized drum, suitable in size and shape to receive, suitably wound, the tube connected to the pump to be installed/uninstalled, which drum is located at the rear end of the platform, it having been provided that at the front end there is arranged a guiding system for said tube, formed as a pulley or the like, which projects with respect to the front edge of the platform, it having been provided that in the front area of the platform there are arranged reels driven by respective hydraulic motors on which the electric power cables of the pump, as well as a cable connected to a level sensor, are wound, which cables are connected to the main tube through a series of separators implanted in the main tube every certain distance.
2. Machine for installing and uninstalling pumps in wells according to claim 1, **characterized in that** the platform is supported by hydraulic leveling feet.
3. Machine for installing and uninstalling pumps in wells according to claim 1, **characterized in that** the platform has dimensions suitable for its transport in a trailer or bed of a truck.
4. Machine for installing and uninstalling pumps in wells according to claim 1, **characterized in that** the

transmission mechanism of the tube-receiving drum incorporates an emergency brake.

5. Machine for installing and uninstalling pumps in wells according to claim 1, **characterized in that** the electric cable-receiving reels are supported by respective guiding pulleys for said cables. 5
6. Machine for installing and uninstalling pumps in wells according to claim 1, **characterized in that** the pulley supporting the main tube is arranged on a frame emerging vertically from the front end of the platform, to be finished in a pair of articulated arms framing the mentioned pulley, the inclination of which arms is adjustable through respective hydraulic cylinders connected to the mentioned frame. 10 15
7. Machine for installing and uninstalling pumps in wells according to the preceding claims, **characterized in that** the supporting means of both the main drum and the reels are supported by means for movement in the direction of the axis of rotation of the corresponding drum or reel. 20

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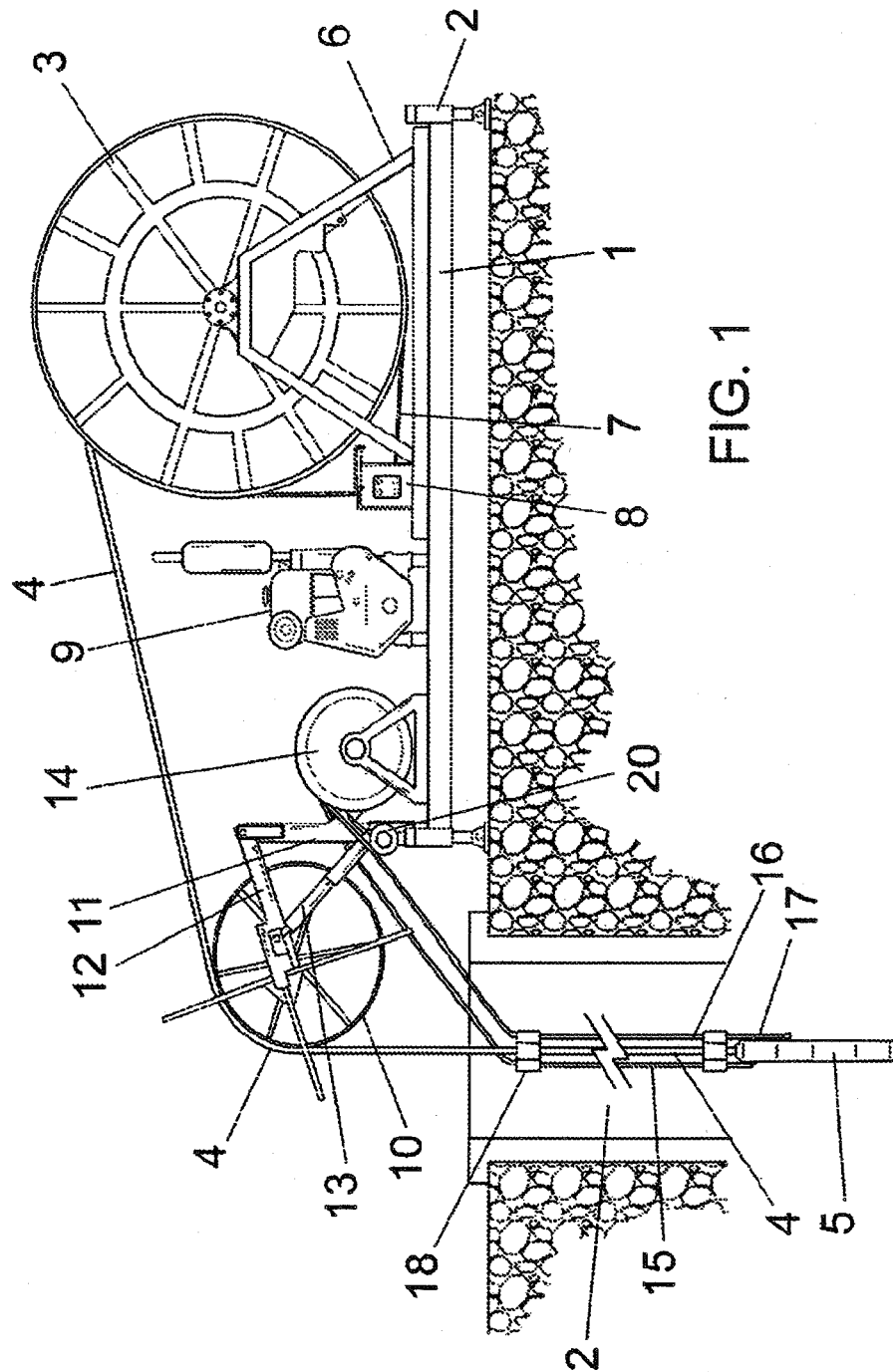
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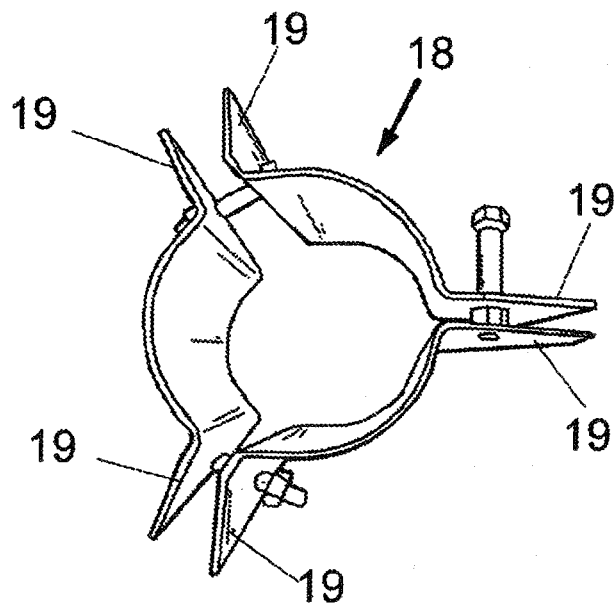


FIG. 2

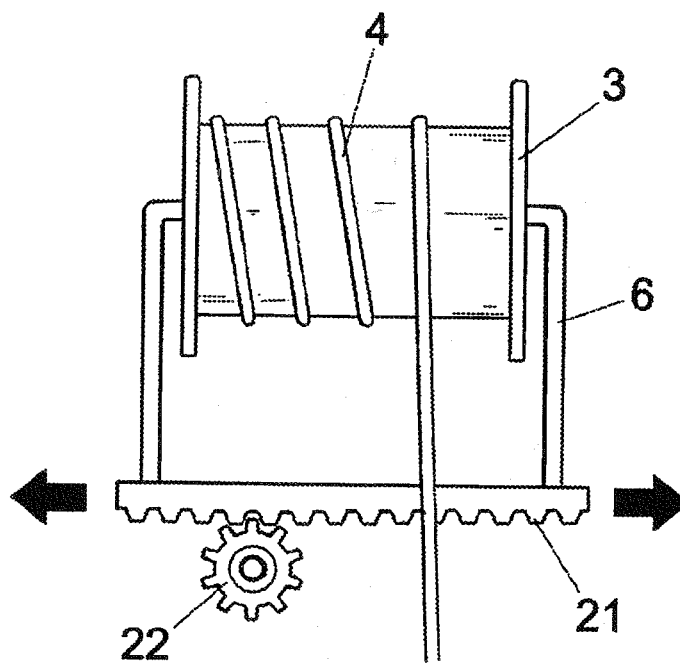


FIG. 3