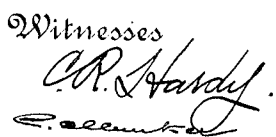


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UNITED STATES PATENT OFFICE.

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SAND-PUMP.

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To all whom it may concern:

Be it known that I, SENSHIRO MORIMURA, a subject of the Emperor of Japan, residing at Tokyo, Japan, have invented certain new and useful Improvements in Sand-Pumps; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to new and useful improvements in sand pumps for well drilling machines.

The principal objects of the present invention are first, to provide a sand pump of such construction that the debris may be readily introduced into the barrel of the pump, and will not drop out of the barrel under any circumstances, unless desired; second, to provide a sand pump in which the parts may be readily disassembled for cleaning or to enable a broken or worn out part to be replaced; third, a pump which may be easily washed, and especially the interior of the pump barrel and piston; fourth, to provide a pump of uniform diameter and one which will straighten the hole which is being drilled and make it round; fifth, to provide a pump which will greatly lessen the time usually required to remove the sand and other debris; and, sixth, to provide a pump which will be of simple and economical structure and which may be easily let into the well opening or emptied, of its contents.

With these and other objects in view, the invention consists of certain novel features of construction, combination and arrangement of parts, as will be more fully described and particularly pointed out in the appended claim.

In the accompanying drawings, Figure 1 is an elevation, partly in longitudinal section, of a sand pump embodying my improvements; Fig. 2 is a fragmentary, partly sectional view of the upper section of the pump looking at right angles to Fig. 1, showing the position of the hoisting cable and grapple during the operation of letting the pump down into the well; and, Fig. 3 is a similar view showing the position of the grapple and hoisting cable after the pump has been let down into the well, or while the pump is being removed.

Referring to the drawings for a more particular description of the invention, the

pump comprises the hollow barrel 1 of uniform diameter, to the upper end of which is screwed the coupling sleeve 2, having a partition 3 provided with the vertical oppositely disposed valve openings 4, which are normally closed by the valves 5 and 6, respectively, the valve 5 being in the form or nature of a ball valve, and the valve 6 being in the form of a disk, having a rubber washer 7 arranged to seat upon the upper end of the valve opening. The stems of the valves 8 extend beneath the wall or partition 3 and are provided with pins 8 which limit the upward movement thereof and hold the valves in position. A piston 10 is slidably mounted in the barrel 1 and is provided with the usual piston rod 11 which extends through the center of the coupling 2 and through a stuffing box 12 of any ordinary form which is arranged upon the exteriorly threaded extension 13 of the wall 3 of the coupling 2 and is contained or inclosed by the casing 14 which screws upon the upper exteriorly threaded portion 15 of the coupling.

A cover plate 16 is arranged in the casing 14 to exclude the entrance of other foreign matter into the lower end of said casing. The wall 3 of the coupling is provided with the depending portion 17 having a tapering scraping extension 18, which is adapted to scrape off any dirt or other matter which may collect on the piston rod 11. The extreme upper end of the piston rod is provided with the swivel 19 which is adapted to be engaged by the hook 20 at the lower end of the hoisting cable or rope 21. The grapple 22 is connected with the lower end of the hoisting cable at a point somewhat above the hook 20, and is adapted to engage a bail 23 which is pivoted to the extreme upper end of the barrel 1. The grapple 22 comprises a pair of corresponding pivoted hooks or engaging members 24, which are pivoted intermediately of their ends upon the bolt 25, and are provided at their lower ends with the hook portions 26 and at their upper ends with the actuating arms 27 which are connected by the links 28 and ring 29 with the hoisting cable.

During the operation of letting the pump down into the well opening, owing to the tension or pull which is exerted upon the hoisting cable, the members of the grapple are held in closed position, against the action of the coil spring 30, which is inter-

posed between the extremities of the arms 27 thereof, while the lower end of the hoisting cable between the point of connection between it and the grapple and the hook 20 is free of any tension and rests in the space 31 above the cover 16. When the pump, however, reaches the bottom of the well opening, the pull or tension upon the hoisting cable is removed when the spring 30 causes the two members of the grapple to disengage the bail 23 of the barrel. By then pulling upon the hoisting cable the piston 10 is caused to recede toward the upper end of the barrel, and in doing so draws the sand and other debris into the barrel through the valves 32.

The valve 32 is arranged within the sleeve 33 screwed to the lower end of the barrel 1 and comprises the cylindrical or annular member 34, which is riveted within the lower end of the sleeve 33 and the upper edge of which forms the valve seat. The valve proper comprises a rubber or leather diaphragm 35, the center of which is secured to the upper edge of a cross piece or rib 36 extending across the member 34, and the edge of which normally seats or bears upon the upper edge of member 34. The diaphragm is provided with back and face plates, 37 and 38, respectively, which are secured to the diaphragm and are connected together by rivets. The center of the diaphragm is secured to the upper edge of the cross piece or rib 36 by the cross piece 39, which is held in position by rivets.

In practice the sand pump is let down to the bottom of the well opening, by means of the hoisting cable, and the plunger then moved to the upper end of the barrel which sucks the sand and other matter through the valve 32 into the interior of the barrel. After the material has been once drawn into the barrel it cannot fall out at the lower end thereof, because of the valve 32 which opens upwardly, as will be obvious, but does not open downwardly. After the barrel has been filled, the pump is removed and the lower end thereof placed in a trough or other receptacle with the barrel inclined at an angle of about 45 degrees. The valve 32 is then opened by the fingers to permit the sand and other matter to pass out of the lower end of the barrel into the trough or receptacle.

The valves 8' constitute an important feature of the invention, and it will be obvious that when the piston 10, and the several heavy parts connected thereto are elevated for drawing the sand within the barrel 1 the weight of said piston and connected parts will be relieved from the contents in the

barrel 1 by the vacuum created therein and therefore the valves 32 will only have the weight of the sand contained in said barrel to support in handling the pump before discharging its contents.

After the barrel has been relieved of its contents the valves 8' are opened by inserting a suitable tool through the openings in the coupling 2 opposite the valves, thereby relieving the vacuum created in the barrel above the piston 10, by its upper stroke and permitting the latter to again assume its lowest position for further operation.

After the barrel has been emptied of its contents, a hose may be inserted into the lower end thereof to wash the interior of the barrel and the piston.

It is to be particularly observed that the sand and other foreign matter can, at no time, pass the piston, and, consequently, the upper end of the barrel is kept clean.

From the foregoing description, taken in connection with the accompanying drawings, the construction and operation of the invention will be readily understood without requiring a more extended explanation.

Various changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention as defined in the appended claim.

Having thus described and ascertained the nature of my invention, what I claim as new and desire to secure by Letters-Patent is:

A device of the character described comprising a receiving barrel, a piston slidably located therein and provided with a piston rod, an intake valve forming a temporary closure for the lower end of the barrel, a coupling forming an upper closed head for the said barrel, valves arranged in said head and located adjacent to openings in the coupling whereby the said valves may be manipulated and released to relieve the vacuum created in the barrel after the contents of the latter have been removed, a casing secured to said coupling through which the piston rod passes a rope connected to said piston, means carried by said rope and adapted for detachable engagement with the upper end of the casing for hoisting the latter.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

SENSHIRO MORIMURA.

Witnesses:

E. EDMONSTON, Jr.,
S. M. McCOLL.