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This invention relates to pumps or water elevating devices, and has for its object to provide in a manner as hereinafter set forth a device of such class which is comparatively simple in its construction and arrangement, strong, durable, thoroughly efficient in its use, conveniently operated and further includes means to overcome excessive leverage during the operation of the device under such conditions providing for its operation with the least possible expenditure of power.

With the foregoing and other objects in view, the invention consists of the novel construction, combination and arrangement of parts as hereinafter more specifically described, and illustrated in the accompanying drawings, wherein is shown an embodiment of the invention, but it is to be understood that changes, variations and modifications can be resorted to which fall within the scope of the claims hereunto appended.

In the drawings wherein like reference characters denote corresponding parts throughout the several views:

Figure 1 is an elevation, partly in section, of a pump or water lifting device in accordance with this invention and further illustrating the position thereof with respect to a source of water supply.

Figure 2 is a section on line 2—2 Figure 1.

Figure 3 is a top plan view of the plunger head.

Figure 4 is a detail in plan illustrating the stop member for the check valve arranged within the tubular plunger stem.

Referring to the drawings in detail 1 generally indicates the pump cylinder comprising a body portion 2 of any suitable diameter and which is open at its lower end and formed with a top 3 provided with a centrally arranged opening 4. The top 3 has an integral upstanding interiorly threaded collar 5 which forms a continuation of the opening 4. A tubular member 6 is secured at its lower end to the collar 5 and said member 6 at its lower end is formed with interior and exterior threads. The exterior threads engage with the threads on the inner face of the collar 5 and threadedly engaging with the interior threads of the member 6 is an annular packing element 7. The body portion 2 is anchored within a well 8 or positioned to communicate with a source of water supply. As shown the body portion 2 is anchored in the well 8 and the tubular member 6 extends from the top 3 of the body portion 2 to the upper end of said well 8 and said member 6 is secured to a platform 9 which acts as a closure for the upper end of the well 8. The platform 9 is formed with an opening 10 for a purpose to be hereinafter referred to. The member 6 carries a top piece 11 which abuts against the lower face of the platform 9 and is secured to the latter or said cap piece can be an integral part of the platform 9 and secured to the member 6. The platform 9 has secured to its upper face a packing element 12, and which forms a continuation of the opening 10 in the platform 9. The platform 9 is fixedly secured in position by the hold fast devices 13.

Connected to the platform 9 is a pair of spaced vertically disposed, opposed standards 14, 15 and the former has a bifurcated upper end terminal portion 16 and the latter a bifurcated upper end terminal portion 17. Positioned at the upper ends of the standards 14, 15, is a supporting frame formed of a pair of side members 18, 19 and an end member 20. One end of the frame is open and the other closed by the end member 20. The open end of the frame is positioned at the upper end of the standard 15 and the frame projects a substantial distance laterally from the upper end of the standard 14. The side members 18 and 19 oppose the upper ends of the standard 14, 15, see Figure 2 and the end member 20 is positioned a substantial distance from the standard 14. The side member 18 is formed with openings 21, 22 and 23 and the side member 19 with openings 24, 25 and 26. The openings 23 and 26 aline and are arranged in proximity to the open end of the frame. The openings 21 and 24 aline and are arranged in proximity to the end member 20 of the frame. The side member 18 is formed with an offset portion 27 projecting laterally therefrom and the side member 19 with an offset portion 28 which projects laterally therefrom. The offset portions 27 and 28 are oppositely disposed with respect to each other and semi-circular in contour. The openings 22 and 25 aline and are arranged between the openings 21, 24 and the offset portions 27, 28. The inner face of the side member 18, between the openings 21 and 22, is formed with a vertically disposed lug 29 and the inner face of the side member 19 between the openings 24 and 25 is provided with an inwardly extending lug 30. The

lugs 29 and 30 oppose each other but are arranged in spaced relation. Extending through the alining openings 21 and 24 is a shaft 31 for an idler roller 32 which is positioned between the side members 18 and 19. The shaft 31 at one end is provided with a head 33 and at its other end with a collar 34 which is detachably connected therewith. The head 33 abuts against the side member 18 and the collar 34 against the side member 19. The side member 19 has its outer face provided with a pair of spaced apertured bosses 35, 36 and the former forms a continuation of the opening 25 and the latter the opening 26. Extending through the alining openings 22, 25 and boss 35 is a shaft 37 for a gear wheel 38 of the desired diameter. The shaft 37 extends through the bifurcated upper end terminal 16 of the standard 14. One end of the shaft 37 carries a head 39 which abuts the side member 18 and the other end carries a removable collar 40 which abuts against the boss 35. Extending through the alining openings 23 and 26 is a shaft 41 upon which is mounted a toothed quadrant 42. Extended from the quadrant 42 as well as being integral therewith is a lever arm 43. The shaft 41 extends through the upper end terminal portion of the standard 15 and also through the boss 36 and has one end provided with a head 44 which abuts against the side member 18. The shaft 41 has its other end provided with a removable collar 45 which abuts against the boss 36. The function of the idler roller 32, gear 38 and quadrant 42 will be presently referred to.

Extending down through the platform 9, tubular member 6, and into the body portion 2 of the pump cylinder is a vertically movable plunger element consisting of a tubular stem or rod 46 and a plunger head referred to generally by the reference character 47. The plunger or rod 46 provides means for conducting off the water from the well 8 during the operation of the plunger element. The plunger rod 46 at its upper end is provided with an enlargement 48 formed therein with a beveled valve seat 49 for a check valve 50. The enlargement 48 is provided with peripheral threads. Seated on the edge of the enlargement 48 is a perforated disk 51 which constitutes a retaining member for the check valve 50. The disk 51 is fixedly secured against the upper edge of the enlargement 48 by a coupling member 52 which threadably engages with the peripheral threads of the enlargement 48. The coupling member 52 overlaps the disk 51; see Figure 1, and has its upper end formed with interior threads for securing therewith an upstanding goose neck 53. The diameter of the plunger rod 46 is less than that of the inner diameter of the tubular member 6 and said rod 46 extends through the packing element 12 and also through the packing

element 7. The lower end of the rod 46 is provided with peripheral threads 54 and which are employed for connecting the plunger head 47 therewith.

The plunger head 47 consists of a body portion formed of an upper section 55 and a lower section 56. The sections 55 and 56 are connected together as at 57. The section 56 extends into the lower portion of the section 55 and threadably engages with the latter. The section 56 centrally thereof is formed with an inlet opening 58 and with an upstanding collar 59 having a beveled top edge and which forms a continuation of the opening 58 and further provides a seat for a valve 60 which is pivotally connected as at 61, to an upstanding lug 62 on the upper face of the section 56. The section 55 has its top formed with a circular row of openings 63 and a centrally disposed opening 65. The lower face of the top of the section 55 is provided with an interiorly threaded collar 66 which is spaced an appropriate distance above the collar 59. The valve 60 operates between the collars 59 and 66 and its upward movement is arrested by the collar 66. When the valve 60 is mounted on the collar 59 the plunger head 47 is closed. Or in other words when the valve 60 is mounted on the collar 59 the inlet opening 58 is closed. The collar 66 threadably engages with the threads 54 at the lower end of the plunger rod 46 for the purpose of connecting the plunger head 47 to the lower end of the rod 46. The lower terminus of the rod 46 is spaced an appropriate distance above the inlet opening 58, see Figure 1. Surrounding the plunger head 47 is a packing member 67 which rides against the inner face of the body portion 2 of the pump cylinder see Figure 1. The plunger head 47 is flanged as at 68, 69 for the purpose of retaining the member 67 in position.

Clamped against the plunger rod 46, an appropriate distance above the platform 9, is a pair of rack members 70, 71. The rack members 70, 71 are oppositely disposed with respect to each other and the member 70 is formed with a lengthwise extending toothed rack 72 and the member 71 with a lengthwise extending toothed rack 73. Each of said rack members is semi-circular in contour and provided with a pair of oppositely extending flanges 74. The flanges of one rack member abut against the flanges of the other rack member and are secured together by the hold fast devices 75. The rack 72 associates with the gear wheel 38 and the rack 73 associates with the quadrant 42.

Interposed between the idler roller 32 and the gear 38 is a vertically shiftable counterbalancing element consisting of a vertical bar 76 provided in its lower end with a weight 77. One side edge of the bar 76 is toothed as indicated at 78 and which asso-

ciates with the gear wheel 38. The other side edge of the bar 76 bears against the idler roller 32. The upper end of the bar 76 is provided with an offset portion 79 constituting a stop for limiting the lowering movement thereof. The upward movement of the counterbalancing element is arrested by the weight 77 which is of greater width than the width of the bar 76. The counterbalancing element provides means for equalizing the weight of the plunger element and the water which is conducted off through the plunger rod 46 and such equalization overcomes excessive leverage under such conditions permitting the operation of the pump or device with the least possible expenditure of power.

When the plunger element is in its lowered position within the pump cylinder, the valve 60 will permit of water entering the plunger head and from there passing into the body portion 2 of the pump cylinder. On the upward movement of the plunger element the weight of the water within the body portion 2 will close the valve 60 and as the plunger head moves upwardly the water will be forced into the plunger rod 46 and discharged therefrom through the goose neck 53. When the plunger element moves downwardly, the counterbalancing element moves upwardly and when the plunger element moves upwardly the counterbalancing element moves downwardly, and by this arrangement a counterbalancing means is provided on the downward and upward movement of the plunger element.

In lieu of employing the counterbalancing element, a pair of pump devices can be arranged side by side in a manner whereby the gear wheel 38 will be common to the two piston elements and by this arrangement one of the pumps or devices will act as a counterbalancing means for the other.

The plunger element is vertically shifted on the swinging of the quadrant 42 by the lever 43. When the lever is swung upwardly the engagement of the quadrant with the rack 73 will move the plunger element downwardly providing what may be termed a water intake stroke, and when the lever 43 is swung downwardly, the quadrant 42 in

connection with the rack 73 will move the plunger element upwardly providing what may be termed a water elevating and discharging stroke. The quadrant 42, rack 73 and lever 43 provides means for reciprocating the plunger element.

It is thought the many advantages of a pump or water lifting device, in accordance with this invention, can be readily understood, and although the preferred embodiment of the invention is as illustrated and described, yet it is to be noted that changes in the details of construction can be had which will fall within the scope of the invention as claimed.

What I claim is:

1. A reciprocatory operating mechanism for the plunger element of a pump comprising a pair of oppositely disposed racks adapted to be bodily carried by said element, oscillatory toothed means engaging with one of said racks for reciprocating said element, counterbalancing means for said element, means operated from the other of said racks for reciprocating said counterbalancing means in a contra-direct direction with respect to the reciprocation of said element, guiding means for said counterbalancing element, and means for limiting the movement in either direction of said counterbalancing element.

2. A reciprocatory operating mechanism for the plunger element of a pump comprising a pair of oppositely disposed racks adapted to be bodily carried by said element, a toothed quadrant meshing with one of said racks, a lever for operating said quadrant to provide for the reciprocation of said element, a counterbalancing element, means operated from the other of said racks for reciprocating said counterbalancing element alternately in opposite directions with respect to the reciprocations of said plunger element due to the operation of the latter, guiding means for said counterbalancing element, and means for limiting the upward and lowering movement of said counterbalancing element.

In testimony whereof, I affix my signature hereto.

CHARLES I. WHIPPLE.