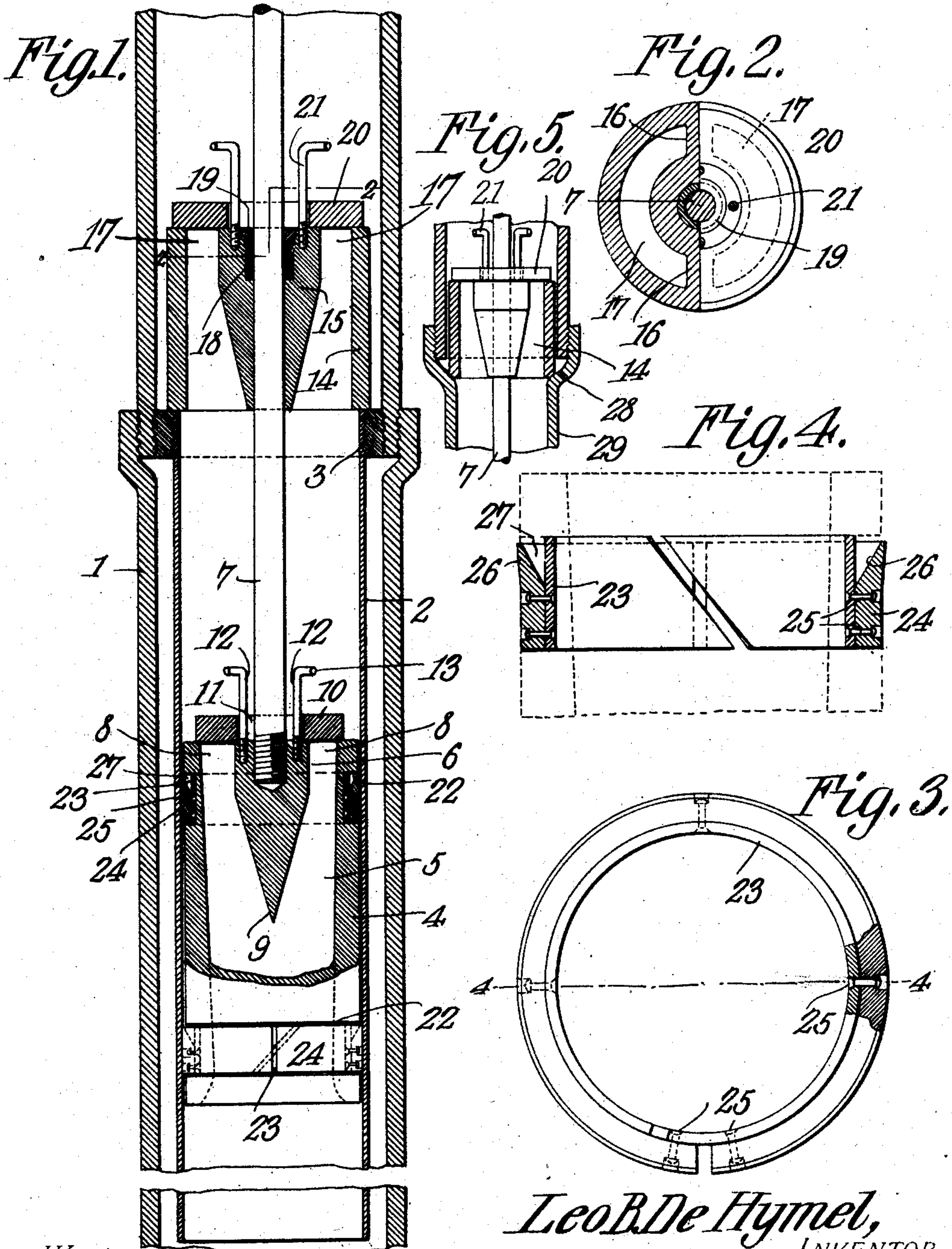


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PUMP.
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WITNESSES:

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LEO BLAKE DE HYMEL, OF SAN ANTONIO, TEXAS.

PUMP.

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To all whom it may concern:

Be it known that I, LEO B. DE HYMEL, a citizen of the United States, residing at San Antonio, in the county of Bexar and State of Texas, have invented a new and useful Pump, of which the following is a specification.

This invention relates to pumps intended more particularly for deep well operations, and it relates especially to the plunger and valves for pumps of this type.

The invention has for one of its objects to improve and simplify the construction and operation of devices of this character so as to be comparatively easy and inexpensive to manufacture and keep in repair, reliable and efficient in use, and to have a comparatively large output for a given expenditure of power.

A further object of the invention is the provision of ring-shaped valves for the plunger and casing of the pump which are so arranged that the flow of water can take place through the openings of the valves, as well as around the outside thereof.

Another object of the invention is to improve the construction of the plunger and floating guide for the plunger rod, so that comparatively large water passages are provided through them which contribute with the form of valves mentioned to increase the output of the pump.

Another object of the invention is to provide a novel form of packing particularly adapted to the style of plunger employed.

With these and other objects in view, as will appear as the nature of the invention is better understood, the invention comprises the various novel features of construction and arrangement of parts, which will be more fully described hereinafter and set forth with particularity in the claims appended hereto.

In the accompanying drawing, which illustrates one of the embodiments of the invention, Figure 1 is a longitudinal section of the apparatus. Fig. 2 is a semi-sectional plan view on line 2—2 of Fig. 1. Fig. 3 is a plan view of one of the plunger packings partly broken away. Fig. 4 is a longitudinal view on line 4—4, Fig. 3. Fig. 5 is a sectional detail view of a slightly modified form of the invention.

Corresponding parts in the several figures are indicated throughout by similar characters of reference.

Referring to the drawing, 1 designates the well pipe or casing of the usual construction within which is concentrically arranged the plunger cylinder 2 which is threaded at its upper end in the ring 3 that is secured in the pump pipe in any suitable manner. The cylinder 2 has a smooth interior and arranged to reciprocate therein is a plunger 4. The cylinder, which is of any suitable length, may be arranged in well pipes 1 of any approved diameter, the ring 3 being of proper size to fit in the well pipe to hold the cylinder in place.

The plunger 4 is preferably hollow throughout its length and the bore 5 thereof expands gradually in an upward direction, and at the upper end is arranged a boss 6 to which the lower end of the plunger rod 7 is attached. The boss 6 is connected with the plunger 4 by two diametrically opposite webs, such as are employed in the plunger rod guide hereinafter to be explained, and shown in detail in Fig. 2. Around the boss 6 are two approximately semi-circular ports 8 through which the water passes during the down stroke of the plunger. The bottom of the boss 6 is formed into an inverted cone shaped projection 9 that constitutes a splitter whereby the column of water passing through the plunger is divided gradually and directed to the ports 8. The boss 6 is arranged within the plunger 4 and the top end thereof is flush with the end of the plunger, so that both cooperate to form a seat for the plunger valve 10. This valve is preferably in the form of a ring which is of slightly larger exterior diameter than the upper end of the bore of the plunger, and the interior of the diameter is slightly less than the diameter of the boss 6. The central opening 11 of the ring valve is, however, large enough to permit the stream of water passing through the ports 8 to flow in part freely inwardly between the wall of the opening and the plunger rod 7 and in part outwardly through the circumference of the valve and cylinder 2. The movement of the valve 10 is guided by a plurality of upright rods 12 arranged at diametrically opposite points around the plunger rod 7 and screwing into tapped openings in the boss 6. The upper end of the rods 12 are bent laterally to form stops 13 whereby the upward movement of the valve is limited. The guide rods 12 are preferably made of wire of suitable stiffness and are of compara-

tively small gage so as not to materially diminish the effective area of the discharge opening of the valve.

At the upper end of the cylinder 2 is a cylindrical float 14 having a central depending inverted cone-shaped guide 15 constituting a splitter and which is longitudinally bored to receive the plunger rod 7. The lower end of the float 14 rests on the ring 3 which forms a seat on which the float is free to have a limited lateral movement, the external diameter of the float being somewhat less than the internal diameter of the well casing 1, so as to permit the guide to readily center itself. The splitter 15 is connected at its upper end with the hollow cylindrical float 14 by diametrically opposite webs 16, as shown more clearly in Fig. 2. These webs divide the space around the upper end of the splitter 15 into two approximately semi-circular ports 17. From the ports, the splitter 15 tapers downwardly to the bottom of the float. The upper end of the splitter is counter-bored to form a stuffing box in which are a plurality of packing rings 18 held under compression around the plunger rod by the gland 19. On the upper end of the float is an annular valve 20 similar in construction to the valve 10 and operating on the same principle. Combined stops and guides 21 are arranged on the float for controlling the movement or lift of the valve.

The plunger 4 has its bore 5 as large as practicable, so that the body of the plunger is comparatively thin. For this reason, the special form of packing shown in the present instance has been designed. The plunger is provided with circumferential packing grooves 22 which are relatively long and shallow, owing to the limited stock of the plunger, such form of grooves being preferable so as not to seriously weaken the walls of the plunger. In each of the grooves 22 is arranged a packing. This packing comprises a split sleeve 23 of metal, and encircling the same is an annular strip of leather 24 that is secured in place by suitably arranged countersunk rivets 25 passing through the strip and split metallic ring. The leather ring 24 is beveled outwardly from its internal surface to constitute a flexible and unsupported rim 26. The bevel of the leather opens upwardly, so that as the plunger moves on its upward stroke, the pocket 27 formed between the rim 26 and metallic ring 23 fills up with water and the pressure thereof and the weight of the water lifted by the plunger holds the rim 26 tightly in contact with the cylinder 2. By this form of packing, leakage is effectively prevented and the strength of the plunger is not seriously impaired.

In the modification shown in Fig. 5, the seat 28 for the float 14 is formed on one of

the sections 29 of the well casing, and the cylinder 2 and its supporting ring 3 is dispensed with. The seat is beveled and the float shaped at its lower end to correspond. This form is adapted for use in connection with deep well casings of ordinary construction.

From the foregoing description, taken in connection with the accompanying drawing, the advantages of the construction will be readily apparent.

What is claimed is:—

1. In a pump, the combination with a casing, of an open ended cylinder rigidly mounted therein and spaced therefrom, a plunger disposed within the cylinder, an inverted cone-shaped splitting element rigid with the plunger, and spaced from the walls thereof to provide semi-circular ports, an annular valve resting upon the upper end of the plunger and normally closing the ports, and being of less transverse diameter than the plunger, means carried by the splitting element to guide the valve in vertical movements, a plunger rod secured to the splitting element, a hollow cylindrical float resting upon the upper end of the cylinder, said float being freely movable laterally, a second liquid splitting element rigid with the float and spaced from the walls thereof to provide semi-circular ports and provided with a longitudinal bore including a suitable packing through which the plunger rod projects, an annular valve resting upon the upper end of the float and being of less transverse diameter than the same, and normally closing the last-named ports, and means carried by the second splitting element to guide the last-named valve in vertical movement.

2. In a pump, the combination with a casing, of an open ended cylinder rigidly mounted therein and spaced therefrom, a plunger disposed within the cylinder, said plunger being provided with valved openings therethrough, a plunger rod secured to said plunger, a hollow cylindrical float resting upon the upper end of the cylinder, and freely movable laterally, an element rigid with the float and spaced from the walls thereof to provide semi-circular ports and provided with a longitudinal bore including a suitable packing through which the plunger rod projects, and an annular valve resting upon the upper end of the float arranged to close said ports.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

LEO BLAKE DE HYMEL.

Witnesses:

HENRY FEILLE,
P. H. SHOOLZ.