

July 22, 1952

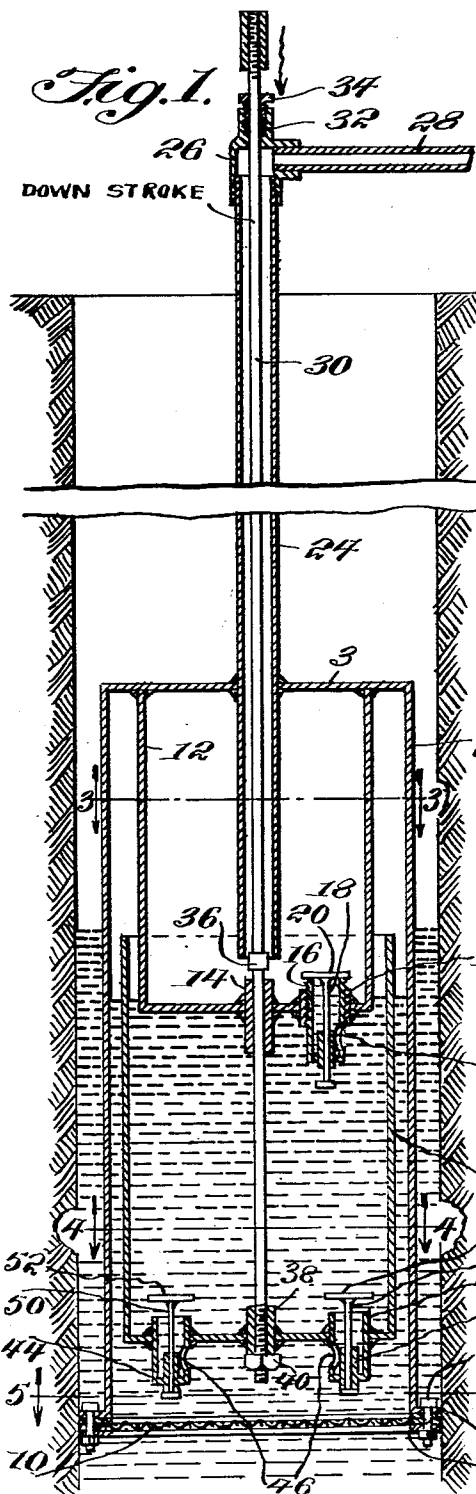
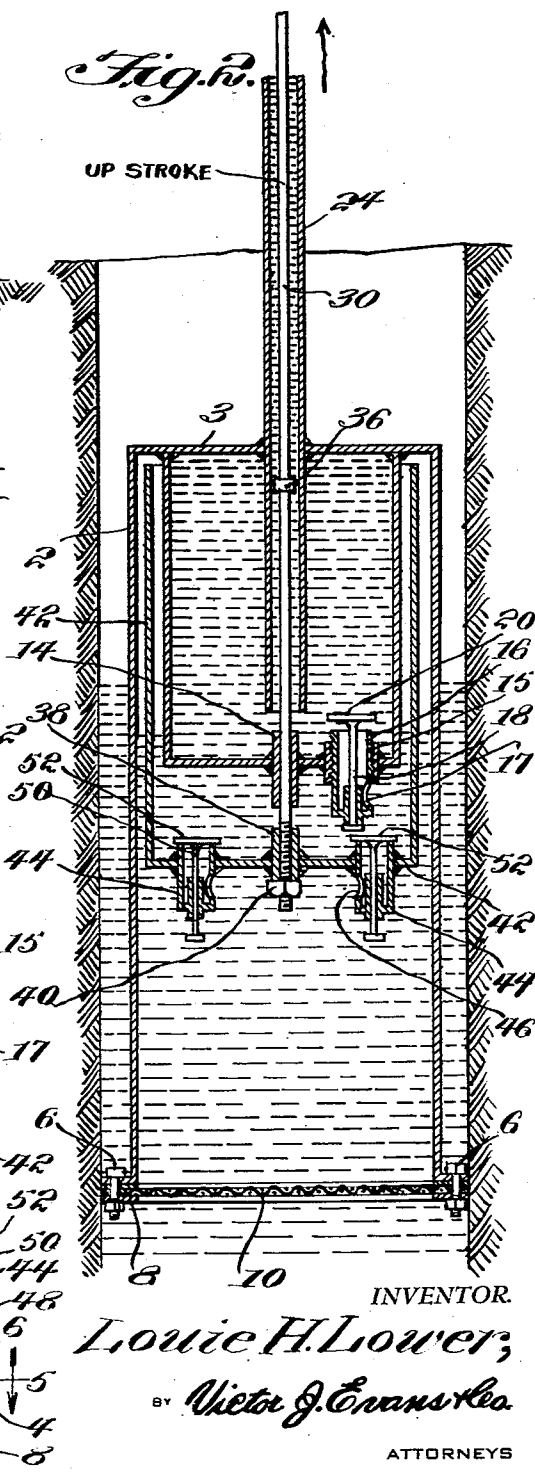
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2,604,053

COMBINED WELL CYLINDER AND FORCE PUMP

Filed July 30, 1946

2 SHEETS—SHEET 1



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2 SHEETS—SHEET 2

Fig. 3.

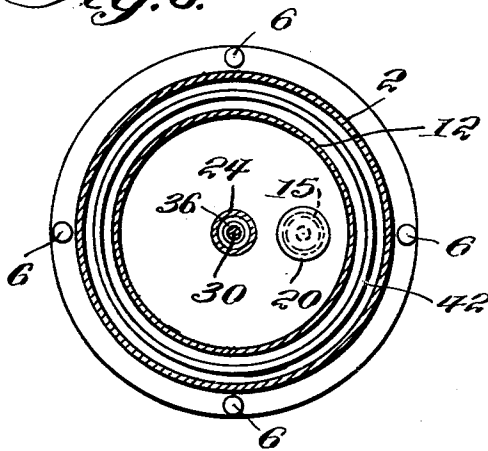


Fig. 6.

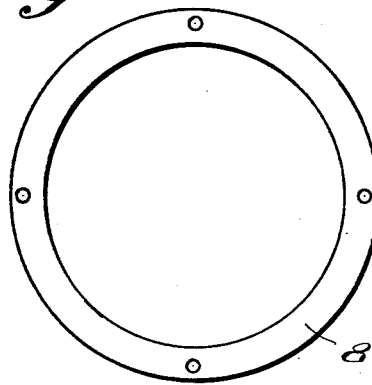


Fig. 4.

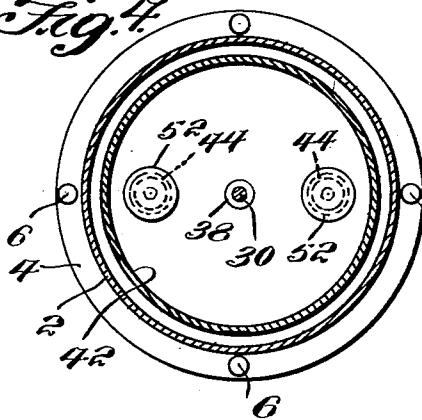


Fig. 7.

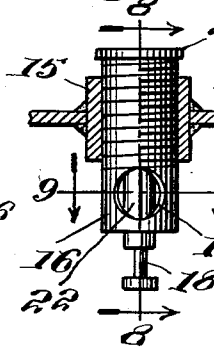


Fig. 8.

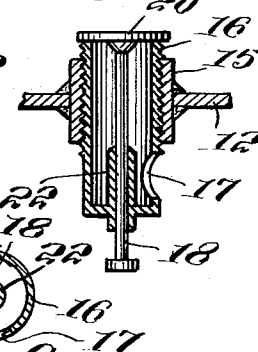


Fig. 9.

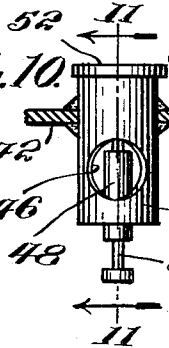


Fig. 10.

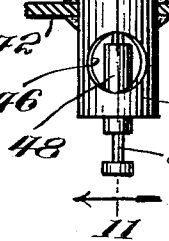


Fig. 11.

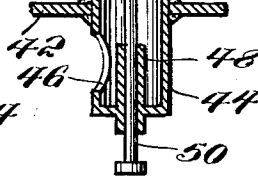
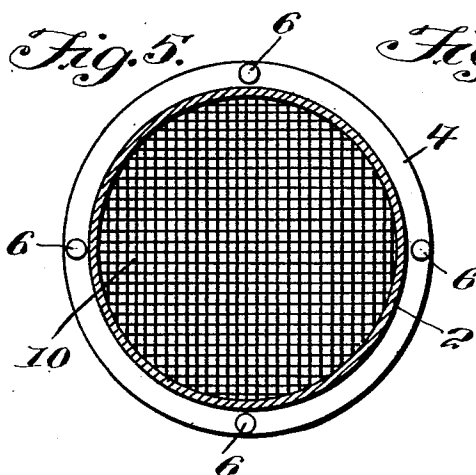


Fig. 5.



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UNITED STATES PATENT OFFICE

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COMBINED WELL CYLINDER AND
FORCE PUMP

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Application July 30, 1946, Serial No. 687,156

2 Claims. (Cl. 103-158)

1

My present invention relates to an improved combined well cylinder and force pump and more especially to the structure employed for lifting water from the well by means of air pressure compressed between a fixed cylinder and a telescoping cylinder so that the water drawn in to the telescoping cylinder on the down stroke through pressure actuated valves will be elevated by the force of the air compressed between the cylinders on the upward movement of the telescoping cylinder to force the water outwardly of the fixed cylinder on the up stroke.

In the accompanying drawings, I have illustrated one complete example of the physical embodiment of my invention according to the best mode I have thus far devised but it will be understood that various changes and alterations may be made in the exemplified structure within the scope of the appended claims.

In the drawings:

Figure 1 is a vertical sectional view of the well cylinder and structure of my invention showing the water lifting cylinder at the lowermost point of its stroke.

Figure 2 is a vertical sectional view thereof showing the water lifter at the top of its stroke.

Figure 3 is a horizontal sectional view at line 3-3 of Figure 1.

Figure 4 is a horizontal sectional view at line 4-4 of Figure 1.

Figure 5 is a horizontal sectional view at line 5-5 of Figure 1.

Figure 6 is a top plan view of the filter screen securing ring.

Figure 7 is a side elevational view of the valve in the air drum.

Figure 8 is a vertical sectional view thereof at line 8-8 of Figure 7.

Figure 9 is a horizontal sectional view at line 9-9 of Figure 7.

Figure 10 is a side elevational view of one of the valves in the water lifter; and

Figure 11 is a horizontal sectional view thereof at line 11-11 of Figure 10.

Referring now to the drawings wherein like characters indicate like parts I have illustrated the present embodiment of my invention as comprising a cylinder 2 having a closed top 3 and adapted to be positioned within a well and partially submerged in the water. The lower open end of the cylinder is formed with an annular flange 4, and the bolts 6 secure the ring 8 to the flange with the filter screen of cloth or metal as 10 therebetween.

An air drum 12 is provided interior of the cylin-

2

der 2 with the upper open end thereof suitably secured to the top 3 of the cylinder as by welding or other method to provide an air tight contact between the air drum and the cylinder top, and this drum is fashioned with a central sleeve 14 in the closed lower end thereof.

Also in the closed bottom of the air drum and at one side of the center I have utilized a sleeve 15 secured suitably and a valve casing 16 is threadedly engaged in the sleeve and formed with a side port 17. A valve rod 18 having a valve 20 is slidably mounted in the sleeve 22 of the valve casing and this valve reciprocates in the sleeve and casing to open and close the upper open end of the casing under pressure of water as will be later described.

A vertical pipe 24 is centrally located within the cylinder and the drum and the elbow 26 connects with the outlet pipe 28 for the elevated water. The pump rod 30 provided with packing 32 and the nut 32 extends downwardly through the pipe 24 and a collar 36 is positioned on the rod to limit the movement of the rod through the sleeve 14 by abutting the sleeve.

The lower end of the rod extends through the sleeve 38 and is secured by nut 40 in the closed lower end of the water lifter 42 comprising an open cylinder reciprocable with the pump rod within the main cylinder 2 and between the cylinder 2 and the air drum in the upper extent of the structure.

The water lifter is also formed with pressure operating valves therein including the valve casings 44 having side ports 46, and the sleeves 48 guide the vertical movement of the valve rods 50 formed with check valves 52.

In operation, as the pump rod is reciprocated vertically either manually or mechanically, the water lifter on the down stroke is forced into the water in the well, the valves 52 opening under pressure of the water to permit the water to flow therein. At the bottom of the stroke, the valves are open and as the lifter begins its ascent, the valves close under pressure of the water within the lifter and the water being raised opens the valve 20 in the air drum the water flowing through the port of the valve at 17 and partially filling the air drum. However, as the water compresses the air in the drum the flow of water therein ceases and the water seeking an outlet being under pressure enters the open mouth of the pipe 24 and is thus lifted to the pipe 28. It will also be noted that as the lifter moves upwardly within the main cylinder 2 air will be compressed within the lifter to cause the water

therein to be forced upwardly through the valve 20. This action is possible for the reason that the annular space between the water lifter 42 and the cylinder 2 has a smaller flow capacity than the flow capacity of the valve 20. In other words, the clearance between the water lifter 42 and the cylinder 2 is so proportioned with relation to the flow capacity of the valve 20 or the orifice opening of the valve 20 that more water will enter the valve 20 than will escape between the water lifter 42 and cylinder 2. For clarity in reading the drawing the space has been exaggerated, for if the space were drawn to show the actual clearance, confusion may exist as to the walls of the water lifter 42 and cylinder 2.

On the down stroke the valve 20 closes and the valves 52 open as described above and the cycle is repeated so long as the rod is reciprocated.

By the use of the structure of my invention the use of leathers and other valve devices of similar character are eliminated, and the long wearing and durable structure is substituted.

Having thus fully described my invention what I claim as new and desire to secure by Letters Patent is:

1. A water lifter for wells comprising a partially submerged cylinder having its lower end open and screened and its upper end closed, an air drum having its upper open end sealed to the inner wall of the closed cylinder end, a pressure actuated valve in the air drum, a cylinder reciprocable in the first cylinder having telescopic arrangement with said air drum, means for reciprocating the cylinder which is telescopically

arranged with said air drum, outlet means for said air drum carried by said submerged cylinder, and pressure actuated valve means in the telescopically arranged cylinder so that liquid entering the telescopically arranged cylinder is forced into said air drum and out of the outlet means therefor.

2. A water lifter for wells comprising a partially submerged cylinder having its lower end open and screened and its upper end closed, an air drum having its upper open end sealed to the inner wall of the closed cylinder end, a pressure actuated valve in the air drum, a cylinder reciprocable in the first cylinder telescopically arranged with said air drum, an outlet pipe extending into the air drum and carried by said submerged cylinder, a pump rod in the pipe and connected with the telescopically arranged cylinder, and pressure actuated valve means in the telescopically arranged cylinder whereby the water filled telescopically arranged cylinder on its upward stroke will transfer the water to the air drum to the limit of the air compression and thence through the pipe.

LOUIE H. LOWER

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The following references are of record in the file of this patent:

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