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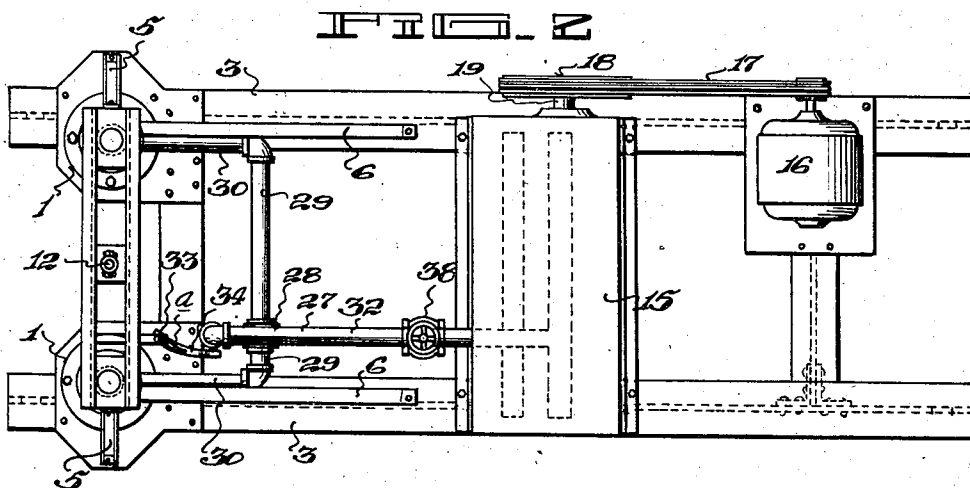
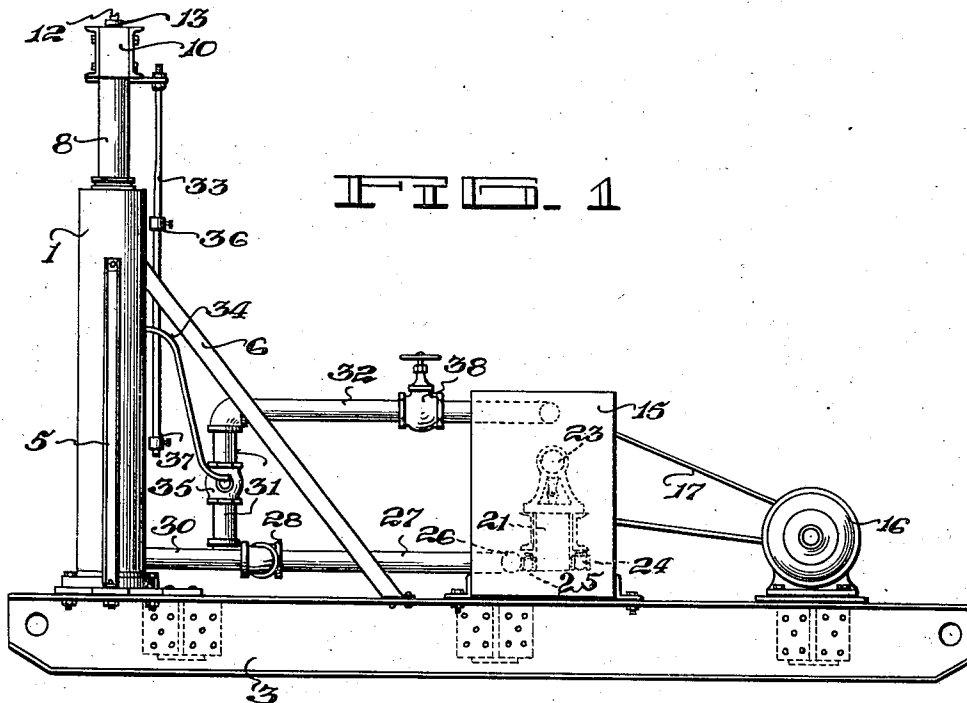
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HYDRAULIC PUMPING APPARATUS

Filed June 7, 1932

2 Sheets-Sheet 1



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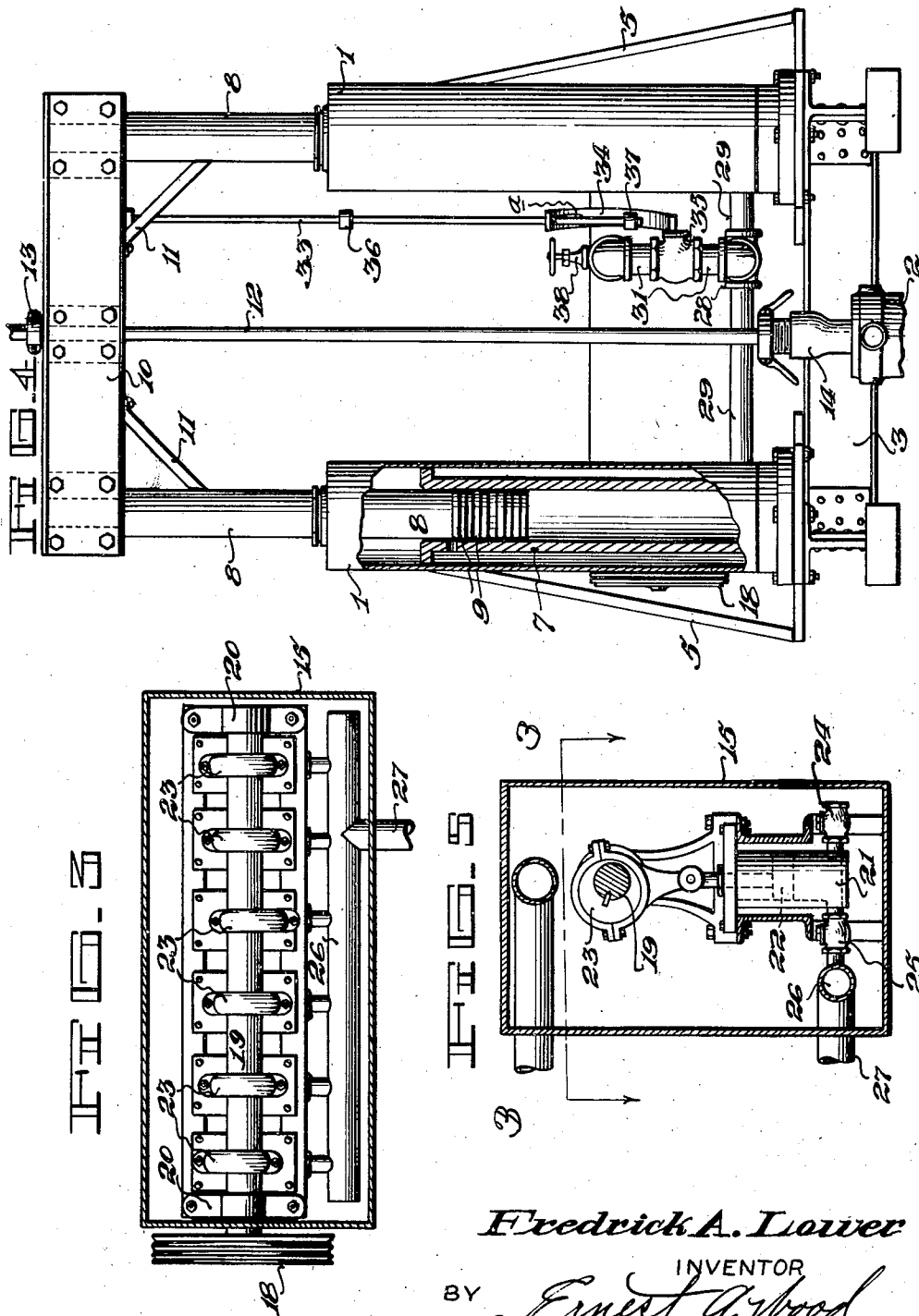
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HYDRAULIC PUMPING APPARATUS

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HYDRAULIC PUMPING APPARATUS

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Application June 7, 1932, Serial No. 615,811

1 Claim. (Cl. 103—41)

This invention relates to pumping apparatus and it has particular reference to hydraulically operated pumps for oil and other wells.

The principal object of the invention is to provide a novel combination of elements designed to actuate the pump rod assembly in the well and thereby pump fluid from the well to storage.

Another object of the invention is to provide hydraulically operated pumping equipment which is of simple and economical construction and which will be dependable in service and require but little attention while in operation.

Still another object of the invention is to provide a fluid reservoir and means for forcing fluid therefrom under pressure into the pump cylinders, combined with automatic means for releasing the fluid from the pump cylinders and returning it to the fluid reservoir at the end of the stroke.

Broadly, the invention comprehends the provision of hydraulic pumping equipment designed to obtain a true, perpendicular stroke of the polished rod, and thereby avoid the lateral stresses to which these rods are subjected when actuated by the old types of mechanical pumping equipment. Repeated stresses eventually cause the polished rod to break by reason of fatigue and allow the pump rod assembly to drop into the well, thereby necessitating an expensive fishing job.

With the foregoing objects as paramount, the invention has particular reference to its salient features of construction and arrangement of parts, which will become manifest as the description proceeds, taken in connection with the accompanying drawings, wherein;

Figure 1 is a side elevation,

Figure 2 is a plan view of Figure 1,

Figure 3 is a plan view on line 3—3 of Figure 5,

Figure 4 is an end elevational view with portions broken away, and

Figure 5 is a view in vertical section of the fluid reservoir.

Continuing with a more detailed explanation of the drawings, 1 designates the vertical tubular casings disposed on opposite sides of a well casing 3 and securely mounted on a base 4. The casings 1 are braced by means of the angularly disposed braces 5 and 6. A tubular member 7 is mounted within each of the casings 1. These members serve as motor cylinders for the pistons 8 which carry piston rings 9. The pistons 8 extend upwardly beyond the casings 1 where they are rigidly secured to the crosshead 10 and braced thereto by the angularly disposed braces 11.

The polished rod 12 passes through the center of the crosshead 10 but is prevented from moving downward relative to the cross head by the clamp 13. The polished rod 12 extends downwardly from the crosshead 10, through the stuffing box 14 and into the casing 2.

Secured to the base 3 is a fluid reservoir 15 within which is located the fluid pumping mechanism used to raise the pistons 8. This mechanism is driven by an electric motor 16 or any other suitable source of power. The power is applied through a belt 17 to a pulley 18 which is keyed to the shaft 19 which is mounted within the reservoir 15 on bearings 20.

A plurality of cylinders 21 within the fluid reservoir 15 serve as pump cylinders for the pistons 22 which are actuated by the eccentrics 23. These eccentrics are keyed to the shaft 19 as shown in Figure 5. The fluid is free to pass into the cylinders 21 by way of the check valves 24, and to leave the cylinders 21 by way of the check valves 25. The check valves 25 communicate with a manifold 26 which in turn communicates with the fluid delivery pipe 27. This pipe terminates in a cross 28 from which fluid pipes 29 and 30 communicate with the base of the motor cylinders 7.

Fluid is returned to the reservoir 15 from the motor cylinders 7 by way of pipes 30 and 29, cross 28, and pipes 31 and 32.

A rod 33 extends downwardly from the cross head 10 and through a slot *a* in a valve control arm 34 in the pipe 31. An adjustable collar 36 is located on the rod 33 above the arm 34 and a similar collar 37 is located on the rod 33 below the arm 34. The rate of return of fluid to the reservoir 15 is controlled by a valve 38 in the pipe 32.

The operation is as follows:

When power from the motor 16 is applied to the shaft 19 the eccentrics 23 cause the pistons 22 to reciprocate, thereby drawing fluid in through the check valve 24 on the upstroke and discharging it under pressure on the down stroke through the check valve 25 and into the manifold 26. From here the fluid travels through pipe 27, cross 28 and pipes 29 and 30 into the motor cylinders 7 below the pistons 8 thereby causing an equal pressure to be exerted on each of the pistons 8 which move upward, thus raising the cross head 10 and pumping the well through the medium 50 of the polished rod 12 and the pump rod assembly.

During the up stroke the valve 35 is closed, but just before the cross head 10 reaches its extreme upward position the collar 37 engages the

valve control arm 34 and a slight further upward movement actuates this arm to open the valve 35. When this is done the fluid within the cylinders 7 is returned to the reservoir 15 by way of pipes 30 and 29, cross 28 and pipes 31 and 32. Upon entering the reservoir 15 the fluid pours over the eccentrics 23, thereby keeping them thoroughly lubricated. The valve 38 serves to partially choke the return path, thereby preventing too rapid a return of mechanism to the lower position which might result in damage to the moving parts.

Just before the mechanism reaches the lowest position in the stroke, the collar 36 engages the arm 34 and a slight further movement closes the valve 35 and the cycle is repeated.

Manifestly, the construction shown is capable of considerable modification, and such modification as is considered within the scope and meaning of the appended claim is also considered within the spirit and intent of the invention.

What is claimed is:

In a hydraulic system for transmitting reciprocatory motion, the combination comprising a fluid reservoir having a fluid inlet and a fluid pressure outlet, a fluid recirculating means comprising a series of horizontally aligned, vertically disposed piston cylinders in said reservoir each having fluid inlets open to said reservoir, a fluid manifold effecting communication between said cylinder and said fluid pressure outlet, pistons in said cylinders, a shaft journaled in bearings at either end interiorly of said reservoir, a series of eccentrics fixed to said shaft, one above each of said cylinders and having connection with each of said pistons to force fluid from said cylinders and reservoir through said outlet, means for rotating said shaft to actuate said pistons, a valve having common connection with said fluid inlet and said fluid pressure outlet and operative at predetermined intervals to control said fluid and to effect its return to said reservoir for recirculation.

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