J. CONLAN.

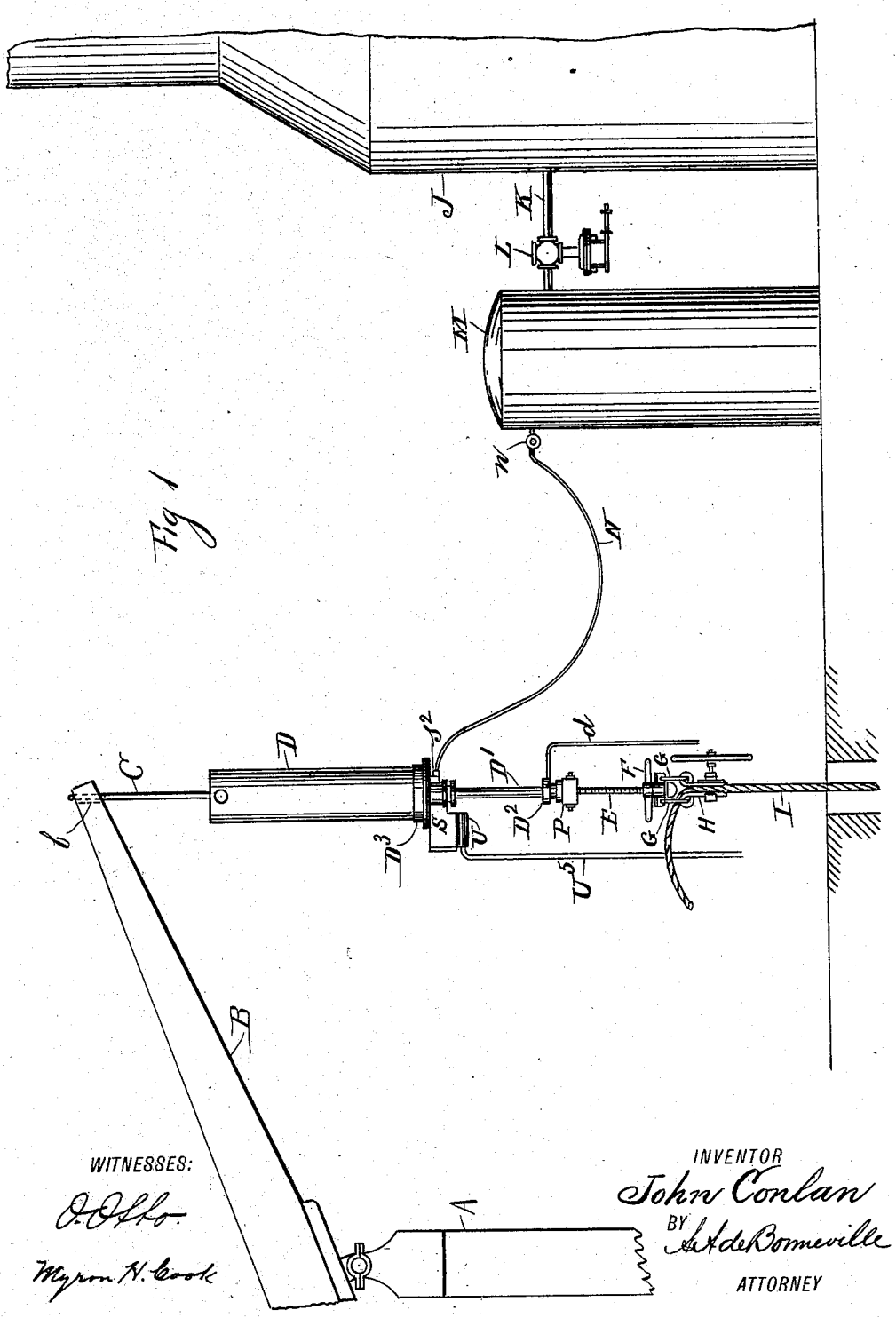
WELL DRILLING APPARATUS.

APPLICATION FILED AUG. 19, 1904.

901,229. Patented Oct. 13, 1908.

2 SHEETS—SHEET 1.

Fig 1



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2 SHEETS—SHEET 2.

Fig 2

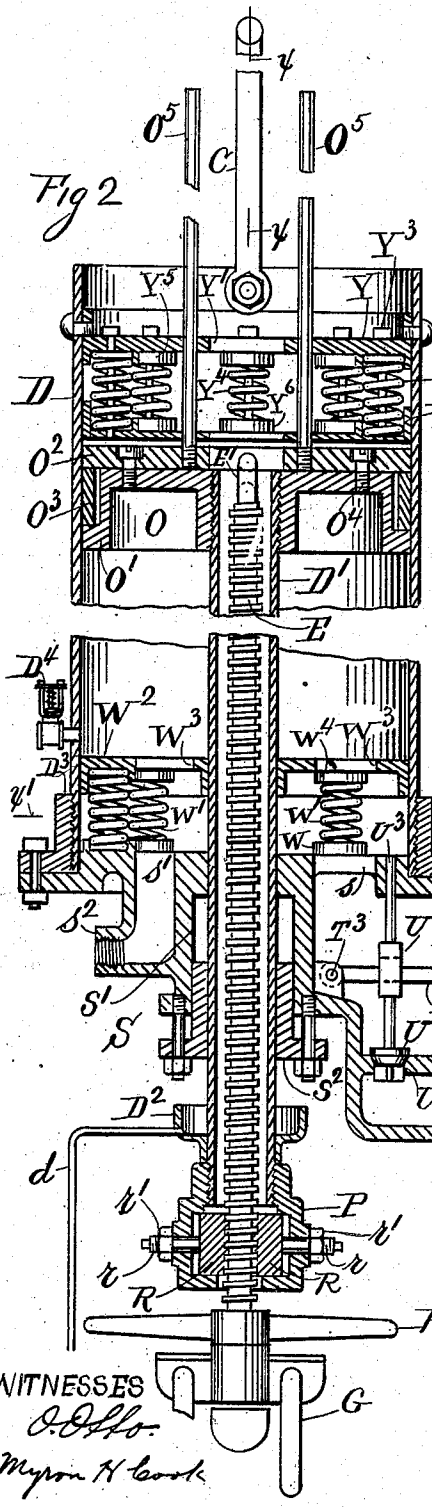


Fig 3

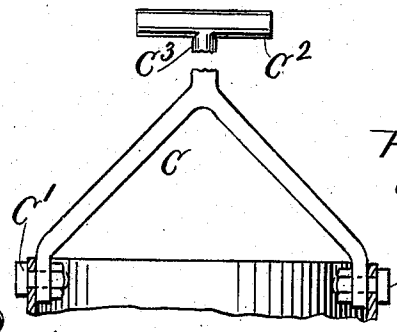


Fig 4

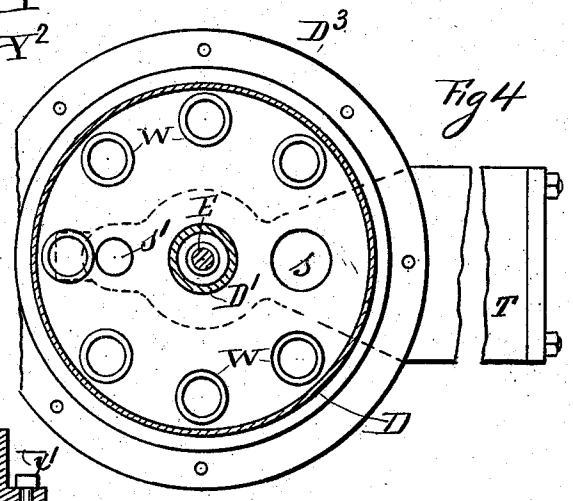
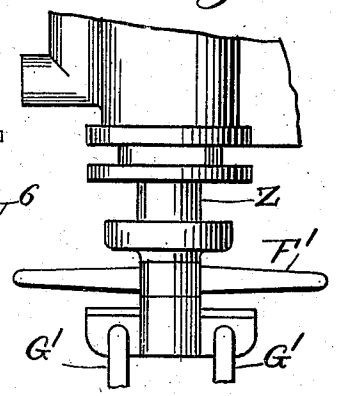


Fig 5



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UNITED STATES PATENT OFFICE.

JOHN CONLAN, OF NEWARK, NEW JERSEY.

WELL-DRILLING APPARATUS.

No. 901,229. Specification of Letters Patent. Patented Oct. 13, 1908.

Application filed August 19, 1904. Serial No. 221,336.

To all whom it may concern:

Be it known that I, JOHN CONLAN, a citizen of the United States, and a resident of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful improvements in Well-Drilling Apparatus, of which the following is a specification.

This invention relates to improvements in well-drilling apparatus, and its organization comprises an automatic feed cylinder, in which a fluid is used as a sustaining medium under a piston, which latter with its appurtenances carries the drilling tools. By suspending the piston with an elastic fluid, allows the automatic feeding of the drilling tools, with the use of wire rope between the piston rod of the piston and the drilling tools.

In the ordinary well-rig a hemp rope is used to suspend the drilling tools in the well, and the rope is made of a length to sustain the drilling tools somewhat above the bottom of the well, when the walking beam of the well rig is at the end of its down stroke. The beam on rising and then lowering causes the cable when the hemp rope is used to stretch, and thereby enables the drill to strike the bottom of the well, which is termed drilling on the spring of the cable. If a wire cable is used with the ordinary well rig, there being practically no stretch to the said wire cable, it will be impossible to sink the well, with the so called spring of the cable.

In the present invention the compressibility of the fluid in the cylinder takes the place of the elasticity of the hemp rope. The piston in the cylinder floats on the elastic and compressible fluid, and the elasticity is communicated to the drilling tools by means of a wire rope, obtaining thereby all the advantages of a hemp rope and the strength and durability of a wire cable. By varying the pressure of the fluid, the position of the piston in the cylinder can be changed, and thereby the regular temper screw can be dispensed with.

In the drawings Figure 1 represents a fragmentary portion of a well rig, a steam boiler, and an elevation of the invention, Fig. 2 shows a partial axial vertical section of a feed cylinder with its appurtenances, Fig. 3 is a partial section of Fig. 2 on the line x, x, Fig. 4 is a partial section of Fig. 2 on the line x', x', Fig. 5 represents an elevation of a portion of a feed cylinder modified.

Referring particularly to Fig. 1 there is represented the samson post A of a well-rig, with a portion of a walking beam B. A hanger C is suspended from the end of the said beam, and supports the feed cylinder D, from the piston rod D′ of which extends a temper screw E with an eye E′. A cross-bar F is secured to the temper screw and links G, with clamps H are located below the bar F in the usual way, to clamp the wire drilling cable I that hangs in the well and carries the drilling tools. A boiler J is connected by piping K and a pressure regulating valve L with a reservoir or tank M. A tube or piping N with the valve n, connects the said tank with the cylinder D.

Referring particularly to Figs. 2 to 4, the cylinder D swings on the bolts C′ that connect the hanger C with the upper end of the said cylinder. A cross-bar C^2 of the hanger bears on the top of the walking beam of the well rig, and the portion C^3 is held in place in a slot b, at the end of said beam.

A piston O in the cylinder comprises the spider O′, follower plate O^2, packing O^3 and bolts O^4. In the said follower plate are tapped guide rods O^5 that pass through openings in the plate Y. The piston is tapped through its center for the hollow piston rod D′, which latter carries the waste cup D^2, with the pipe or tube d. At the lower end of the piston rod is secured the support P which holds the threaded clamps R for the temper screw E. Bolts r extend from the clamps, pass through openings in the support and are held in place by the nuts r'.

At the lower end of the cylinder D is screwed the flange D^3, to which latter is bolted the cylinder head which I will designate by the letter S. The said head is provided with the usual stuffing box S′ and its gland S^2. It has formed in its face the port s, that leads to the trap T, and the port s' which connects with the nozzle s^2 to which latter is connected the tube or piping N.

The trap T comprises the float T′ carried on the arm T^2, which is pinned at one end of the chamber of the trap by means of the pin T^3. A valve U is arranged to open a discharge port U′. The arm T^2 of the float passes through the spindle U^2 of the valve, the upper end U^3 of the said spindle being guided through an opening in the upper portion of the cylinder head S. A chamber U^4 at the lower portion of the trap has the threaded opening U^6 from which extends the waste tube or piping U^5.

On the inner face of the cylinder head S

are formed the pockets W that carry the springs W′, and the latter support the cover W^2 that fits the bore of the cylinder. The said cover has openings W^3, and the pockets W^4 for the springs W′. The combination of the cylinder head, springs and cover forms a buffer at the lower end of the cylinder.

At the upper end of the cylinder there is secured a plate Y with an opening Y′, and spring pockets Y^5. A movable plate Y^2 with spring pockets Y^6 is suspended from the plate Y, by means of bolts Y^3, springs Y^4 surrounding the bolts and adjusted in the spring pockets. The combination of the two plates with its springs and bolts constitutes a buffer at the upper end of the cylinder.

In Fig. 5 the temper screw E is dispensed with, and the piston Z is shown directly connected with the bar F′, below which are shown the links G′, which latter can suspend the clamps for the drilling cable as usual. At the lower end of the cylinder D there is shown a safety valve D^4.

To use the invention the drilling cable I, of wire rope, with its tools are placed over the well hole as usual. The piston O is floated or suspended in the cylinder D, by means of the fluid pressure admitted from the tank M.

The apparatus shown is for steam although other elastic fluids, air or gases may be used. The steam is supplied by the boiler J, through the regulating pressure valve L, and the piping K, to the tank M from which latter it is led by the tube or piping N, and then enters the cylinder through the nozzle s^2, port s' and openings W^3 in the plate W^2, after which the fluid bears up against the lower face of the piston O. The opening Y′ is made in the upper plate Y for the escape of any steam or fluid which may leak past the piston O. The walking beam is now oscillated, and the tools with the cylinder D and its appurtenances will be raised and lowered.

The compressibility of the fluid in the tank M, as well as the fluid in the cylinder D under the piston O, allows the piston with its appurtenances, drill &c. to operate in the well with the same effect, as drilling on the spring of the cable. The direct connection, by means of the tube N between the cylinder D and tank M allows the elasticity of the fluid in the said tank to become available as a cushion for the well tools. If any of the steam is condensed and is not returned to the tank M, it will escape by way of the trap T and tube or piping U^5. The water finds its way into the trap by way of the port s. It will be discharged from the trap by reason of the valve U rising by means of the action of the liquid on the float T′. The valve U is normally kept on its seat by the fluid pressure in the cylinder. The waste cup D^2 catches any leakage around the piston rod D′, and any water collected will be led away by the pipe or tube d. If for any reason there is an excess of pressure in the cylinder D, it will be relieved by the safety valve D^4, which valve can also be opened by hand to relieve the pressure and lower the piston O.

Having described my invention I claim:

1. In a well rig the combination of a walking beam, a hanger suspended from said beam, a feed cylinder suspended from the hanger, a buffer at each end of the cylinder, a piston in the feed cylinder, drilling tools supported by the piston, a reservoir for fluid of requisite pressure, piping connecting the reservoir with the feed cylinder below the piston.

2. In a well rig the combination of a walking beam, a hanger suspended from the beam, a feed cylinder suspended from the hanger, a spring buffer at each end of the feed cylinder a piston in the feed cylinder, a drill cable and drilling tools supported by the piston, a boiler, a reservoir, piping connecting the boiler and reservoir, a pressure regulating valve in the piping, and piping leading from the reservoir to the feed cylinder under the piston thereof.

3. In a well rig the combination of a cylinder, a piston suspended therein by a fluid, a hollow piston rod extending from the piston, a temper screw adjustably clamped within the piston rod, clamps suspended from the temper screw, a drilling cable held by the clamps, and drilling tools held by the cable.

4. In a well rig the combination of a cylinder, a piston suspended therein by steam pressure, a hollow piston rod extending from the piston, a temper screw adjustably clamped within the piston rod, rope clamps suspended from the temper screw, a drilling cable held by the clamps, and drilling tools held by the cable.

Signed at New York in the county of New York and State of New York this 17th day of August A. D. 1904.

JOHN CONLAN.

Witnesses:
MYRON H. COOK,
O. OTTO.