(No Model.) 2 Sheets—Sheet 1.

W. F. BURR.

MACHINERY FOR OPERATING OIL WELLS.

No. 524,244. Patented Aug. 7, 1894.

Fig. 4.

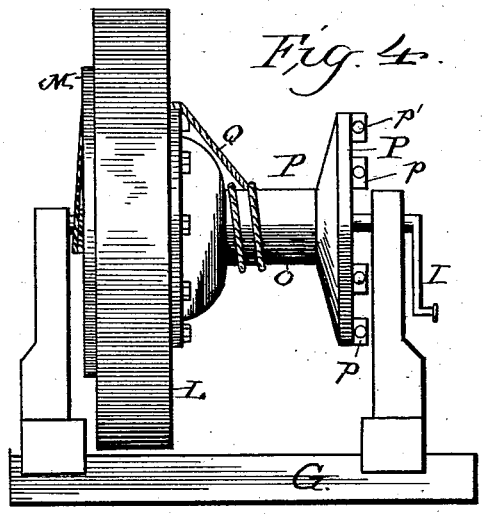

Fig. 5.

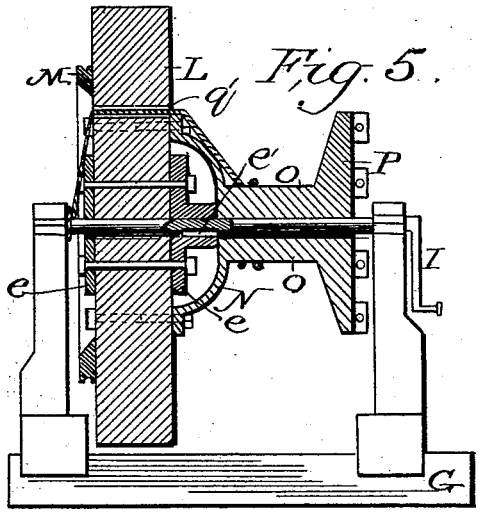

Fig. 1.

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MACHINERY FOR OPERATING OIL WELLS.

No. 524,244. Patented Aug. 7, 1894.

Fig. 2.

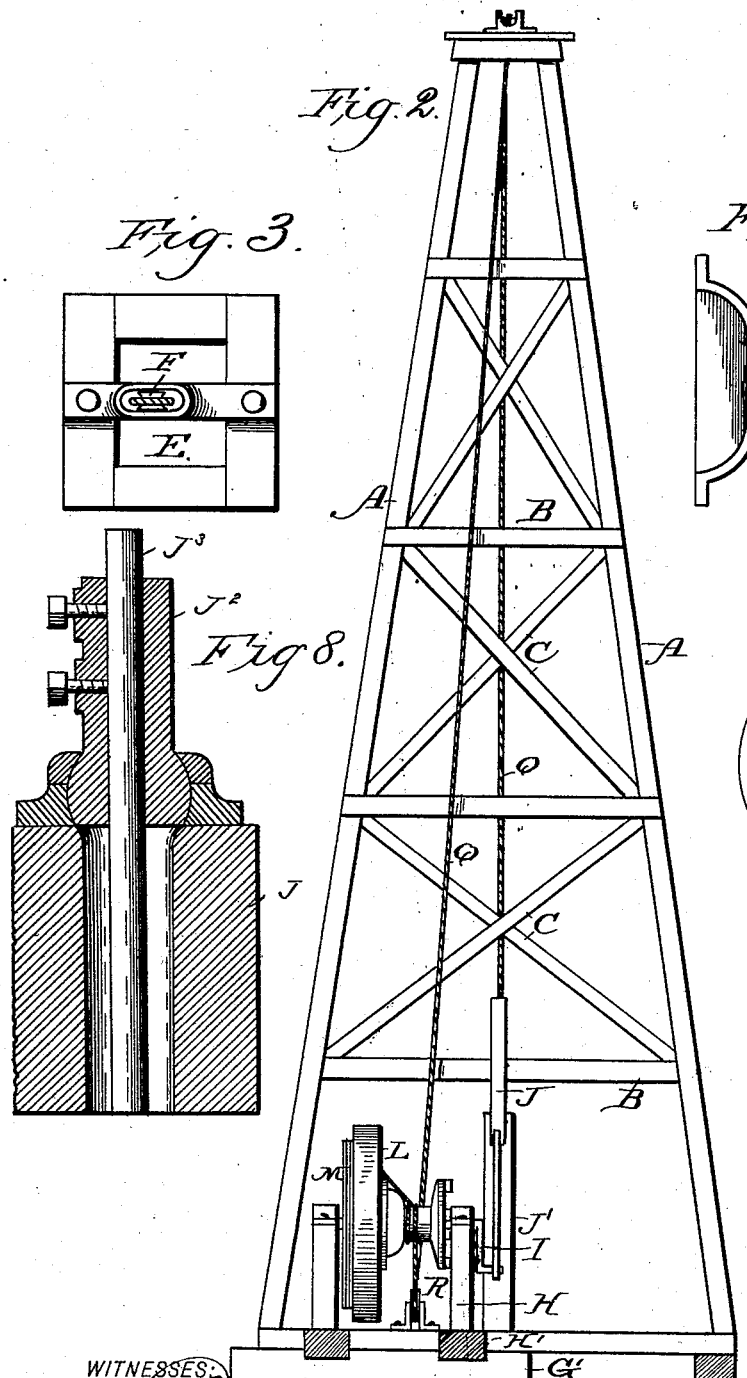

Fig. 3.

Fig. 6.

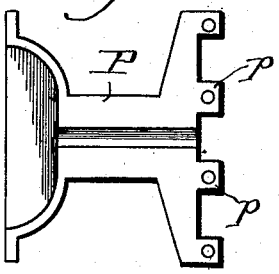

Fig. 7.

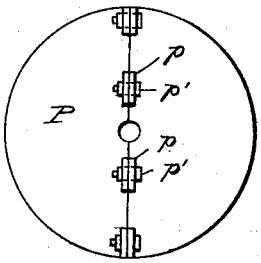

Fig 8.

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MACHINERY FOR OPERATING OIL-WELLS.

SPECIFICATION forming part of Letters Patent No. 524,244, dated August 7, 1894.

Application filed September 7, 1893. Serial No. 484,992. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM F. BURR, a citizen of the United States, residing at Eldred, in the county of McKean and State of Pennsylvania, have invented certain new and useful Improvements in Machinery for Operating Oil-Wells, of which the following is a specification, reference being had therein to the accompanying drawings.

Figure 1 is a side elevation of my invention. Fig. 2 is an elevation of Fig. 1 looking in the direction of the arrow 1. Fig. 3 is an enlarged view of the top of the derrick. Fig. 4 is a detached elevation, enlarged, of the part of the machinery to which my invention more particularly pertains. Fig. 5 is a central vertical section of Fig. 4. Fig. 6 is a detached view of one half of the spool when made in its preferred form. Fig. 7 is an end view of the spool looking toward the left of Fig. 4. Fig. 8 is a vertical section, enlarged, of the inner end of the walking beam, the adjuster and a section of the polish rod.

In the drilling of an oil well it is customary to combine with a crank shaft a spool or winding drum having attached thereto a rope running thence over a pulley at the top of the derrick for the purpose of handling the appliances which are raised and lowered within the well in the operation of drilling; the crank being combined with devices for producing an up and down movement of the various tools within the well. And where part of such devices consisted of a lever pivoted at one end and carrying at its opposite end a pulley engaging with a bight of the rope which ran from the winding drum up over the pulley of the derrick provision was made for connecting said lever with the pump of an adjacent previously completed well. But my invention, from the fact that my winding drum is never used as a bull-wheel and cannot be so used, because it is rigidly connected to the crank-shaft, but performs the function in a pumping-rig which is ordinarily performed in a pumping-rig by a bull-wheel, but which is not that of a bull-wheel in a drilling-rig, permits the operator to remove from the derrick the bull-wheel as soon as he has completed the drilling of the well; using my winding-drum for hoisting out and lowering in the sucker rods.

The use of my invention not only promotes economy by dispensing with the bull-wheel and the rope for driving it from the band wheel, but also saves the operator from the annoyance which results from the changes in the length of that rope arising from differences in atmospheric conditions.

Other parts of the invention relate to details of construction, as will be fully pointed out in the claims.

Like reference letters refer to similar parts wherever they are used.

Referring to the drawings A A are the posts of the derrick, usually four in number, one at each corner.

B B are horizontal girts, and C C are diagonal braces; there being, of course, the usual sills and flooring.

D, D, represent a rectangular frame at the top of the derrick and connecting the upper ends of the posts with a cross girt E with a pulley F mounted thereon; there being an opening or openings through the girt below the pulley, for the passage of a rope, as will be explained.

G, G′, are sills, ordinarily embedded, or partially embedded in the ground, with a pair of posts H rising from stringers H′, which, with the sills G G′, and braces *h*, *h*, constitute a supporting frame.

I is a pumping crank-shaft mounted in the upper ends of the posts H by means of any suitable bearings.

J is a walking-beam mounted on the upper end of the samson post J′ so as to vibrate thereon; the post having braces *j j*.

i is a pitman connecting the crank with the outer end of the walking beam.

At the inner end of the walking beam, which is directly above the tubing, there is an adjuster connected with the polish rod, the lower end of the latter passing through the usual stuffing box at the upper end of the casing head K, and connected to the sucker rods. When desired there may be a swivel plug at the upper end of the polish rod. But as my invention does not pertain to these last enumerated devices they may be of any usual or approved construction, and need not therefore be described in detail.

I′ is a band wheel mounted on the crank shaft I and secured rigidly thereto.

As is customary in this class of machinery I propose to connect the band wheel with the crank shaft by means of flanges $l, l^{\times}$, one upon either side of the wheel, they being preferably provided with hubs and keys l', with bolts passing through the flanges and the band wheel.

In band wheels of pumping rigs as usually constructed there is a grooved pulley or sheave secured to one face of the band wheel as is indicated at M Figs. 4 and 5; this sheave being ordinarily used to drive the bull wheel which is mounted on the opposite side of the derrick, with its shaft in planes which are parallel to the planes of the crank shaft I, the rope for letting down and hoisting out the sucker rods being wound upon the bull wheel shaft, which, in order to secure the desired speed is made of wood and a number of inches (say twelve) in diameter. But in my invention I omit the bull wheel shaft and its driving sheave M, and substitute therefor a winding mechanism mounted upon the pumping crank shaft.

I will now describe one mode which I have adopted for carrying my invention into effect.

Referring more particularly to Figs. 4, 5, and 6, N, N, O O, P. P. represent a spool or winding-drum divided longitudinally through its axis into two substantially like parts when it is desired to apply the device to a previously constructed and mounted crank-shaft and band wheel.

In the preferred construction the parts N N constitute a chamber which is parti-spherical in configuration, with a vertical flange, n, n, which is adapted to fit the flat vertical face of the band wheel L; and, in practice, is secured thereto by bolts n'.

O, O, are sleeve sections semi-cylindrical in form, each being grooved horizontally to receive the crank shaft, and preferably fitting said shaft somewhat closely.

P, P are semi-flanges projecting from the ends of the sleeve sections, and provided with means for securing them firmly together.

A convenient kind of fastening is indicated in the drawings, and consists of outwardly projecting lugs or ears p, p, with screws or rivets p' through them.

By examining Figs. 4 and 5 it will be readily understood that the chambered flange N, N, is adapted to receive and fit over the hub of the flange, l, and thereby facilitate bolting the rim $n\ n$ to the face of the band wheel L; it being understood that as the band wheels are usually constructed they are provided with such hubbed flanges which are keyed to the crank shaft. But, of course, if a band wheel of cast iron, or having a hub and spokes of cast iron be used, then the flange at the inner end of the spool should be correspondingly modified, so that it may be readily connected with the spider of the band wheel.

Q is a rope having one end attached, as, for instance, at q to the sucker rod, running thence up over the pulley F, thence down under the pulley, R, on the frame work just outside of the derrick, thence to the spool upon which it is wound.

In Figs. 4, and 5, I have illustrated a simple and efficient way of fastening that end of the rope. That is to say, I pass it through an opening q' in the band wheel and thence around the crank shaft where it is tied or secured by some sort of an easily untied knot or looping; so that, as the crank shaft is rotated in the right direction, the rope is wound upon the spool, as will be readily understood without further explanation.

It is customary, in order to avoid cramping of parts, particularly at the wrist pin of the crank, to so locate the parts that a line drawn at a right angle to the axis of the crank shaft will intersect the wrist pin and the longitudinal axis of the walking beam; and as it is desirable to have the portion of the rope which is between the pulley F and the sucker rod in line with the tubing, I propose to locate that pulley directly above the tubing and then locate the pulley R about in line with the center of the spool, substantially as is indicated in Fig. 2, and so that the inclined leg or strand of the rope shall lie quite close to the side of the derrick, and thus be out of the way. But when such arrangement or disposition of the parts is found inconvenient or undesirable the pulley R may be located inside of the derrick. Or, as another modification, I may use two pulleys at the upper end of the derrick, the outer edge of the outer one being about in line with the outer faces of the girts and braces B, C, thus avoiding the necessity of having the outer leg or line of the rope cross the plane of those girts and braces.

Of course in applying my invention to a crank shaft and band wheel when these latter parts are in course of original construction, the spool may be much simplified in structure, and may be attached directly to the crank shaft by means of either a key or set screws as shall be found convenient. But when adapted specially for application to a pumping band wheel and crank shaft as usually built, I prefer to make the spool in separable parts, with a chambered flange at the band wheel N, substantially as shown in the drawings.

It will of course be understood that when the machinery is being used in actually pumping a well, the rope must be either detached from the spool or wound upon it with both ends properly secured to the spool, and in practice I prefer to detach the rope, using it only after the pitman is disconnected from the crank so that the walking beam remains stationary.

It will be understood that the band wheel is to be driven by a reversible engine, in order that the crank shaft may be rotated in opposite directions as shall be required for pulling out and putting in the sucker rods; and it is evident that the diameter of the spool may be varied according to the speed of the engine to facilitate shortening the time required for

handling the sucker rods; because under ordinary conditions a crank shaft of the usual diameter, say three to four inches, would wind and unwind the rope so slowly as to be impractical for ordinary purposes.

What I claim is—

1. In a pumping rig for oil and other wells, the combination with the walking-beam, the crank-shaft and the pitman, of a band-wheel mounted on the crank-shaft, a winding-drum mounted on the crank-shaft and provided at one end with a chamber to receive the hub of the band-wheel, and means for connecting the chambered end of the drum to the band-wheel; the shaft, the band-wheel and the winding-drum rotating in unison, substantially as set forth.

2. In a pumping rig for oil and other wells, the combination with the walking-beam, the crank-shaft and the pitman, of a band-wheel mounted on the crank-shaft, a winding-drum divided longitudinally into two parts each provided with vertical flanges, and means for connecting the parts of the drum to the band-wheel; the shaft, the band-wheel and the winding-drum rotating in unison, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM F. BURR.

Witnesses:
H. H. DOUBLEDAY,
N. CURTIS LAMMOND.