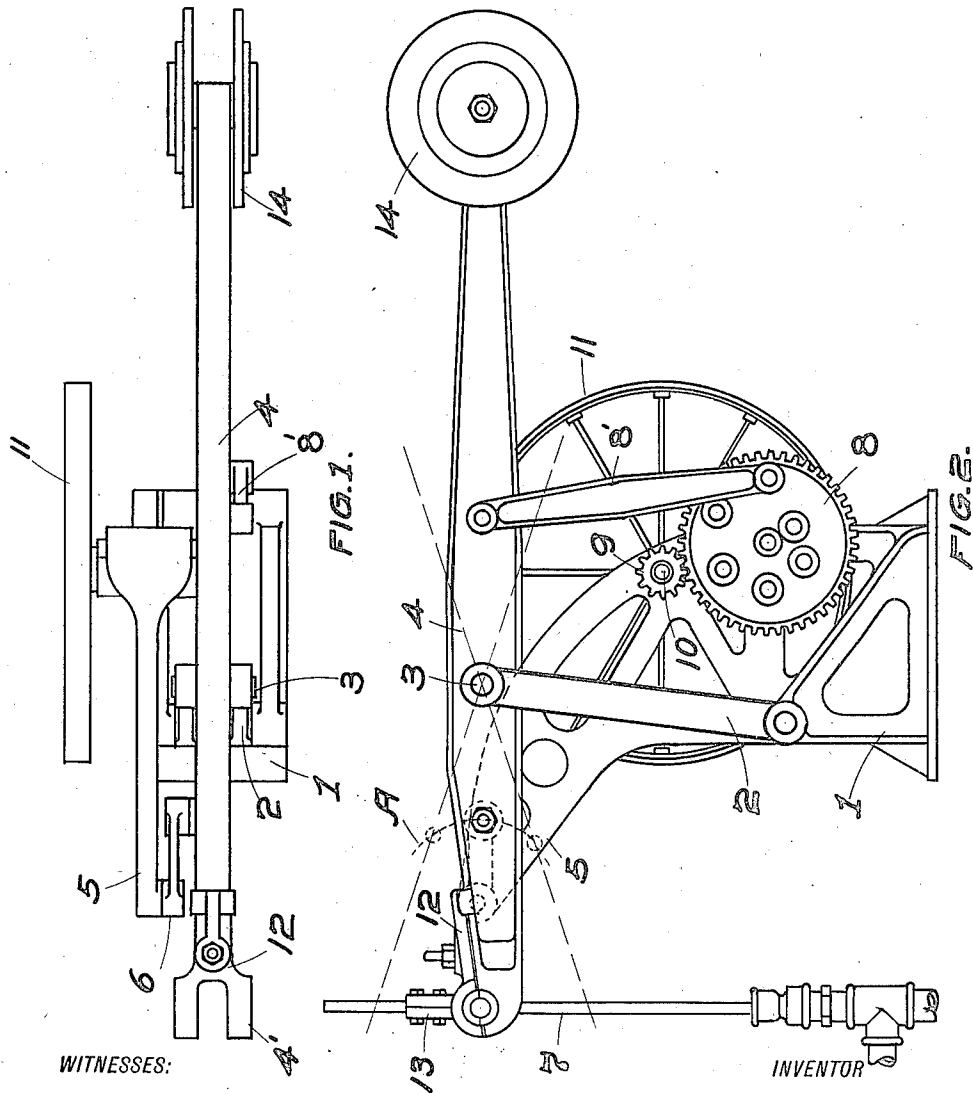


J. P. COFFMAN.
PUMPING RIG.
APPLICATION FILED DEC. 14, 1914.

1,146,404.

Patented July 13, 1915.



WITNESSES:

D. D. Mallory
F. S. Luman

INVENTOR

JOSEPH P. COFFMAN

BY
Edw. P. Luman
ATTORNEY

UNITED STATES PATENT OFFICE.

JOSEPH P. COFFMAN, OF RENO, PENNSYLVANIA, ASSIGNOR TO NATIONAL TRANSIT COMPANY, OF OIL CITY, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

PUMPING-RIG.

1,146,404.

Specification of Letters Patent.

Patented July 13, 1915.

Application filed December 14, 1914. Serial No. 877,114.

To all whom it may concern:

Be it known that I, JOSEPH P. COFFMAN, citizen of the United States, residing at Reno, in the county of Venango and State of Pennsylvania, have invented certain new and useful Improvements in Pumping-Rigs, of which the following is a specification.

My invention relates to improvements in pumping rigs for deep wells, and more particularly for oil and gas wells.

The object, construction and utility of my improved pumping rig are herein set forth with sufficient clearness to enable those skilled in the art to which it relates, to make and use the same, and the scope of my invention is particularly pointed out and defined in the claims.

In the pumping of oil wells it is customary to employ a walking-beam in some one of its various modified forms to actuate the pumping-mechanism, and in all such cases, so far as applicant is aware, all of the present forms of beams have, at their respective ends, the arcuate line of movement which is characteristic of all levers having a fixed fulcrum point.

That portion of the pumping-mechanism to which the actuating end of the beam is attached, is an extension of the sucker-rod, and this extension is termed the "polished-rod,"—so termed because it is finished or polished to adapt it to reciprocate with a minimum amount of friction through a stuffing-box that forms the upper termination of the well-tubing, through which the fluid is pumped from the well. Unless said polished-rod is actuated in a straight, vertical line, which coincides with its longitudinal axis,—that is to say, its true, normal line of travel—its movement through said stuffing-box will be cramped, thus consuming an excess of power to actuate the same, and said box, and the packing within the same will become worn and inefficient, permitting a leakage and waste of oil through the same.

It is, therefore, the object of this invention, to provide a pumping-rig comprising a walking-beam, so constructed and mounted, that the pumping-end thereof, at the point at which it is attached to said polished-rod, will be caused to travel in a straight vertical line which coincides with the longitudinal axis of said rod, and its normal line of movement, and wherein the

objectionable arcuate line of movement of said point of attachment is eliminated.

One form of construction whereby my inventive idea may be mechanically embodied is shown in the drawings which form a portion of this specification. These drawings are, in several respects merely illustrative, however, and I do not wish to be understood as confining the embodiment of my invention to the precise form of construction and combination of elements there shown, as various modifications,—as will be hereinafter pointed out—could be employed without departing from the scope of my invention.

In said drawings: Figure 1 is a plan view of a pumping rig constructed in accordance with my invention. Fig. 2 is a side elevation of same.

The construction here illustrated is substantially as follows: Within a suitable frame-work 1, is mounted a vertically-extending rocker-arm 2, the upper end of which is formed into suitable bearings for the reception of the fulcrum-trunnions 3 of a walking-beam 4, and in which bearings said beam is adapted to oscillate vertically. Through the medium of said rocker-arm 2, said beam is adapted to have, in addition to its vertically-oscillative movement, a longitudinally-oscillative movement: said longitudinal oscillations are of such extent as to cause the pumping end 4' of said beam 4, at the point where it is attached to the polished-rod 7, to travel in a straight line which is co-incident with the longitudinal axis of said rod; said longitudinally-oscillative movement is secured in the following manner: said frame 1 is provided with a rigid, upwardly-extending arm 5, the upper end of which is positioned in close proximity to one side of said beam 4, and at a point intermediate the trunnions 3 and the pump end 4' of said beam. To the extremity of said arm is pivotally attached one end of a horizontally-extending link or secondary rocker-arm 6. The other end of said link is attached to said walking-beam at a point intermediate the pivotal point of said link and the trunnions 3, or fulcrum point of the beam. When said beam is caused to oscillate vertically, the swinging end of said link 6, which is attached to said beam, is caused to move on the arcuate line A, and this causes said beam 4 to have a degree of longitudinal oscillation which is just sufficient

to cause the connecting point of the beam with the polished rod, to move in a straight, vertical line, coincident with the normal line of travel of said polished-rod.

5 I have shown certain means whereby beam 4 may be vertically oscillated, which means consists of a crank-wheel 8, shown as a spur-gear, driven by a pinion 9, to the shaft 10 of which is secured a belt-wheel 11 to which
10 power may be transmitted by means of a belt from any suitable source of power; a pitman 8' serves to transmit motion from said crank-wheel 8 to said walking-beam. Any other
15 suitable means may be employed for operating said walking-beam, such, for instance, as one of the well-known forms of pumping-jack, and this, in turn may be operated by any suitable method now commonly employed. A suitable clamp 12 is provided
20 upon the end 4' of said beam 4, for the engagement of the polished-rod-clamp 13, commonly termed the "adjuster". The free, rearward end of said beam 4 is provided with a counter-weight 14, adapted to counter-
25 balance the weight of the actuated pumping mechanism.

I claim the following:

A pumping rig comprising in combination, a base or frame 1 having an upwardly-extending arm 5, a vertically-extending 30 rocker-arm 2 mounted at its lower end in said base, a walking beam 4 pivotally mounted at the upper end of said rocker-arm, a clamp, as 12, positioned at one end of said beam adapted for the operable engagement 35 of the pumping mechanism 7 of a well, a link 6 secured at one end thereof to said arm 5 and at the other end to said walking-beam for the purpose set forth, a counterweight 40 14 carried by said beam adapted to counter-balance the weight of the actuated pumping mechanism 7, and suitable gearing, as the combination 11, 9, 8 and 8' also mounted in said base or frame for imparting oscillation 45 to said beam.

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

JOSEPH P. COFFMAN.

Witnesses:

MERRILL H. LILLY,
CLIFFORD KAHLE.