

H. G. SMITH.
PUMPING JACK.
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992,075.

Patented May 9, 1911.

2 SHEETS—SHEET 1.

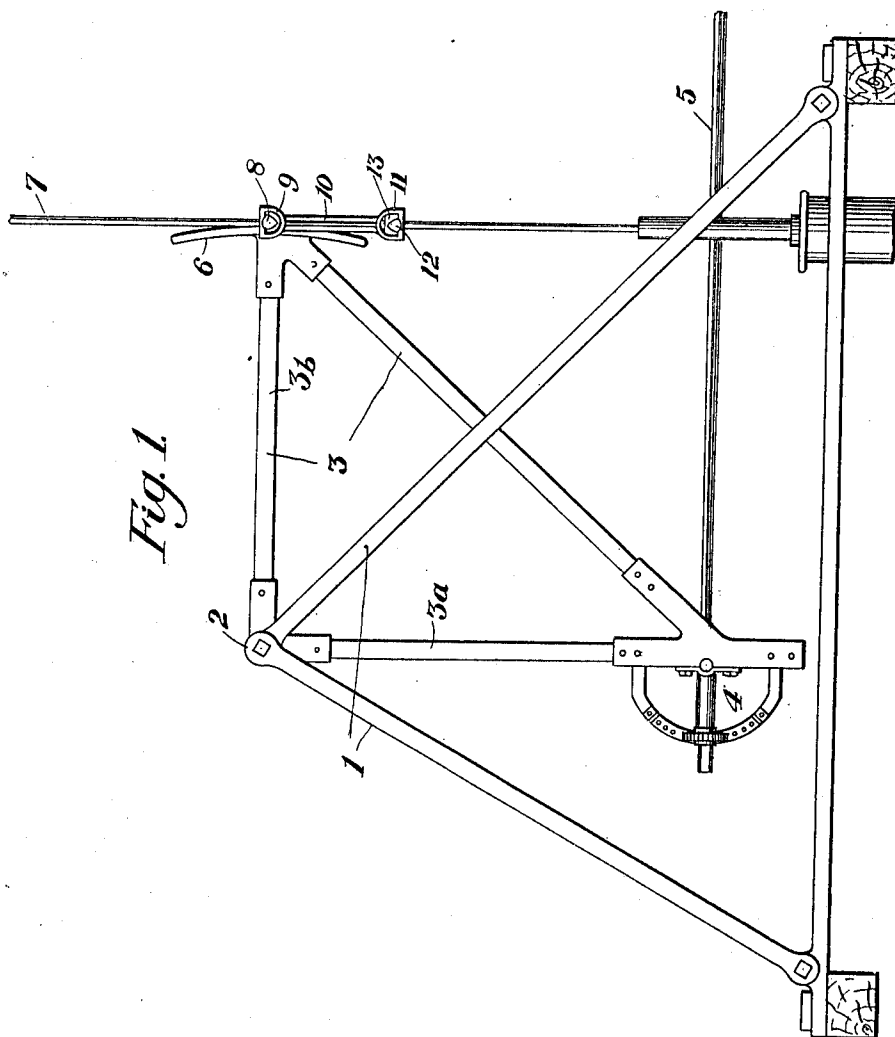


Fig. 1

Witnesses
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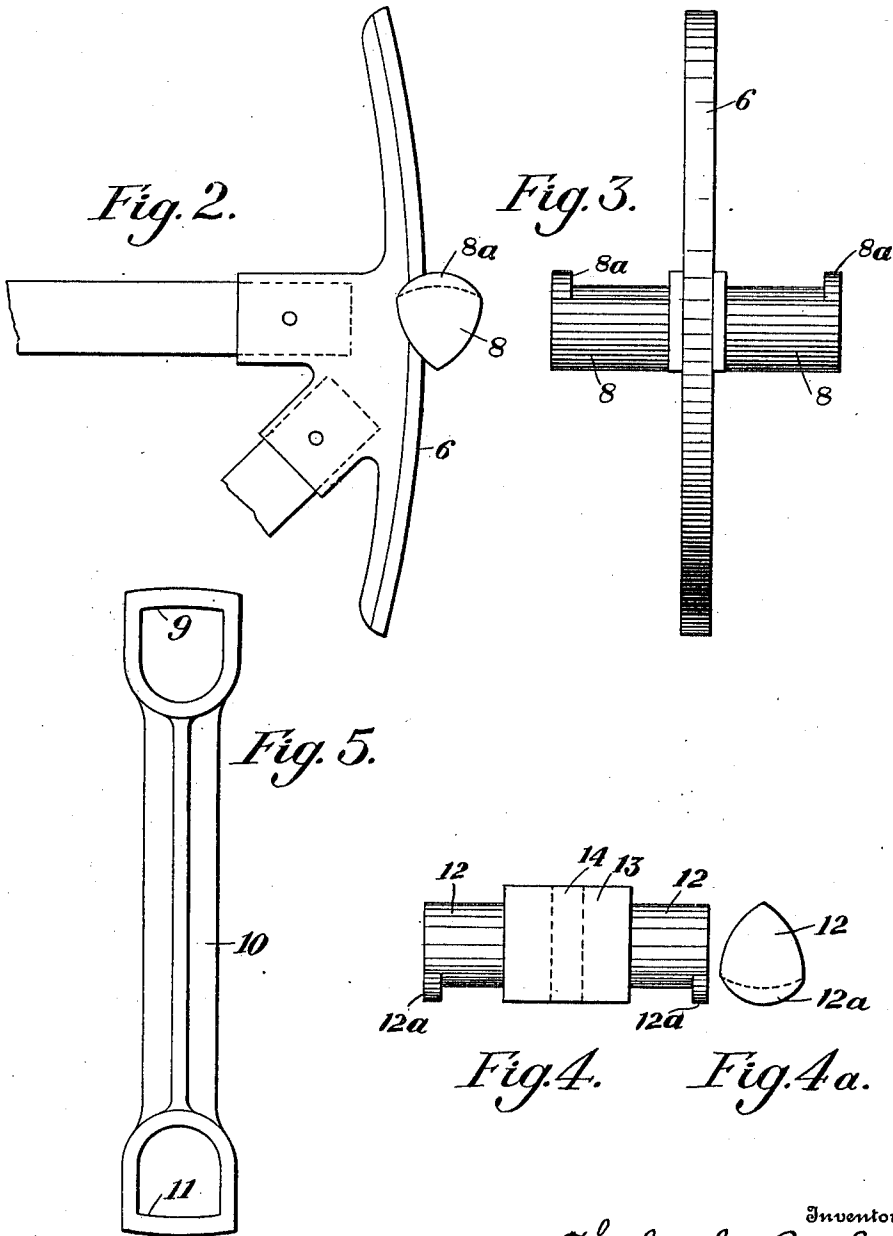
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2 SHEETS-SHEET 2.



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HERBERT G. SMITH, OF BARTLESVILLE, OKLAHOMA.

PUMPING-JACK.

992,075.

Specification of Letters Patent.

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Application filed June 12, 1908. Serial No. 438,250.

To all whom it may concern:

Be it known that I, HERBERT G. SMITH, a citizen of the United States, residing at Bartlesville, in the county of Washington and State of Oklahoma, have invented certain new and useful Improvements in Pumping-Jacks, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to machine elements, and especially to pumping jacks and the like.

It has for its object the provision of means whereby motion may be communicated from a rocking member to a reciprocating member without disturbing the alinement of the latter and without the use of rotating bearings.

I shall describe the invention as embodied in a pumping jack, but of course this is to be taken as definitive and not restrictive, since numerous other applications of the same principle may be made.

The type of pumping jack now generally in use is that having a rigid frame carrying a bell crank lever or rocker journaled in the frame at its angle with one arm dropping downward and connected with the pull rod, while the other extends horizontally forward and is connected with the polished rod or sucker rod of the pump. This rod passes through a cross-head, above which is a clamp fastened to the rod. At the ends of this cross-head are side arms, these lying parallel and serving as links to connect the lower cross-head with a fixed cross-head above. They are secured in place by means of nuts. This forms a swinging joint, and since it affords no support for the polished rod, the latter is held in plumb by means of an arc-shaped guide carried by the rocking lever and having its center in the axis of the lever. With this arrangement there is constant wear on all the bearings, and it is difficult to gear up and ungear, on account of the many parts requiring tools in their adjustment.

According to my present improvement, I still make use of the rigid frame and the rocker lever connected through its lower arm to a pull rod and through its upper arm to the polished rod. Instead of circular bearings for the side arms or links, however, I provide what I may term rocker bearings in which there is little or no friction, the movement depending on two surfaces com-

ing together as cams without lateral displacement. The arc-shaped guide may be employed or may be omitted, the complete improvement contemplating its omission.

My present construction may be briefly described as a swinging joint composed of a pair of double-ended stirrups hung over rocking cams. By properly shaping the curved faces of these cams, the arc-shaped guide may be done away with. Since the bearing points for the swinging joint constantly change at both ends during their movement, it is only necessary to adjust the parts so that the mean amplitude of change will equal the lateral displacement due to the arc of stroke, to keep the pull always perpendicular and the rod properly alined.

My invention is illustrated in the accompanying drawings wherein—

Figure 1 shows a pumping jack of the type mentioned, with my improvement applied thereto. Fig. 2 is a side view on an enlarged scale of the outer end of the rocking lever showing a bearing head. Fig. 3 is a face view thereof. Fig. 4 is a side view of the lower cross bar with its bearing heads. Fig. 4^a is an end view thereof. Fig. 5 is a face view of one of the double stirrups or side arms.

Referring to the drawings and especially to Fig. 1, the numeral 1 represents a double frame, composed of two triangular side frames, having their apices 2 provided with bearings for the trunnions or stub shaft of the bell crank rocker lever 3. The lower arm of this rocker lever, indicated at 3^a, is connected by adjustable mechanism 4 to the pull rod 5 by means of which motion is communicated to the rocker and thence to the pump. The upper arm 3^b of the rocker carries a metal head upon which is the usual arc-shaped guide, which however in this case is unnecessary and may be dispensed with.

Upon each side of the rocker head is a bearing head 8, and upon each of these bearing heads is hung a stirrup 9 forming the upper terminus of a side arm or link 10, which has at its lower end another stirrup 11 for engagement with a similar bearing head 12 of a cross arm 13. In order to prevent displacement of the stirrups from the bearing heads 8 and 12, I provide each of the former with an upraised flange 8^a and each of the latter with a similar upwardly extending flange 12^a. The cross arm 13 is centrally drilled at 14 to receive the polish

or sucker rod 7 being attached thereto in any suitable manner, as by means of a clamp upon the rod above the cross arm.

The operation of my invention will now be understood. At each stroke of the pull rod 5, (which is actuated by a suitable prime mover), the rocker arm 3 turns upon its pivot 2 and lifts the bearing heads 8 through an arc having its center in the pivot. The bearing heads 8 rock in the stirrups 9 and lift the side arms 10 which lift the cross arm 13, and that in turn lifts the sucker rod. As the bearing head 8 rocks in the stirrup 9, different portions of the under face of the stirrup bar come in contact with and rest upon different portions of the upper face of the bearing head, according to the shape of the contiguous bearing faces.

As shown, the point of support shifts from the inner edge of the bearing head at the beginning of the stroke to the outer edge at the end thereof; and so long as this amplitude is equal to the horizontal displacement due to the arc of stroke, the pull of the sucker rod will be vertical at all times.

Sundry advantages will be at once apparent after reading this description of my improvement. In the first place, it is cheaper than the old construction because the arms may be made as simple castings. In the second place it is simpler and easier to gear up and ungear, there being no nuts, and no necessity for wrenches or other tools. In the third place, the life of all the parts is lengthened, and especially the bearing parts of the swinging joint. These are usually the first to wear out in the entire jack, beside involving the necessity for constant oiling and adjusting. In my case none of this is necessary.

I am aware that some changes can be made in shape and other matters of detail as well as in the method of applying my bearings and connecting parts to jacks and other machines, and I wish it distinctly understood that all such as do not depart from the spirit of my invention are within the scope and purview of the appended claims.

Having thus described my invention what I claim and desire to secure by Letters Patent is—

1. A pumping jack comprising in combination the following instrumentalities: a frame, a rocker lever journaled in said frame, a pull rod and source of power therefor, a polish rod, bearing heads on the rocker lever, each having a portion of its periphery shaped to form a bearing surface, a cross arm on the polish rod carrying similar bearing heads, and links passing over and adapted to rock with rolling contact on the bearing surfaces of said heads so as to constitute a substantially frictionless parallel motion, substantially as described.

2. A pumping jack comprising the follow-

ing instrumentalities: a frame, a bell crank rocker lever journaled at its angle in said frame, a pull rod connected to one extremity of said lever, a polish or sucker rod, together with broad-faced bearing heads on the upper end of the rocker lever, an apertured cross arm receiving and holding the polish rod, broad-faced bearing heads on the said cross arm, side links having terminal stirrups passing over said bearing heads with their inner surfaces resting and adapted to rock upon the broad faces of the heads, said faces and stirrups having such curvature, and being so proportioned that in all positions of the polish rod power will be delivered from the upper to the lower stirrups in a vertical line.

3. A jack motion comprising the following instrumentalities: a frame or support carrying bearings, a rocker member journaled at one point in said bearings and means to oscillate the same therein, a bearing head on the oscillating member having an extended bearing surface curved on a radius greater than its own greatest dimension and adapted as a whole to swing in the arc of a circle, a reciprocatory member adapted to move in a line tangent to said arc, a bearing head on said reciprocatory member arranged so that its axis is parallel at all points of its travel to that of the bearing head on the rocker member, and a link connection between the two bearing heads with a stirrup taking over the bearing on the rocker head and adapted to rock thereon so as to constantly shift its point of support toward and away from the center of oscillation of the rocker, sufficiently to compensate for the recession and approach of the rocker head from and to the line of motion of the reciprocatory member during oscillation; whereby for all positions of the rocker member, power will be delivered to the reciprocatory member in the direct line of its motion.

4. A jack motion comprising the following instrumentalities: a frame or support carrying bearings, a rocker member journaled at one point in said bearings and means to oscillate the same therein, a bearing head on the oscillating member with an arc-shaped cam surface having its axis of curvature parallel to the axis of oscillation, a reciprocatory member adapted to move in a line meeting the arc of oscillation in at least one point, a bearing head on said reciprocatory member arranged so that its axis is parallel at all points of its travel to that of the bearing head on the cam surface, and an intermediate power transmitting member connecting the two bearing heads, with an extended arc-shaped cam surface resting and adapted to rock on the cam surface of the rocker-member-bearing-head during its oscillation so as to constantly shift its point of support toward and away from the center

of oscillation of the rocker sufficient to compensate for the recession and approach of the rocker head from and to the line of motion of the reciprocatory member; whereby
5 for all positions of said rocker member, power will be delivered to the reciprocatory member in the direct line of its motion.

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

HERBERT G. SMITH.

Witnesses:

GRACE HERSHEY,
BEN U. ATCHISON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
