

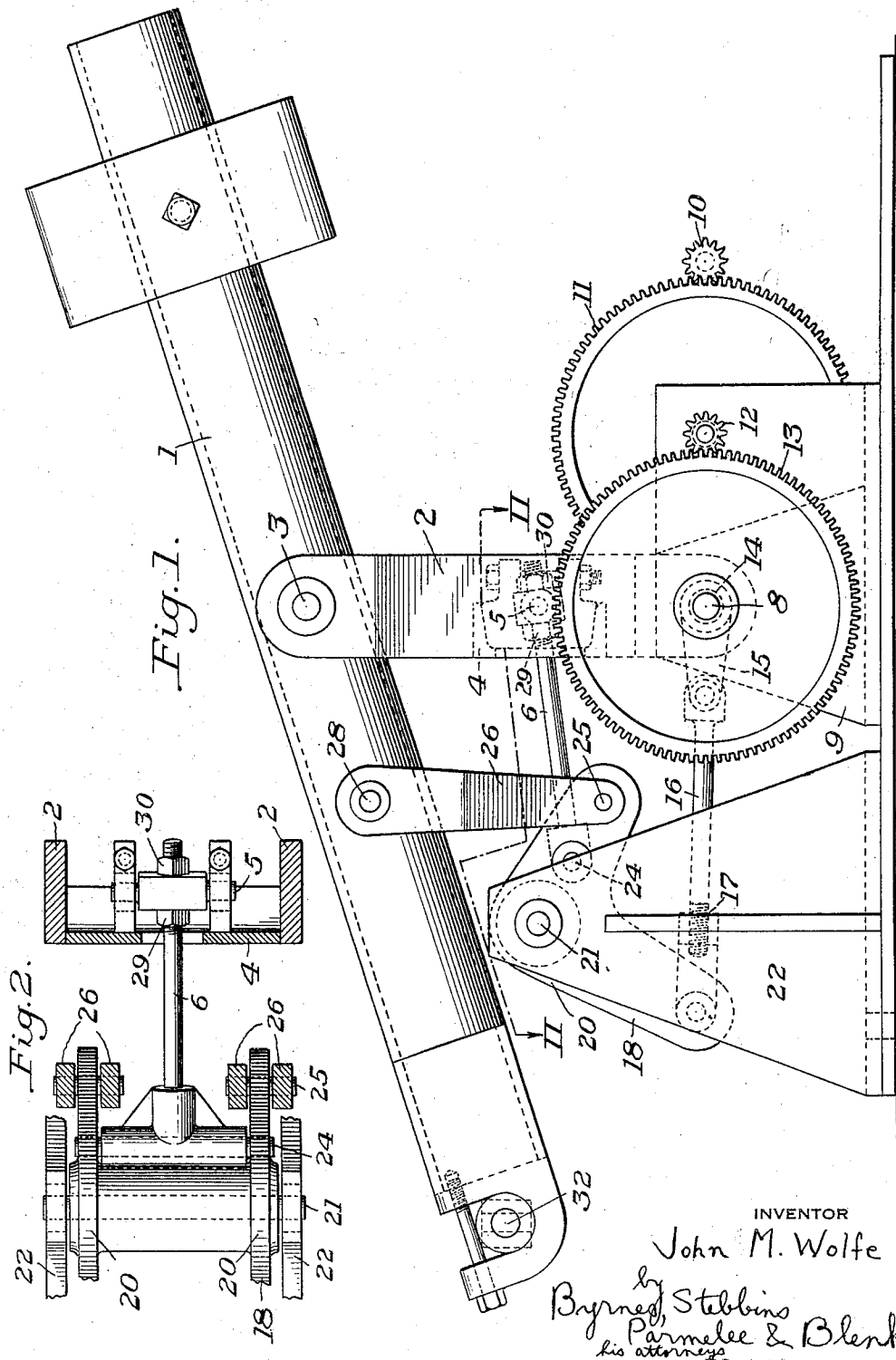
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PUMPING JACK

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UNITED STATES PATENT OFFICE

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PUMPING JACK

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This invention relates to operating mechanism for reciprocating an element in a straight line; and more particularly to a pumping jack for reciprocating a pump element in a straight line.

In pumping and in actuating various types of mechanism in which it is necessary to reciprocate an element in a straight line, the actuating mechanism may, with advantage, employ a lever for imparting the stroke to the element to be reciprocated, if this lever may be so moved as to impart to the said element straight-line movement. My improved pumping jack is of sturdy construction, and is efficient in operation, having a rockable member on which is pivotally mounted the floating lever through which power from a motor or other prime mover is imparted to the element to be reciprocated. The motion which will result in straight-line reciprocation of the pump element is imparted to the rockable member by a toggle action, which will now be described.

In the accompanying drawing in which not as limiting my invention but merely for the purpose of illustrating the same, I have shown one embodiment which the same may assume,

Fig. 1 is a view in side elevation of my improved pumping jack;

Fig. 2 is a detail view partly in plan and partly in section on the line II—II of Fig. 1.

A floating lever 1, which is shown herein as a length of pipe, is pivotally mounted on a rockable member 2. In the embodiment shown, trunnions 3 are provided for pivotally mounting the floating lever on the rockable member.

As illustrated in the drawing, the rockable member 2 comprises a pair of legs, one on each side, with a cross-frame 4 extending between the same. In this cross-frame 4, the end of a cross-link 6 is pivotally mounted, as by trunnions 5. The lower portions of the side legs of the rockable member 2 are pivoted on the axis 8 to a frame 9. It will be apparent, therefore, that whereas the floating lever 1 may be swung about the trunnions 3, the rockable member 2 may be rocked about the axis 8 by suitable mechanism including

the cross-length 6, so as to require that a pump element operatively connected to an end of the lever 1 shall be reciprocated in a straight line.

The lever may be swung about its trunnions 3 by actuating mechanism comprising a motor (not shown) having a motor pinion 10 meshing with a large gear 11. Both the large gear 11 and a small pinion 12 are secured to the same shaft so as to rotate together. The pinion 12 meshes with a large gear 13 on a crank shaft 14 mounted in the frame 9 on the axis 8. The crank 15 of this crank shaft is connected by a link 16 whose length may be adjusted as indicated at 17 with an arm 18 extending generally downwardly from a crank 20. This crank 20 is pivoted on a fixed pivot 21 to a pedestal 22; and in the particular embodiment illustrated, the arm 18 is branched so as to receive between the lower portions thereof the end of the cross-link 16; and in similar manner, the crank 20 is branched so as to receive therebetween the other end of the cross-link 6. This cross-link 6 is pivotally connected at 24 to the crank 20. To the outer portions of the branches of the crank 20 are pivotally connected, as at 25, the links 26 which have their ends pivotally connected to the floating lever 1. This last pivotal connection may likewise be in the form of trunnions 28.

It will be noted that the cross-link 6 cooperates with the crank 20 to form a toggle, and that the links 26 are connected to extensions of one branch of this toggle. As this toggle is straightened, the rockable member 2 is swung in clockwise direction; and after the branches of the toggle move past dead-center, the rockable member 2 is drawn back again in counter-clockwise direction. The centers are so arranged that when the lever 1 is at right angles to the direction of reciprocation of the pump element, the centers 5, 24 and 21 are on dead-center. As the floating lever 1 moves in either direction from said position, the rockable member 2 is moved in counter-clockwise direction, thus producing reciprocation of the pump element in a straight line.

The link 16 may, as above described, be

adjusted by means of the screw-thread connection 17. Such adjustment varies the arcuate travel of the lever 1. The length of the cross-link 6 may also be varied by means of the nuts 29 and 30 on the screw-threaded end of the link 6. These nuts cooperate with opposite sides of the squared portion of the trunnion 5, and may be rotated on the cross-link 6 to bring the centers 24 and 5 closer together, or further apart in a well known manner. By thus adjusting the length of the link 6, the lever 1 may be repositioned, being moved bodily to the left or right so that the trunnions 32 may be in alignment with the direction of the reciprocation of the pump element or the like.

It will be noted that the operating mechanism is compactly arranged, the rockable member 2 being pivoted on the axis of the crank 15. Moreover, the elements are combined to give a sturdy construction, and due to the manner in which the parts are journaled, efficiency in operation is assured. My invention provides operating mechanism for a rod line or the like, which mechanism is free from posts and beams. Moreover, there is no motion control device connected to the swivel by which the pump rod is connected to the operating mechanism. An improved construction for use in this field is provided by thus mounting the entire operating mechanism on a single base member.

While I have illustrated and described one specific construction of pumping jack, it will be understood that the invention is not restricted to the particular construction or arrangement shown, but may be variously modified within the contemplation of the invention and under the scope of the following claims.

I claim:

1. In a pumping jack, driving mechanism, a floating lever operatively connected thereto and driven thereby for reciprocating a pump element, and mechanism for mounting and controlling the motion of said floating lever to impart straight-line motion to said pump element comprising a rockable member pivotally supporting said floating lever and a toggle extending between a fixed pivot and a pivotal connection to said rockable member.

2. Operating mechanism for reciprocating an element in a straight line including in combination a rockable member, a floating lever pivotally mounted on said rockable member, said floating lever being operatively connected to the element to be reciprocated, and a toggle extending between a fixed pivot and a pivot on said rockable member.

3. In a pumping jack, a rockable member, a floating lever pivotally mounted on said rockable member, said floating lever being operatively connected to a pump element for reciprocating the same in a straight line,

driving mechanism for actuating said floating lever comprising a crank and a link between the crank and the floating lever, and a link between said crank and said rockable member.

4. In a pumping jack, a rockable member, a floating lever pivotally mounted on said rockable member, said floating lever being operatively connected to a pump element for reciprocating the same in a straight line, a toggle pivoted to said rockable member and extending laterally to a fixed pivot, a link extending between said floating lever and an extension of one link of the toggle, and actuating mechanism for swinging the toggle links.

5. In a pumping jack, a rockable member, a floating lever pivotally mounted on said rockable member, said floating lever being operatively connected to a pump element for reciprocating the same in a straight line, a link pivotally connected to said floating lever, a crank mounted on a fixed pivot and operatively connected to said link to actuate said floating lever, and a cross-link pivoted to said rockable member and having a pivotal connection to said crank intermediate the fixed pivot of the crank and the first-mentioned link.

In testimony whereof I have hereunto set my hand.

JOHN M. WOLFE.