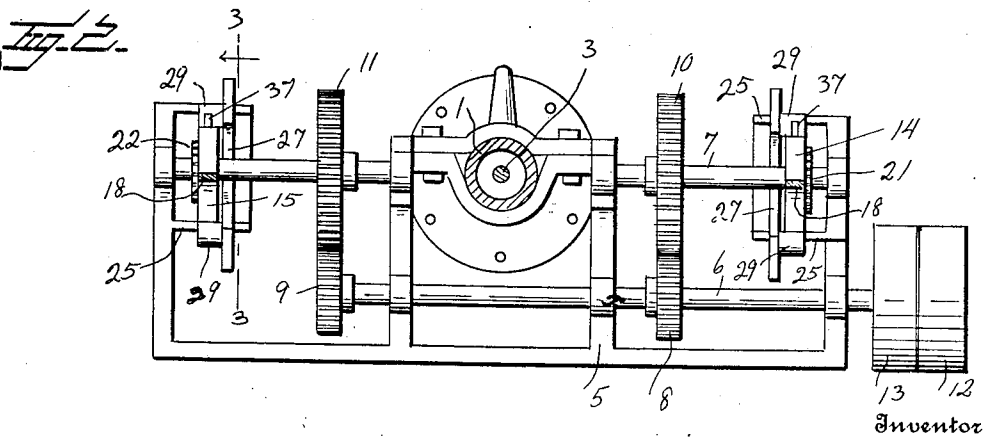


PUMP JACK.

**1,354,237.**

2 SHEETS—SHEET 1.



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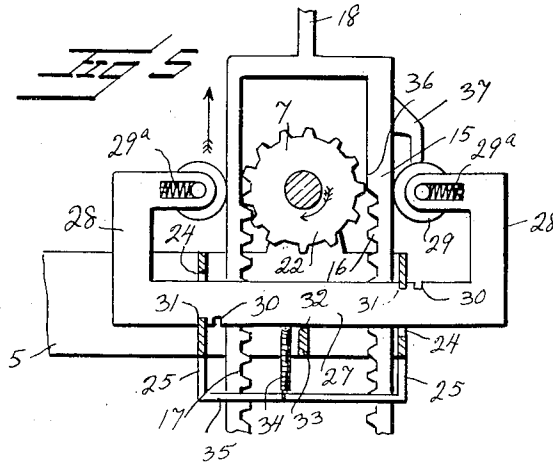
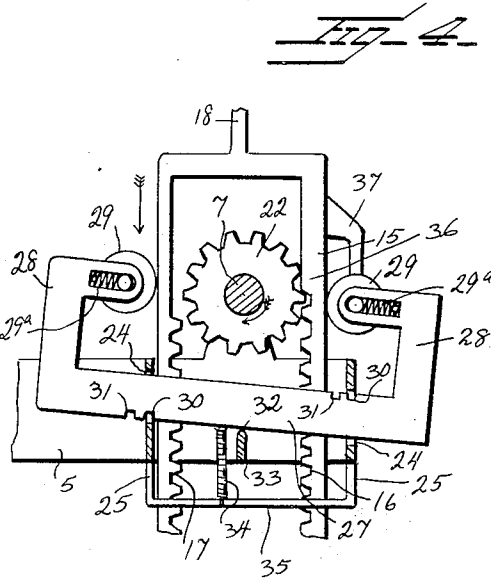
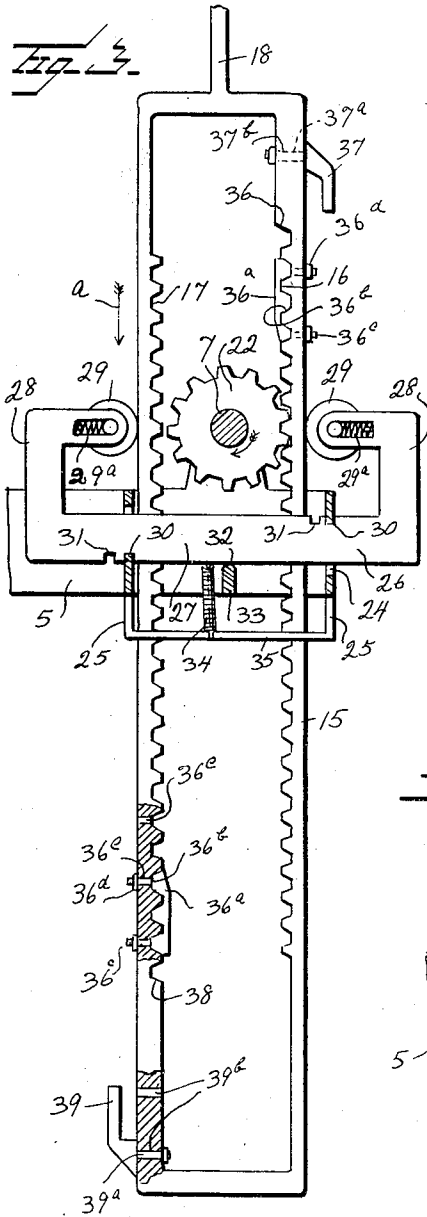
PUMP JACK.

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1,354,237.

Patented Sept. 28, 1920.

2 SHEETS—SHEET 2



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# UNITED STATES PATENT OFFICE.

GEORGE W. BOYD, OF RECTOR, ARKANSAS.

## PUMP-JACK.

1,354,237.

Specification of Letters Patent. Patented Sept. 28, 1920.

Application filed April 2, 1919. Serial No. 286,836.

*To all whom it may concern:*

Be it known that I, GEORGE W. BOYD, a citizen of the United States, residing at Rector, in the county of Clay and State of Arkansas, have invented certain new and useful Improvements in Pump-Jacks, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to an improved pump jack and an object of the invention is to provide a simple, efficient and practical mechanism for rapidly operating a pump rod of a pump, whereby the water may be lifted exceedingly rapidly, so as to insure a continuous flow.

The invention further aims to provide improved connections (capable of being adjusted diagonally) between continuous revolvable driving power, and continuous reciprocating driven power, whereby the pump rod of a pump may be reciprocated with rapidity, in order to so lift the water, as to insure a continuous outflow thereof.

While the design and construction at present illustrated and set forth is deemed preferable, it is obvious that as a result of a reduction of the invention to a more practical form for commercial purposes, the invention may be susceptible to changes, and the right to these changes is claimed, provided they are comprehended within the scope of what is claimed.

The invention comprises further features and combination of parts, as will be hereinafter set forth, shown in the drawings and claimed.

In the drawings:

Figure 1 is a view in elevation of the improved pump jack constructed in accordance with the invention, showing the same applied.

Fig. 2 is a plan view.

Fig. 3 is a sectional view on line 3—3 of Fig. 2.

Fig. 4 is a view of the upper portion of the structure shown in Fig. 3, showing the lowermost position of the rack frame 15, showing the rack frame locking member tilted and in the act of being shifted by the rack frame so as to be disposed in a locking position to hold the gear teeth in engagement with the gear 22 when the frame is moving upwardly.

Fig. 5 is a detail view showing the frame

15 as having been shifted, and locked in such shifted position.

Referring more especially to the drawings, 1 designates a conventional form of pump, the casing of which has an upright 2, in which the reciprocating pump rod 3 of the pump is guided. The upper end of the pump rod 3 carries a transverse bar 4.

A suitable frame 5 is arranged in close position to the pump, and in bearings of said frame shafts 6 and 7 are mounted. The shaft 6 is provided with gear wheels 8 and 9, while the shaft 7 has gears 10 and 11, with which the gears 8 and 9 mesh. Mounted upon the shaft 6 are fast and loose pulleys 12 and 13, and a belt (not shown) may normally coöperate with the pulley 13 (which is loose) but when it is desired that power be transmitted to the shaft 6, the belt may be shifted, to engage the fast pulley 12.

Mounted in guides of the frame are reciprocating frames 14 and 15, the opposite sides of each of which have rack teeth 16 and 17. The upper ends of the frame have connected thereto bars 18. The upper ends of the bars 18 are provided with a plurality of apertures 20, any one of which may receive a pin 19 which may pass through an aperture of the bar 4, so as to connect the bars 18 adjustably to the bar 4. Carried by the shafts 7 are gears 21 and 22, and when the frames 14 and 15 are moving downwardly, as indicated by the arrows *a*, the gears 21 and 22 are meshing with the teeth 16, but when the frames 14 and 15 are shifted, so that their teeth 17 may mesh with the gears 21 and 22, the frames 14 and 15 will move in the opposite direction.

Mounted in the openings 24 of a part of the lateral plates 25 (which are positioned opposite each other) of the opposite ends of the frame 5 are rack frame locking members 26. Referring to Figs. 3, 4 and 5, it is to be observed that each locking member similarly operates, therefore in the present instance the operation of only one is described. The construction of the locking members is identical. Therefore, each locking member comprises the base portion 27 and the upstanding L-shaped arms 28, which are provided with rollers 29. It is to be noted that these rollers engage the outer faces of the sides of the rack frame, acting as guides and anti-frictional means. Furthermore, it is to be noted that the rack

frames are pivoted so as to swing laterally, so that their teeth may engage and disengage with the teeth of the gears 21 and 22. Referring to Figs. 3, 4 and 5 it is to be noted that the base portion of the locking members is provided with notches 30 and 31. When the locking member is in position, as shown in Fig. 3, the notches 30 engage the upper and lower edges of the openings 24, and when the locking member is shifted as shown in Fig. 5, the notches 31 engage the upper and lower edges of the openings 24 respectively. The locking member rocks or fulcrums on the edge 32 of a transverse piece 33 of the end parts of the frame 5, there being a coil tension spring 34 connecting the locking member and a transverse bottom bar 35 of the end portions of the frame 5. This tension spring constitutes means to hold the locking member normally in the position shown in Fig. 3. Referring to Fig. 3, it is to be noted that the rack frame 15 is moving downwardly as indicated by the arrow *a*. Therefore when the portion 36 of the rack frame is just engaging the teeth of the gear 22, as shown in Fig. 4, the rack frame is in the act of being tilted on its pivot 19. At the same time that the rack frame is in the act of being tilted, an abutment arm 37 at the upper right-hand part of the frame 15 is in the act of engaging the right-hand anti-frictional roller 29, which will tilt the locking member to the position shown in Fig. 4 against the action of the tension spring 34. This movement of the locking member will disengage the notches 30 from the upper and lower edges respectively of the openings 24, leaving the locking member free to be shifted, at the same time that the rack frame 15 is shifted, so that the teeth of the gear 22 may engage the teeth 17, after which the rack frame may move vertically upwardly. The rack frame is entirely tilted when the teeth 17 and those of the gear 22 mesh, and in this case the notches 31 respectively engage the upper and lower edges of the openings 24, locking the locking members in their shifted positions, hence holding the teeth 17 of the rack frame in mesh with the teeth of the gear 22. After the rack frame reaches its uppermost position, the portion 38 (where the teeth 17 terminate) of the diagonally opposite lower portion of the rack frame will engage the teeth of the gear 22, so that the rack frame may be tilted in the opposite direction, and this will occur at the same time the abutment lug 39 at the lower portion of the rack frame will contact with the lower left-hand portion of the member 26, which will again tilt the locking member, whereby it may be shifted with the rack frame simultaneously, after which the foregoing operations will repeat.

From the foregoing it is to be noted

that the pump rod of a conventional form of pump is given a reciprocating motion exceedingly rapid so that the water may be rapidly lifted in the pump to insure a continuous flow from the pump spout. This reciprocating motion to the pump rod is created through the medium of the reciprocating rack frames, which receive power from the revoluble driven shaft 7. The pivotal connection 19 is designed to be fairly loose, to permit of the requisite oscillation of the rack.

While it has been stated that Fig. 3 is a sectional view on line 3—3 of Fig. 2, it is to be noted that the construction is slightly modified. For instance, there are adjustable, or rather movable abutments 36<sup>a</sup> mounted on the sides of the rack frames 14 and 15. These abutments are provided with teeth 36<sup>b</sup> to engage the teeth of the sides of the rack frames 14 and 15, there being integral bolts 36<sup>c</sup> formed on the abutments and designed to be engaged by the nuts 36<sup>d</sup>, that is after the bolts are inserted through any two of the openings 36<sup>e</sup>, whereby the abutments may be secured adjustably to the sides of the rack frames 14 and 15.

These abutments are designed to be utilized in lieu of the portions 36 and 38, which act as shoulders, for the purpose of being engaged by the gears 22, in order that the rack frame may be shifted, to disengage the teeth on one side from the gear 22, and cause engagement of the teeth of the opposite side with the gear 22. It is to be noted that these abutments can be positioned on the rack frame, so as to limit the rack frame in its stroke in either direction. Also in Fig. 3, the abutment arms 37 and 39 are capable of adjustment, since they are provided with integral shanks 37<sup>a</sup> and 39<sup>a</sup> to enter the openings 37<sup>b</sup> and 39<sup>b</sup>. Suitable nuts are applied to the shanks 37<sup>a</sup> and 39<sup>a</sup>, so as to hold the shanks in place, and also to prevent displacement of the abutments. It is necessary to apply the abutments 37 and 39 adjustably on the frame, when the abutments 36<sup>a</sup> are employed, so that when the frame is limited in its stroke in either direction, other than only using the abutments 36 and 38, the abutments 37 and 39 may be in position to tilt the rack frame locking members 26, according to the limited stroke of the frame. It is to be observed that the rollers 29 are yieldably mounted, so as to permit the members 26 to tilt, and yet keep the rollers in constant contact with the frames 14 and 15. This yieldable mounting is accomplished by means of the springs 29<sup>a</sup>.

The invention having been set forth, what is claimed as new and useful is:

1. The combination with a pump provided with a reciprocating pump rod, of a driven shaft revoluble in one direction only and provided with a gear, a supporting frame

for said shaft, a rack frame mounted in the supporting frame and having opposite sets of gear teeth, one set meshing with the gear when the rack frame moves in one direction, the other set meshing with the gear when the frame is moving in the opposite direction, means at diagonally opposite ends of the rack frame cooperating with the gear to tilt the rack frame, a locking member mounted in openings of the supporting frame and having interlocking connections with the sides of said openings, said locking member having means between which the rack frame engages to guide the rack frame and being shiftable with the rack frame, spring means for holding the locking member inter-locked with the sides of the said openings, means at each end of the rack frame to engage the guiding means of the locking member to tilt it at the end of each stroke of the rack frame to disengage the interlocking connections.

2. The combination with a pump provided with a reciprocating pump rod, of a supporting frame having guides and provided with openings, a driven shaft mounted in said frame and revoluble in one direction only, a rack frame mounted in said guides and having opposite sets of gear teeth, one set meshing with the gear when the rack frame moves in one direction, the other set meshing with the gear when the rack frame moves in the opposite direction, means at diagonally opposite ends of the rack frame cooperating with the gear to tilt the rack frame, said supporting frame having openings, a locking member mounted in said openings of the supporting frame, interlocking connections between the locking member and the sides of said openings, said locking member having yieldable anti-frictional members between which the rack frame engages to guide the rack frame, said locking member being shiftable with the rack frame, spring

means for holding the locking member inter-locked with the sides of the openings, means at each end of the rack frame to engage the guiding means and the locking member to tilt the member at the end of each stroke of the rack frame to disengage the interlocking connections.

3. The combination with a pump provided with a reciprocating pump rod, of a supporting frame having openings and provided with guides, a driven shaft mounted in bearings of the supporting frame and being revoluble in one direction only and provided with a gear, a rack frame in the guides of the supporting frame, and having opposite sets of gear teeth, one meshing with the gear when the rack frame moves in one direction, the other set meshing with the gear when the rack frame is moving in the opposite direction, means at diagonally opposite ends of the rack frame cooperating with the gear to tilt the rack frame, a locking member shiftable in said openings and provided with notches and having yieldable guiding means between which the rack frame is guided, and whereby the rack frame may shift with the locking member, spring means connected to the locking member for holding one or the other of said notches in engagement with the edge of one of said openings, whereby either set of rack teeth may be held in mesh with the gear, means at each end of the rack frame to coact with the yieldable guide means of the locking member, to tilt said member at the end of each stroke of the rack frame, to disengage either of the notches from the edge of one of said openings.

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

GEORGE W. BOYD.

Witnesses:

W. C. FRETS,  
J. E. WEST.