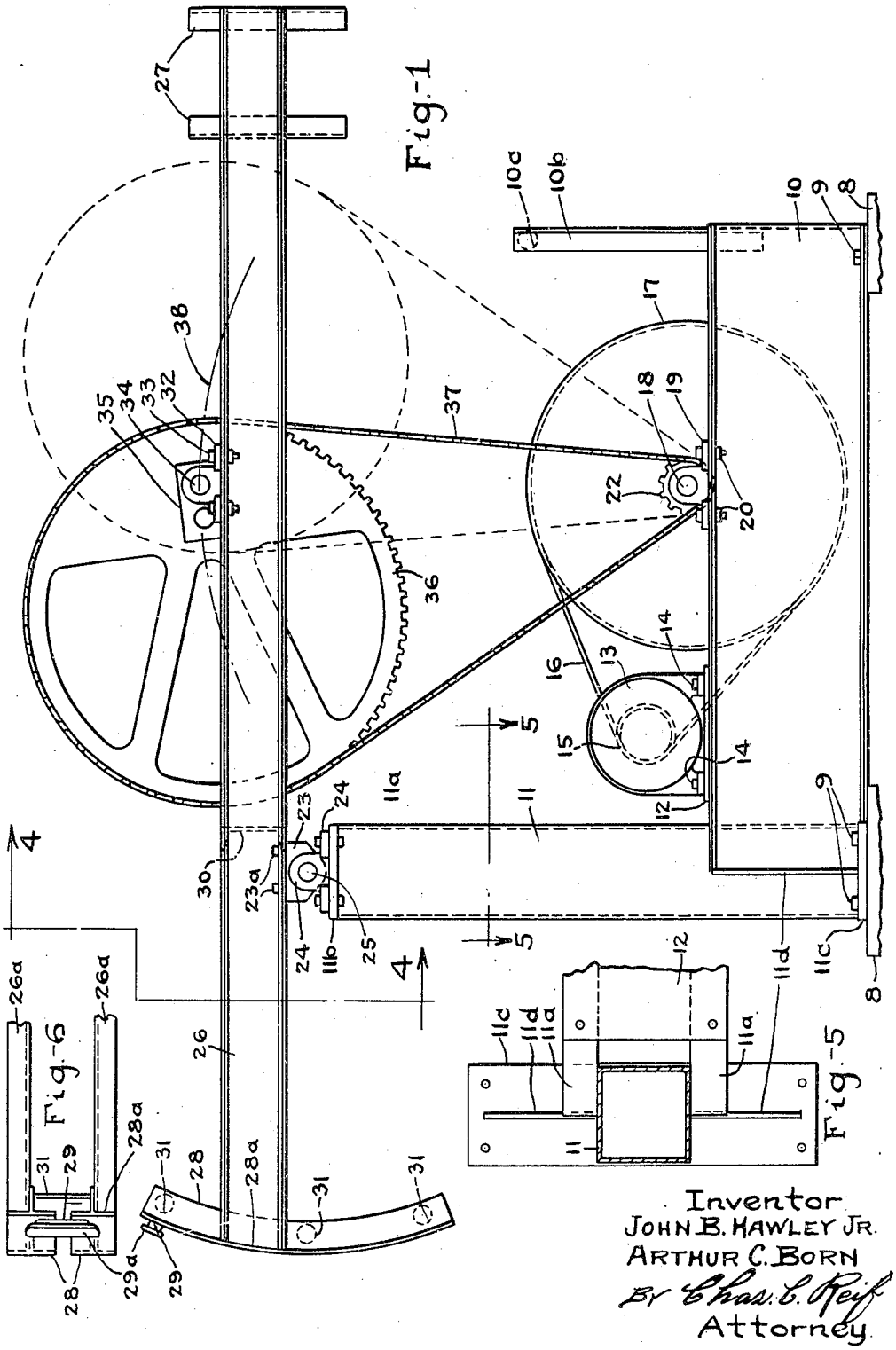
Nov. 15, 1949 J. B. HAWLEY, JR., ET AL 2,488,124

PUMP JACK

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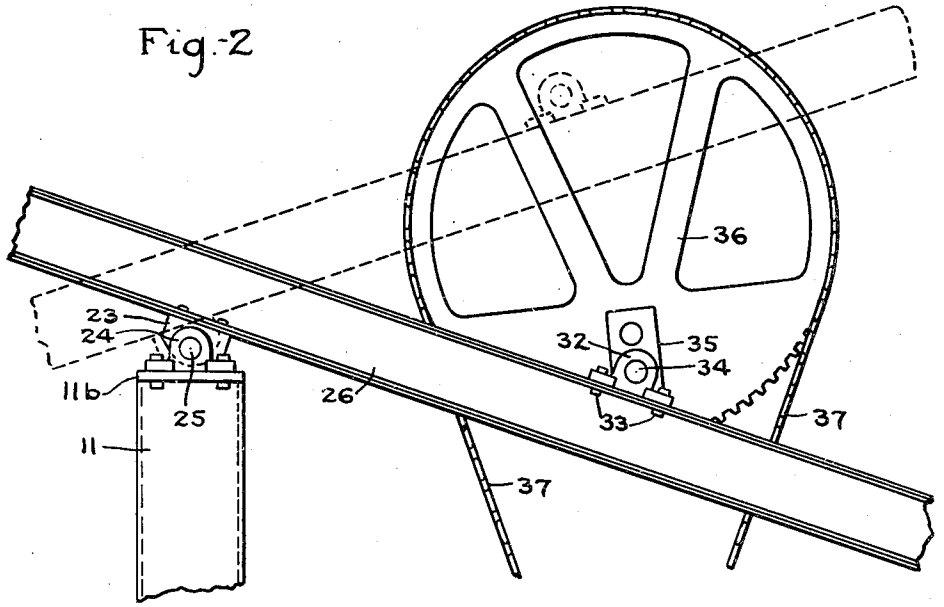
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Fig.-2



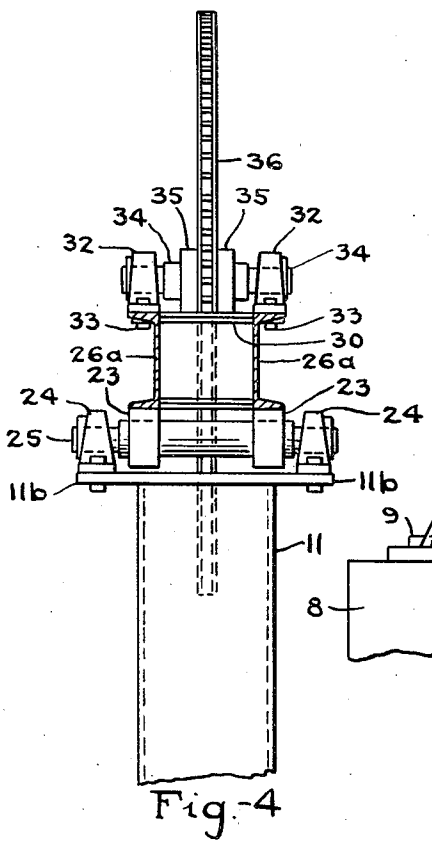


Fig.-4

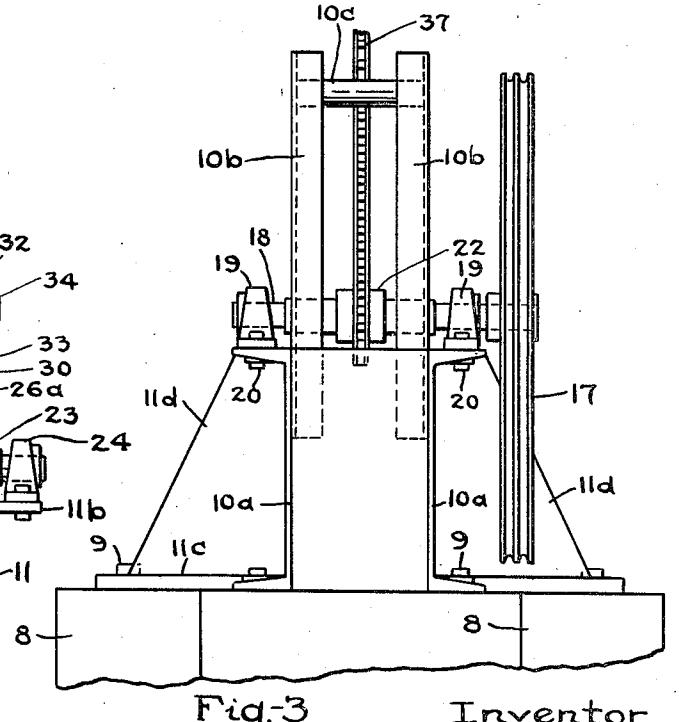


Fig.-3

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PUMP JACK

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4 Claims. (Cl. 74—41)

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This invention relates to a pump jack, and while the invention is applicable to a pump jack for various kinds of pumps, it particularly is designed as a pump jack for an oil well.

It is an object of this invention to provide a very simple and efficient structure of pump jack comprising an oscillating member or beam adapted to be connected at one end to the pump.

It is a further object of the invention to provide a pump jack comprising a beam mounted for oscillation in a substantially vertical plane, an eccentric member mounted for rotation on said beam, a driving member below said beam rotatable about a fixed axis, and means connecting said driving member and eccentric member for rotating the latter and maintaining their axes of rotation a fixed distance apart.

It is more specifically an object of the invention to provide a pump jack comprising an upright support, a beam pivoted at the top of said support, said beam having a weighted end, an eccentric sprocket mounted for rotation on said beam about an axis at the side of said support opposite said weighted end, a base member, a driving sprocket mounted on said base member for rotation about a fixed axis and a chain running over said sprockets whereby rotation of said eccentric sprocket will oscillate said beam.

These and other objects and advantages of the invention will be fully set forth in the following description made in connection with the accompanying drawings in which like reference characters refer to similar parts throughout the several views and in which:

Fig. 1 is a view in side elevation of the device;

Fig. 2 is a partial view similar to Fig. 1 showing the parts in different positions, the position of some parts being indicated in dotted lines;

Fig. 3 is a view in end elevation as seen from the right of Fig. 1;

Fig. 4 is a partial vertical section taken on line 4—4 of Fig. 1;

Fig. 5 is a horizontal section taken on line 5—5 of Fig. 1; and

Fig. 6 is a partial top view of the part shown in Fig. 1.

Referring to the drawings, a pump jack is shown comprising a base member 10. While member 10 could be variously formed, in the embodiment of the invention illustrated it is shown as comprising spaced channels 10*a* having their flanges directed away from each other. An upright support 11 is disposed at one end of base member 10, the same comprising plates arranged in rectangular relation and secured together, the same being secured at their tops and bottoms to plates 11*b* and 11*c* respectively. Vertical plates 11*d* extend from plate 11*c* upwardly to the tops of channels 10*a* at the end thereof adjacent support 11 and said channels 10*a* extend along the sides of support 11 and may be secured thereto in any suitable manner. Plate 11*c* and base member 10 are secured to suitable foundations 8 by bolts 9. Angle members 10*b* are secured respectively to the inner sides of channels 10*a* at one end thereof in any suitable manner, as by welding, and project upwardly some distance above base member 10. A rod 10*c* extends between angle members 10*b* adjacent their upper ends. A plate 12 extends across the tops of channels 10*a* adjacent upright 11 and a motor 13 is secured to plate 12 in any suitable manner, as by bolts 14 extending through flanges on said motor and through plate 12 and the flanges of channel members 10*a*. A pulley 15 is mounted on the driving shaft of motor 13 and a belt or belts 16 run over pulley 15 and a larger pulley 17 secured to a shaft 18 journaled in bearings 19 secured to the tops of channel members 10*a* in any suitable manner, as by the headed and nutted bolts 20. A driving sprocket 22 is connected to shaft 18 between bearings 19 and said sprocket is mounted for rotation about the axis of shaft 18 which is a fixed axis.

Bearings 24 are mounted on plate 11*b* adjacent the ends thereof and a shaft 25 is mounted for oscillation in bearings 24. A beam 26 is provided, and while this could take various forms, in the embodiment of the invention illustrated, it is shown as formed by a pair of channels 26*a* having their flanges facing away from each other. Bearings 23 are secured to the bottoms of channels 26*a* in any suitable manner, as by bolts 23*a*. Shaft 25 passes through the bores in bearings 23. Beam 26 is thus mounted for oscillation about the axis of shaft 25. Channels 26*a* are connected adjacent one end by spaced channels 27 which extend vertically between channels 26*a* and have their flanges contacting the webs of channels 26*a*. Channels 27 extend at right angles to channels 26*a* and some distance at either side thereof. A channel 30 extends between and is secured to the adjacent sides of channels 26*a* adjacent bearings 23. At the end of beam 26 opposite members 27, T-shaped members 28 of arcuate form are secured, the same having the central webs thereof extending along the inner adjacent sides of channels 26*a* and one of their flanges 28*a* extending across the ends of channels 26*a*. A plate 29 extends between

and is secured to the outer sides of members 28, the same having a projecting flange 29a at its outer side. Spaced rods 31 extend between the central portions of members 28 above and below beam 26. A pair of bearings 32 are secured respectively to the top flanges of channels 26a in any suitable manner, as by the headed and nutted bolts 33. A shaft 34 is journaled in bearings 32 and extends between channels 26a, the same having journaled thereon a block 35 secured to and forming part of a large sprocket 36. Block 35 has two holes through either of which shaft 34 may pass. A chain 37 runs over sprocket 36 and over driving sprocket 22. The usual pump rod (not shown) will be attached to members 28.

In operation the end of the beam 26 having members 27 thereon will be weighted. Motor 13 will be driven and this through pulley 15 and belt 16 will drive pulley 17 and shaft 18. Sprocket 22 will thus be driven and this will cause chain 27 to travel over sprocket 22 and sprocket 36 so that the latter will be rotated. The center of shaft 34 is offset quite a distance from the center of sprocket 36 so that sprocket 36 forms an eccentric. As sprocket 36 rotates therefore and since the chain 37 is of constant length and maintains the center of sprocket 36, a constant distance from the center of sprocket 22, the rotation of sprocket 36 causes the portion of beam 26 at the right of upright 11, as seen in Fig. 1, to descend. This raises the end of the beam having members 28 thereon so that the pump rod is raised. Upon the rotation of sprocket 36 through the other half of its revolution, the end of beam 26 at the left of upright 11 will descend by gravity. Beam 26 is thus oscillated and the pumping operation effected. The necessary connections to the pump can be made from members 28 and adjacent parts. Members 27 form convenient means for attaching counter-weights if these are desired. Members 10b and 10c form guards. The center of sprocket 36 moves in an arc defined by line 38.

From the above description it will be seen that we have provided a very simple and efficient pump jack. The mechanism for oscillating beam 26 is exceedingly simple and yet the same is very effective and efficient. The degree of oscillation of beam 26 can be varied by having shaft 34 extend through the different holes in block 35. The device has been amply demonstrated in actual practice, found to be very successful and efficient and is being commercially made.

It will of course be understood that various changes may be made in the form, details, arrangement and proportions of the parts, without departing from the scope of applicant's invention, which generally stated, consists in a device capable of carrying out the objects above set forth, in the parts and combinations of parts disclosed and defined in the appended claims.

What is claimed is:

1. A pump jack having in combination, an upright support, a pivot at the top of said support, a beam connected to said pivot for oscillation in substantially a vertical plane, means at one end of said beam for supporting counterweights, means at the other end of said beam for connection to a pump, a bearing on said beam at one side of said support, and substantially midway between said pivot and said first mentioned means, a circular sprocket eccentrically mounted for rotation in said bearing, a base member, a rotatable driving member mounted in said base member for rotation about a fixed axis, and means for rotating said sprocket from said driving member and maintaining the axes of rotation of said driving member and sprocket a fixed distance apart.

2. A pump jack having in combination, a base member formed of spaced parallel members, a post substantially square in cross section fitted between and secured between said members at one end thereof, and having a transversely extending base flange the bottom of which is flush with the bottom of said base member, plates disposed in a vertical plane and disposed at opposite sides of said members respectively, said plates extending upwardly from said flange to the tops of said members respectively, and secured to said flange and member, a bearing secured to the top of said post, a pivot shaft in said bearing extending transversely of said base member, a bracket journaled on said pivot member, a beam formed of parallel side members to the bottom of which said bracket is connected to connect said beam to said post for oscillation in a vertical plane, arcuate angle plates at one end of said beam beyond said post adapted to be connected to a pump rod, means at the other end of said beam for supporting counterweights, bearings on said beams substantially midway between said post and said latter end, a shaft in said last mentioned bearings extending transversely of said beam, a circular sprocket journaled eccentrically on said last mentioned shaft and disposed centrally between the side members of said beam, bearings on said base member, a third shaft extending between said last mentioned bearings, a sprocket mounted on said third shaft disposed centrally of said parallel members, a chain running over said sprockets, a pulley on said third shaft, a motor mounted on said base spaced horizontally from said third shaft, a pulley on said motor and a belt running over said pulleys.

3. A pump jack having in combination, a base member formed of spaced oppositely disposed parallel channels, a hollow post substantially square in cross section and of plate construction disposed at one end of said base, the same fitting between and extending partway between the webs of said channels, said post having a base extending transversely of said channels at its bottom, the bottom of said flange being flush with the bottoms of said channels, a plate at each side of said post secured to said flange extending vertically and engaging the end of one of said channels, said plates being secured to said base, post and the ends of said channels, a bearing secured to the top of said post, a shaft journaled in said bearing, a beam comprising spaced oppositely directed channels with their flanges projecting away from each other, brackets secured to the bottom of said beam at each side thereof through which said shaft passes so that said beam is swingable on said shaft, means at one end of said beam adapted to have a pump rod secured thereto, means at the other end of said beam for holding counterweights, a bearing on the top of each of said channels of said beam between said shaft and said last mentioned means, a second shaft journaled in said bearings, a sprocket having a hub disposed eccentrically thereon and bored to receive said last mentioned shaft, said sprocket being rotatable about the axis of said second shaft, bearing brackets on the top of each of said base channels, a third shaft journaled in said brackets, a sprocket secured to said last mentioned shaft, a chain running over said sprockets,

a pulley secured to said last mentioned shaft at one side of said base, a motor secured on said base between said post and said last mentioned shaft, a pulley on said motor and a belt running over said pulleys whereby rotation of said last mentioned sprocket by said motor will rotate said first mentioned sprocket and oscillate said beam.

4. A pump jack having in combination, a base comprising laterally spaced longitudinally extending parallel members, a post secured to and upstanding at one end of said base, a plate at the top of said post, spaced bearings secured to said plate, a substantially horizontal shaft journaled in said bearing, a beam comprising longitudinally extending spaced members connected together, bearings secured to the bottoms of said last mentioned members respectively through which said shaft passes whereby said beam is pivoted to said post about a substantially horizontal axis, means at one end of said beam for supporting counterweights, transversely alined bearings secured respectively to the tops of said last mentioned members between said shaft and said last mentioned means, a second shaft extending through said last mentioned bearings, a sprocket having an eccentric hub through which said second shaft passes and to which it is secured, said

sprocket being disposed between said last mentioned members and movable therebetween, bearings secured to the tops of said base members respectively, a third shaft journaled in said last mentioned bearings, a sprocket secured to said shaft between said base members and in line with said first mentioned sprocket, a chain running over said sprockets, a motor supported on said base, means for driving said third shaft from said motor, and means at the other end of said beam adapted to be connected to a pump rod whereby a compact jack is provided and said chain is substantially at the transverse center of said base and beam.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,592,391	Stevenson	July 13, 1926
1,758,730	Winters	May 13, 1930
2,049,315	Patterson	July 28, 1936