W. L. DAYTON.

PUMP JACK.

APPLICATION FILED MAR. 20, 1918.

1,309,842.

Patented July 15, 1919.

2 SHEETS—SHEET 1.

FIG. 1.

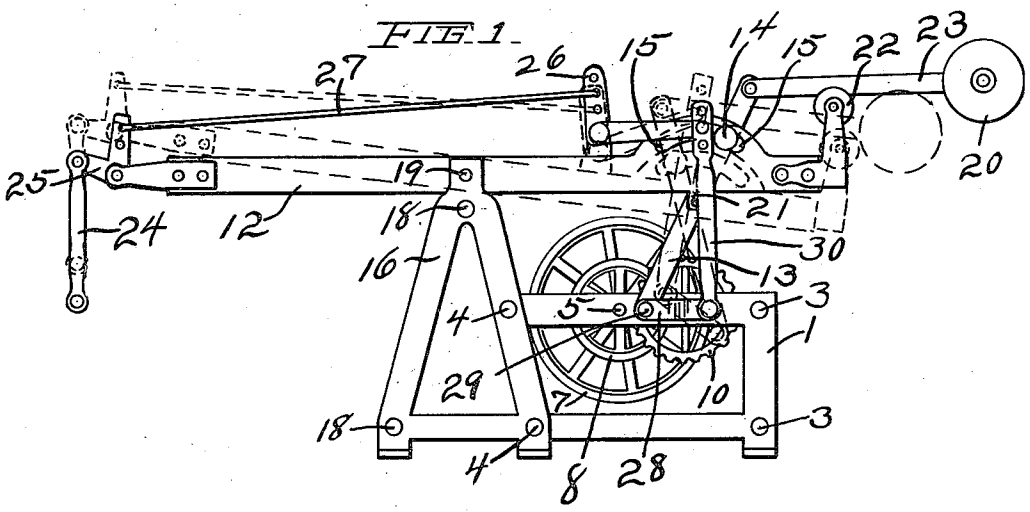
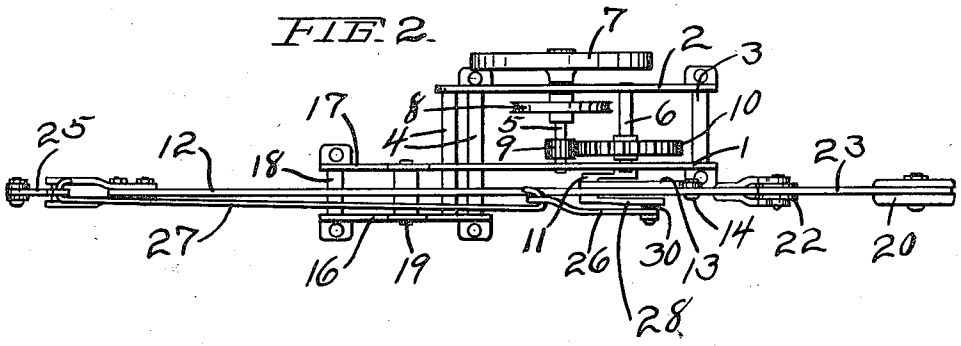


FIG. 2.



Inventor

William L. Dayton

By A. L. Jackson

Attorney

W. L. DAYTON.

PUMP JACK.

APPLICATION FILED MAR. 20, 1918.

1,309,842.

Patented July 15, 1919.

2 SHEETS—SHEET 2.

FIG. 3.

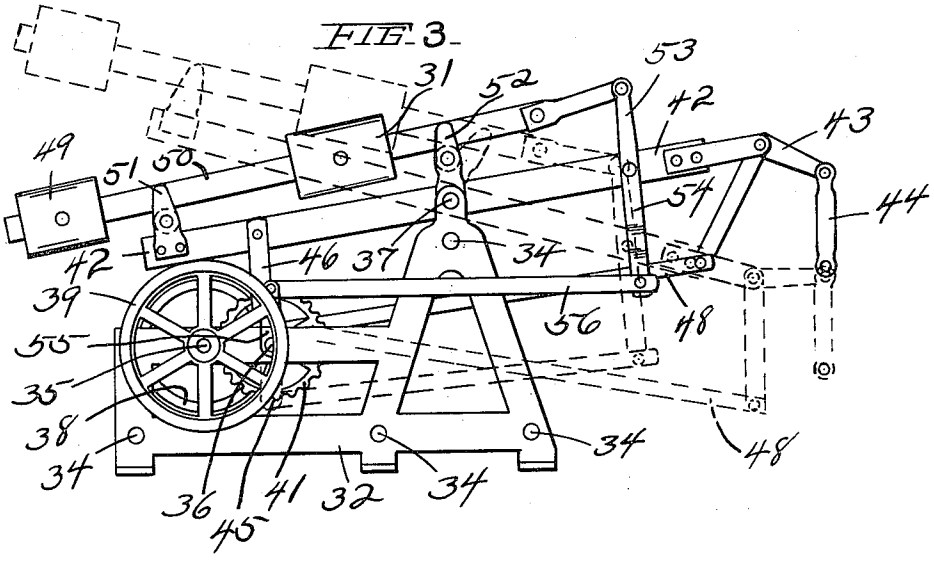


FIG. 4.

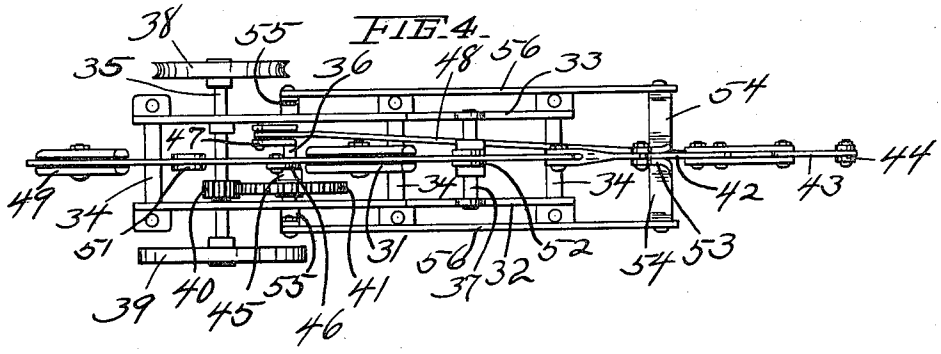
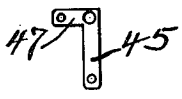


FIG. 5.



Inventor

William D. Dayton

By A. D. Jackson

Attorney

UNITED STATES PATENT OFFICE.

WILLIAM L. DAYTON, OF FORT WORTH, TEXAS, ASSIGNOR TO GRAVITY PUMP AND POWER CO., OF FORT WORTH, TEXAS.

PUMP-JACK.

1,309,842. Specification of Letters Patent. Patented July 15, 1919.

Application filed March 20, 1918. Serial No. 223,482.

To all whom it may concern:

Be it known that I, WILLIAM L. DAYTON, a citizen of the United States of America, residing at Fort Worth, in the county of Tarrant and State of Texas, have invented certain new and useful Improvements in Pump-Jacks, of which the following is a specification.

My invention relates to pump jacks and more particularly to means for aiding the power mechanism of pump jacks; and the object is to provide simple gravity actuated devices for aiding the driving or actuating mechanism of the pump jacks so that less power will be required and so that the pump jack will operate with less jerking and work more evenly. One object is to provide means for automatically shifting a coöperating weight so that the weight will aid the pump jack on the upstroke of the pump jack for lifting the load and then to shift the weight on the down stroke so that the weight will not retard or hinder the downstroke. Other objects and advantages will be fully explained in the following description and the invention will be more particularly pointed out in the claims.

Reference is had to the accompanying drawings which form a part of this application.

Figure 1 is a side elevation of the pump jack. Fig. 2 is a plan view of the same. Fig. 3 is a side elevation of a pump jack which is a variation from the pump jack previously shown. Fig. 4 is a plan view of the pump jack shown in Fig. 3. Fig. 5 is a detail view of the cranks 45 and 47.

Similar characters of reference are used to indicate the same parts throughout the several views.

The pump jack is provided with a main frame composed of parts or members 1 and 2 which are duplicates in construction and these frame members are connected by bars 3—3 and 4—4 and by the shafts 5 and 6. A balance wheel is mounted on the power shaft 5 and a power wheel 8 is mounted on the shaft 5. A pinion 9 is mounted on shaft 5 and meshes with and drives a cog wheel 10 which drives shaft 6. A crank 11 is rigid with shaft 6. The crank 6 is the main actuating element of the pump jack. The machine is provided with a walking beam 12 which is actuated from the crank 11 by means of a lever-pitman 13 which is pivotally connected to the crank 11 and connected to the walking beam by a pivot bolt 14 which has a sliding engagement with the walking beam 12, the walking beam having a curved slot 15 which permits movement of the walking beam 12 and the lever-pitman 14 relative to each other. The walking beam 12 is fulcrumed in a frame which is in part an extension of the main frame and will be referred to as the fulcrum frame and this frame is composed of a frame member 16 which is connected to the cross bars 4—4 and a frame member 17 one side of which is integral with the frame member 1. The fulcrum frame is braced by the cross bars 4—4 and by cross bars 18 and by the fulcrum bar 19. The object in extending the pitman rod 13 above the walking beam 12 is to move a weight 20 which aids the driving power mechanism. The full line illustration in Fig. 1 shows the weight 20 near the extreme limit of its movement. The pitman-lever 13 is pivotally connected to the walking beam at 21 and the bolt 14 serves as a guide to keep the lever or pitman 13 and walking beam in proper working relation, that is, parallel to each other. The arm 23 which carries the weight 20 is pivotally connected to the pitman-lever 13 and runs over an idler 22 which is mounted on the power end of the walking beam 12. The weight 20 can be moved toward and from the fulcrum 19 of the walking beam 12 by means of the crank 11 and the pitman lever 13 for cooperating with driving power mechanism, but means are provided for automatically shifting the weight 20 by the weight of the sucker rod and the sucker rod connection 24 so that the driving power mechanism will be relieved of that function. A bell crank lever 25 is fulcrumed on the work end of the walking beam 12 and a bell crank lever 26 is fulcrumed on the walking beam 12 between its power end and its fulcrum 19. A link bar 27 is pivotally connected to the levers 25 and 26. A crank 28 is rigidly connected with the crank 11. A pitman bar 30 is pivotally connected to crank 28 and to the lever 26. The mechanism is so timed that the weight 20 is at the highest point and farthest away from the fulcrum 19 when the sucker rod is at its lowest point and when the work end of the walking beam

reaches its highest point, the weight 20 soon begins to move away from the fulcrum 19 and moves on outwardly and upwardly as the work end of the walking beam carries the sucker rod down. As the work end pulls the sucker rod upwardly, the weight 20 is moving toward the fulcrum 19 and moving downwardly at the same time.

The variation shown in Figs. 3 and 4 include an additional weight 31 and certain variations in the means for shifting the weights. There is a slight variation in the frame also. The form shown in Figs. 3 and 4 has two frame members 32 and 33 which are braced to each other by cross bars 34. The frame members 32 and 33 will also be braced to some extent by the power shaft 35, and by the fulcrum bar 37. A power wheel 38 and a balance wheel 39 are rigid with shaft 35. A pinion 40 is rigid with shaft 35 and meshes with and drives a cog wheel 41 which drives the shaft 36. A walking beam 42 is fulcrumed in the frame members 32 and 33 by means of a fulcrum bar 37. A bell crank lever 43 is fulcrumed on the beam 42 and a sucker rod 44 is pivotally connected to the lever 43. The beam 42 is actuated by a pitman bar 46 and a crank 45, the latter being rigid with shaft 36, the shaft 36 being composed of two stub shafts and the crank 45 being in two parts, one part connected to one of the stub shafts and the other part being connected to the other stub shaft. The bell crank lever 43 coöperates with the walking beam 42 in operating the sucker rod, and means are provided for actuating the lever 43. A crank 47 is rigid with the shaft 36 and is pivotally connected to a link bar 48 which is pivotally connected to the bell crank lever 43. One part of the crank 45 and one part of the crank 47 are integral with each other. Two weights 31 and 49 coöperate with the walking beam 42 for actuating the sucker rod. These weights are shiftable by means of a bar 50 which is slidably mounted in bearings 51 and 52 which are rigid with the beam 42. A lever 53 is fulcrumed on the walking beam 42 and is pivotally connected to the bar 50. The lower end of the lever 53 has two arms 54. Cranks 55 are rigid with the stub shafts 36 and are pivotally connected to link bars 56 which are pivotally connected to the arms 54. By the means thus described the weights 31 and 49 are shifted to the farthest point from the fulcrum 37 just as the walking beam 42 starts to pull the sucker rod 44 upwardly and to shift the weights toward the fulcrum 37 on the downstroke of the sucker rod connection 44. The weights are automatically shifted to increase the working power of the walking beam 42.

What I claim, is,—

1. A pump jack comprising a frame, a walking beam fulcrumed on said frame, a power wheel provided with a shaft journaled in said frame, a lever fulcrumed on said walking beam, a shiftable weight connected to one end of said lever, and operative connections for the other end of said lever with said shaft for actuating said walking beam and said weight.

2. A pump jack comprising a frame, a walking beam fulcrumed on said frame, a power wheel provided with a shaft journaled in said frame, a lever fulcrumed on said walking beam, a shiftable weight connected to one end of said lever and guiding connection of said lever with said walking beam to hold the lever and the walking beam in operative relation, and operative connections for the other end of said lever with said shaft for actuating said walking beam and weight.

3. A pump jack comprising a frame, a walking beam fulcrumed on said frame, a power wheel provided with a power shaft journaled in said frame, a crank shaft journaled in said frame and gearing for driving said crank shaft from said power shaft, a lever fulcrumed on said walking beam and having one end operatively connected to said crank shaft, and a shiftable weight provided with an antifriction bearing mounted on said walking beam and operatively connected to the other end of said lever.

4. A pump jack comprising a frame, a walking beam fulcrumed on said frame, a power wheel provided with a power shaft journaled in said frame, a crank shaft journaled in said frame and gearing for driving said crank shaft from said power shaft, a lever fulcrumed on said walking beam and having one end operatively connected to said crank shaft, a shiftable weight provided with an antifriction bearing mounted on the power end of said walking beam and operatively connected to the other end of said lever, said walking beam having a curved slot therein, and a guiding connection of said lever with said walking beam moving in said slot.

5. A pump jack comprising a frame, a walking beam fulcrumed on said frame, a power wheel provided with a power shaft journaled in said frame, a lever fulcrumed on the power end of said walking beam and operatively connected with said power shaft, a shiftable weight provided with an antifriction bearing mounted on said walking beam, and a bell crank lever fulcrumed on the work end of said walking beam with one arm to be connected to a sucker rod and the other arm operatively connected to said shiftable weight.

6. A pump jack comprising a frame, a walking beam fulcrumed on said frame, a power wheel provided with a power shaft journaled in said frame, a crank shaft jour-

naled in said frame and gearing for driving said crank shaft from said power shaft, a bar pivotally connected to said walking beam and operatively connected to said crank shaft, a shiftable weight provided with antifriction bearings mounted on said walking beam and operatively connected with said crank shaft, and a bell crank shaft fulcrumed on the work end of said walking beam and operatively connected with said crank shaft.

In testimony whereof, I set my hand, this 21st day of January, 1918.

WILLIAM L. DAYTON.