Oct. 14, 1930. W. F. RESCHKE 1,778,228

PUMPING UNIT

Filed Oct. 15, 1928 2 Sheets-Sheet 1

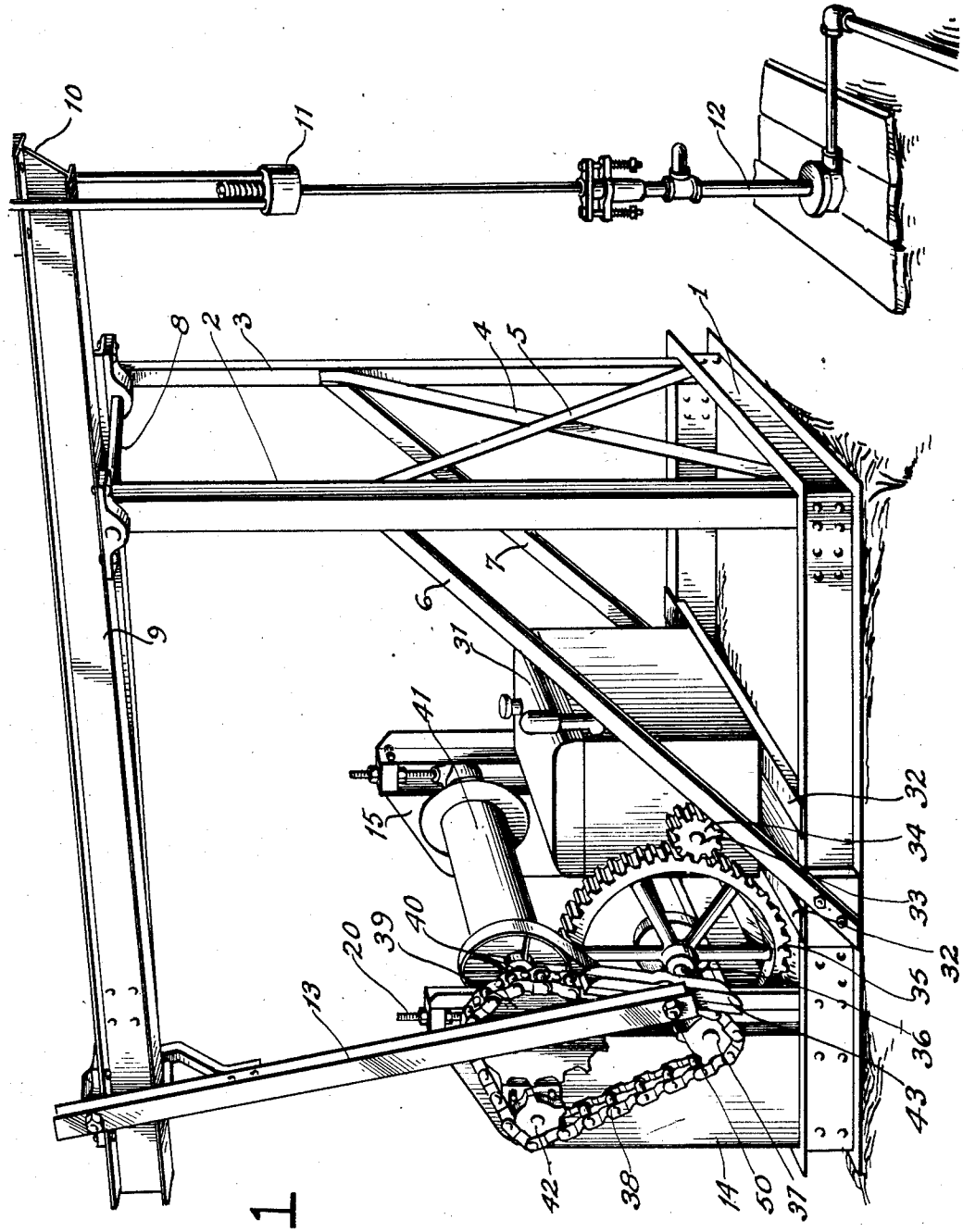



Fig. 1

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Filed Oct. 15, 1928 2 Sheets-Sheet 2

Fig 2

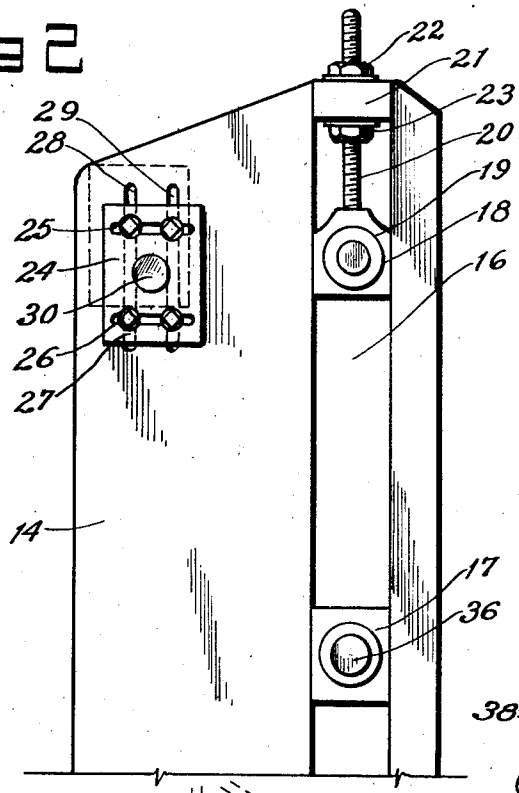



Fig 3

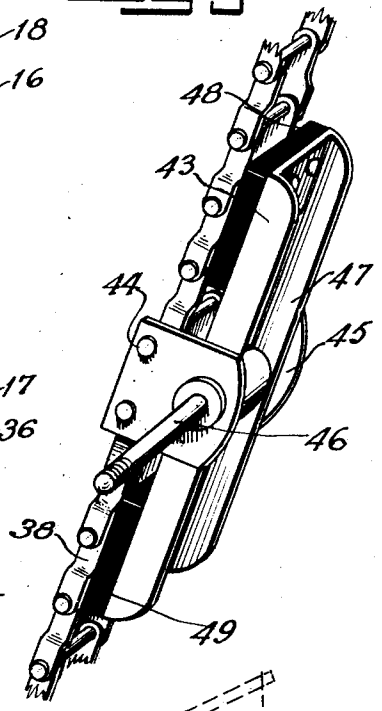
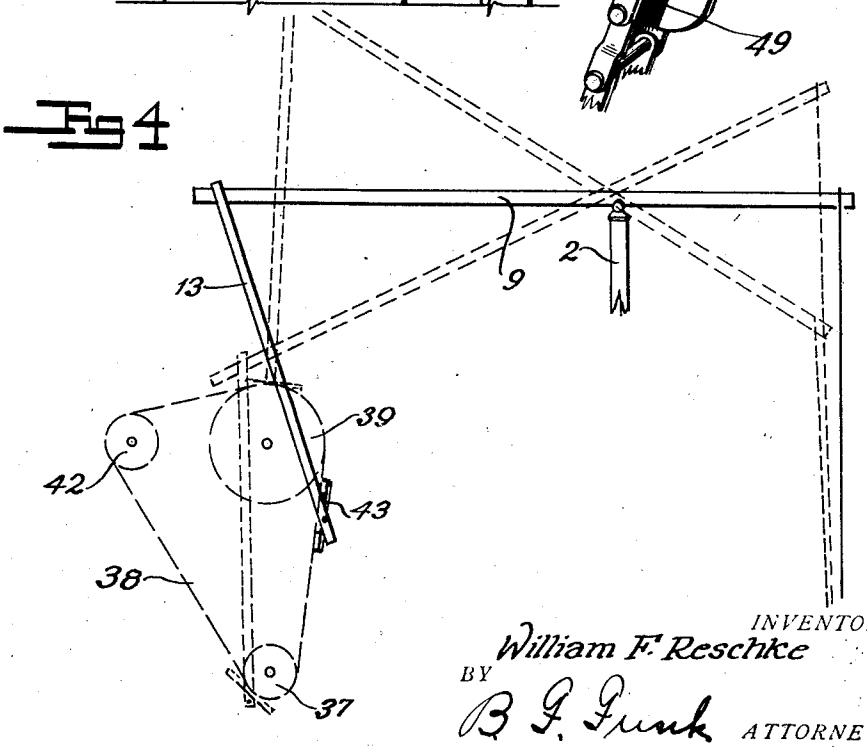



Fig 4




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# UNITED STATES PATENT OFFICE

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## PUMPING UNIT

Application October 15, 1928. Serial No. 312,454.

This invention relates to pumping jacks. The main purpose of the invention is to provide a pumping jack so constructed that it will have a relatively slow pick-up until the fluid begins to be lifted so that when the load comes on the sucker rods, they will not be subjected to undue strain or jar.

It is recognized in oil well practice that there is about one inch slack in the sucker rods for each one hundred feet of well depth. If the upward or lifting movement of the sucker rods is relatively rapid before the slack is taken out, it is obvious that when the load (that is the oil) starts to be lifted, the string of sucker rods will be subjected to very sudden severe tensional strains causing them to whip and break with the resultant loss due to shut-downs for repairs.

Provision is made for varying the amount of slow pick-up before the load starts to lift so that compensation may be made for wells of different lengths, this being desirable because the deeper the well, the greater the slack and it is desirable that as soon as the slack is taken out of the rods the lift becomes more rapid. I have also provided means for preventing thrust of the chain between two sprockets inward which has a tendency to cause the chain to become locked on one sprocket wheel or the other. The means is illustrated as consisting of a shoe or bar carried by the chain and to which the pitman is secured to take its power from the chain and sprocket mechanism and transfer it to the walking beam of the jack.

There are certain other novel features of the invention all of which will be specifically described hereinafter, reference being had to the accompanying drawings in which:—

Fig. 1 is a perspective view of a pumping jack constructed in accordance with my invention.

Fig. 2 is an elevational view of one of the standards and the adjustable bearings for the shafts of the jacks.

Fig. 3 is a perspective view of the shoe and part of the chain and

Fig. 4 is a diagrammatic view of the parts of the jack.

Referring now to the drawings by numerals of reference, 1 designates the base of a frame, at one end of which are two up-rights or standards 2 and 3 braced by the cross-braces 4 and 5 and by the diagonal braces 6 and 7. At the upper end of the posts 2 and 3 is a rock-shaft 8 constituting a pivot or fulcrum for the walking beam 9 to the toe 10 of which the usual sucker rod connections 11 are secured to pump the oil in the tubing 12. Near the rear end or heel of the walking beam 9 is a pitman 13. All of this mechanism is substantially old.

At the rear end of the base 1 are two up-rights or bearing supports 14 and 15. These are substantially duplicates so I will describe only one of them.

The member 14 is shown in detail in Figure 2. It consists of a heavy flat plate having a vertical slot 16 with a shaft bearing 17 near the lower end and an adjustable bearing 18 at its upper end. The adjustable bearing 18 is mounted in a sliding block 19, vertically adjustable by the screw 20 which passes through the fixed block 21 at the top of the slot 16. The block 19 is held rigid after it is adjusted by the nuts 22 and 23. To one side of the block 19 is a plate 24 having transverse slots 25 and 26 through which bolts 27 pass. These bolts also pass through vertical slots 28 and 29 in the member 14 so that the plate 24 can be adjusted both horizontally and vertically. The plate carries a stud shaft 30 on which may be mounted a sprocket to be referred to hereinafter.

As heretofore stated, the members 14 and 15 are alike except that the member 14 carries the plate 24 and the arrangement for adjusting it, whereas no similar plate is necessary for the member 15. The power unit is indicated at 31 on the boards 32, carried by base 1 and it may consist of a gas engine, electric motor or any other suitable prime mover. Its power shaft 33 carries a pinion gear 34 which meshes with the tooth gear 35 on shaft 36, mounted in the block 17, carried by the members 14 and 15. One end of the shaft 36 carries a sprocket 37 for driving the chain 38 which passes over the sprocket 39 on shaft 40, mounted in the bearings 18 in blocks 19, supported in the slots 16 of the

members 14 and 15. The shaft 40 also carries a reel or spool 41. On the stub shaft 30 is a sprocket 42 around which the chain 38 passes. Between certain links of the chain is a block 43 having two outstanding plates 44 and 45 through which a pin or shaft 46 passes at right angles to the line of travel of the chain. Between the plates 44 and 45 is mounted an elongated channel-shaped shoe or bar 47 having on its inner face rubber blocks 48 and 49 which contact with the links of the chain to act as sound deadening devices, it being apparent that the shoe rocks in the plates 44 and 45. The pin 46 passes through the pitman 13 and is secured thereto by a suitable nut 50. The sprockets 37, 39 and 42 are so co-related that the links of the chain pass in the path of an inverted triangle with the base of the triangle in a substantially vertical plane so that the distance between the bottom of sprocket 37 and the top of sprocket 39 is less on the front side than the distance on the rear side. Consequently, the up-stroke of the pitman will be relatively rapid until the pin 46 reaches the top of the sprocket 39 at which time the pin begins to move toward the sprocket 42 at a lesser angle, during which time the sucker rods begin to lift with a relatively slow motion, then as the pin rounds the sprocket 42 on its downward travel toward pinion 37, the motion is accelerated. The distance of travel from the top of sprocket 49 to the sprocket 42 will be adjusted through the medium of the blocks 19 and the plate 24 to compensate for the amount of slack in the sucker rods, it being estimated that there is one inch slack in each one hundred feet of sucker rods, so it will be seen that the amount of travel at relatively low speed will be varied according to the depth of the well and it will also be apparent that the jack will have a relatively long stroke, lifting more fluid at each stroke than is possible with the conventional type of walking beam. There is a material advantage in providing the long stroke because the fewer reciprocations of the sucker rods per minute, the less liability of the rods slipping or crystallizing so liability of shut-downs, due to broken rods, will be reduced below what is usually encountered where rapid short strokes are employed.

The shoe or bar 47 which is connected to the pitman 13 prevents twisting in the chain and it also prevents the chain from moving inward toward a plane passing through the axis of the sprockets 37 and 39. The main advantage of this is that it prevents the chain from locking on the teeth of the sprockets and insures easy withdrawal of the sprocket teeth from the links of the chain and since the chain cannot be twisted, a direct push and pull will be directed on the pitman so that it will not be subjected to twisting strains.

The spool or reel 41 may be used as a sand reel or for pulling casing, tubing, sucker rods and the like.

I have shown what at this time appears to be the best form of my invention, but I do not wish to be limited to the exact details of construction shown.

What I claim and desire to secure by Letters Patent is:—

1. A pumping jack comprising a prime mover, a chain and sprocket mechanism driven thereby, a shoe including an elongated bar carried by the chain and bearing against the links thereof, said shoe having a pivot and link engaging plates carried by the chain in which the pivot is mounted, the pivot having a pitman engaging end.

2. A device for preventing kinking of sprocket chains comprising two parallel plates, a pivot carried by the plates and an elongated shoe loosely mounted on the pivot, the elongated shoe having a face to bear against the links of the chain to prevent kinking thereof.

3. A pumping jack comprising a prime mover, a chain and sprocket mechanism driven thereby, a shoe including an elongated bar having ruber blocks on the inner face of the bar at the end thereof to bear against the chain links, side plates carried by the chain, a pivot passing through the side plates in spaced relation to the chain, the bar being supported by the pivot and a pitman engaging end on the pivot.

In testimony whereof I affix my signature

WILLIAM F. RESCHKE.